U.S. Army Garrison Alaska

Integrated Natural Resources Management Plan

2007 - 2011

Final March 30, 2007
Updated September 25, 2009

Sikes Act Road Map

The Sikes Act Road Map references the chapters and paragraphs in the Integrated Natural Resources Management Plan (INRMP) and is cross-referenced to the thirteen criteria points required by the Sikes Act. Stakeholders and interested parties can use the road map to quickly check the location and effectiveness of this INRMP in meeting Sikes Act requirements.

Required Sikes Act Criteria	Location in Integrated Natural Resources Management Plan
1. No net loss in the capability of military installation lands to support the military mission of the installation.	Chapter 1, Chapter 2 and throughout the Integrated Natural Resources Management Plan
2. Establishment of specific natural resource management goals and objectives and time frames for proposed action.	Annexes B, C, D, E, and F, and Prescriptions
3. Integration of, and consistency among, the various activities conducted under the plan.	Prescriptions
4. Fish and wildlife management, land management, forest management, and fish and wildlife oriented recreation.	Chapter 3, and Annexes B, C, and D
5. Fish and wildlife habitat enhancement or modification.	Chapter 3 and Annex D
6. Provisions for spending hunting and fishing permit fees exclusively for the protection, conservation, and management of fish and wildlife, including habitat improvement, and related activities in accordance with the INRMP.	Chapter 4 and Annexes A and D
7. Wetland protection, enhancement, and restoration, where necessary for support of fish and wildlife.	Chapter 3 and Annex B
8. Public access to the military installation that is necessary or appropriate for sustainable use of natural resources by the public to the extent that such use is consistent with the military mission and the needs of fish and wildlife resources, subject to requirements necessary to ensure safety and military security.	Chapter 3 and Annex E
9. Sustainable use by the public of natural resources to the extent such use is not inconsistent with the needs of fish and wildlife resources management.	Chapter 3 and Annex E
10. Enforcement of applicable natural resource laws and regulations.	Chapter 3 and Annex E
11. Exemption from procurement of services under Office of Management and Budget Circular A-76 and any of its successor circulars.	Chapter 4 and Annex A
12. Priority for contracts involving implementation of this INRMP to state and federal agencies having responsibility for conservation of fish and wildlife.	Chapter 4 and Annex A
13. Review of this INRMP and its effects every five years.	Chapter 4 and Annex A

This Integrated Natural Resources Management Plan
is dedicated to the memory of
Tony Payne

INTEGRATED NATURAL RESOURCES
MANAGEMENT PLAN
2007-2011

U.S. ARMY GARRISON ALASKA

APPROVAL

This Integrated Natural Resources Management Plan meets the requirement of the Sikes Act (16 U.S.C. 670a et seq.) as amended and provides a benefit to the species contained within this plan.

David L. Shutt
Colonel, U.S. Army
Commanding

27 Feb 07
Date

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MANAGEMENT PLAN
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U.S. ARMY GARRISON ALASKA

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Tom Melius
Regional Director
Region 7, U.S. Fish and Wildlife Service

March 30, 2007
Date

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MANAGEMENT PLAN
2007-2011

U.S. ARMY GARRISON ALASKA

APPROVAL

This Integrated Natural Resources Management Plan meets the requirement of the Sikes Act (16 U.S.C. 670a et seq.) as amended and provides a benefit to the species contained within this plan.

~~McKie Campbell~~ DENBY S. LLOYD
Commissioner
Alaska Department of Fish and Game

9 April 07
Date

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EXECUTIVE SUMMARY

Purpose

This Integrated Natural Resources Management Plan (INRMP) will guide implementation of the natural resources programs for U.S. Army Garrison Alaska (USAG-AK) lands from 2007 through 2011. The INRMP is designed to support the military mission, manage USAG-AK's natural resources and to ensure compliance with related environmental laws and regulations. The plan also ensures the maintenance of quality training land allowing for the U.S. Army Alaska to accomplish it critical military missions.

Scope

This plan applies to organizations internal and external to USAG-AK that are involved with or interested in the management and/or use of USAG-AK's land and natural resources for military and nonmilitary purposes. This plan applies to active duty units, National Guard and Reserve components, Installation Management Command garrisons, directorates, private groups, and individuals. This INRMP applies to all Army lands in Alaska managed by USAG-AK, including Fort Wainwright Main Post, Yukon Training Area, Tanana Flats Training Area, Donnelly Training Area, Gerstle River Training Area, Black Rapids and Whistler Creek Training Area, and Fort Richardson. This plan falls within the framework of the U.S. Army Alaska Range Development Plan and is an integral part of the USAG-AK's Master Plans and Range & Training Land Program Development Plans. This INRMP will provide guidelines for the natural resources management of USAG-AK during the next five years (2007-2011) and will provide a solid foundation from which to build and continue the program beyond 2011.

Relationship to the Military

U.S. Army Alaska provides combat training for Army Soldiers in Alaska. These Soldiers are among the most specialized military professionals in the world, and they train in some of the world's harshest environments. This INRMP supports the military mission by conserving, managing and enhancing training lands upon which the mission is critically dependent. It also highlights recreational opportunities associated with natural resources, thus supporting USAG-AK's commitment to both the Quality of Life and the Army Communities of Excellence programs. Impacts of military activities upon natural resources and means to mitigate these impacts are described in this plan. However, this Integrated Natural Resources Management Plan does not evaluate U.S. Army Alaska's military missions, nor does it replace any need for environmental documentation of those missions.

Environmental Compliance

This INRMP is required by the Sikes Act (16 U.S.C. 670a et seq.), Department of Defense Instruction 4715.3 (*Environmental Conservation Program*), and Army Regulation 200-3 (*Natural Resources - Land, Forest, and Wildlife Management*). This plan describes how USAG-AK will implement provisions of Army Regulation 200-3 and local regulations, most notably U.S. Army Alaska Regulation 190-13 *Enforcement of Hunting, Trapping and Fishing on Army Lands in Alaska* (U.S. Army Alaska 2006b) and U.S. Army Alaska Regulation 350-2 *Range Regulation* (U.S. Army Alaska 2002). This INRMP helps USAG-AK comply with other federal and state laws, most notably laws associated with environmental documentation, wetlands, endangered species, water quality, and wildlife management.

This INRMP has the signatory approval of the U.S. Fish and Wildlife Service to acknowledge its compliance with the Endangered Species Act and Migratory Bird Treaty Act. U.S. Fish and Wildlife

Service review of the INRMP is considered informal consultation with regard to the Endangered Species Act. This INRMP also has the signatory approval of the Alaska Department of Fish and Game as required by the Sikes Act. Department of Interior, Bureau of Land Management is also a signatory partner. This INRMP meets the Army requirements for an Integrated Wildland Fire Management Plan and Bureau of Land Management requirements for a Forest Management Plan, Outdoor Recreation Management Plan, and Habitat Management Plan for Public Law 106-65 withdrawn lands.

The National Environmental Policy Act (NEPA) requires federal agencies to consider the environmental consequences of proposed major federal actions. Installations are directed by 32 CFR Part 651 (Army Regulation 200-2, *Environmental Analysis of Army Actions*) and NEPA to integrate environmental analysis as much as practicable with other environmental reviews, laws, directives, and executive orders. Comments received from the public review of the 2002 -2006 Forts Richardson, Fort Wainwright, and Donnelly Training Area Integrated Natural Resources Management Plans indicated that the public would prefer future updated INRMPs and their associated NEPA analyses be kept as separate documents so it would be easier to review the NEPA analysis of the plans. USAG-AK thus has prepared a separate environmental document, *Environmental Assessment of the USAG-AK Integrated Natural Resources Management Plan (2007- 2011*), that provides a comprehensive description, analysis, and evaluation of all environmental components proposed within this document.

Ecosystem Status

Fort Wainwright

Fort Wainwright is subdivided into six major training areas: Main Post, Yukon Training Area, Tanana Flats Training Area, Donnelly Training Area, Gerstle River Training Area, and Black Rapids Training Area. Fort Wainwright has five vegetative types: moist tundra; treeless bogs; fens; open, low-growing spruce forests; and closed spruce-hardwood forests (Amji, personal communication 2006). The installation has a wide variety of flora and fauna, none of which are classified as threatened or endangered. There are approximately 509 vascular species (Buzby, personal communication 2006), 38 documented mammal species, 16 documented fish species, 158 documented bird species, and one species of amphibian – the wood frog (*Rana sylvatica*). There are no reptile species. Although the natural resources program affects many species, moose (*Alces alces*), ruffed grouse (*Bonasa umbellus*), and black bear (*Ursus americanus*) are the most intensively managed by the Alaska Department of Fish and Game.

The quality of both surface water and groundwater is assumed to be good, with the exception of localized pollution associated with past activities, mostly within the Main Post area. Due to this contamination, Fort Wainwright has been declared a “Superfund” site under the Comprehensive Environmental Response, Compensation, and Liability Act. There have been no indications of changes in the quality of surface water since Army occupation of the land. Trends in biological diversity are not documented, but there is no reason to suggest that Army activity on the land has adversely affected biological diversity. Effects of military use on soils are primarily evident in the Main Post area.

Fort Wainwright’s capability to support its current military mission is stable. The capability of the land to produce forest products has steadily improved since large-scale timber removal has not occurred and the forest is maturing, especially in areas where fires have been minimized. The post can clearly continue to support its small fuel wood and Christmas tree program. The capability of the ecosystem to support hunting, fishing, and trapping continues to be good. Fishing opportunities have increased in some areas due to stocking. Agriculture is not a viable option on Fort Wainwright.

Fort Richardson

Fort Richardson has six broad ecosystem types: alpine, sub-alpine, boreal forests, freshwater lakes and ponds, rivers and streams, and estuarine. The post supports a wide variety of plants and animals, and its relatively wild status is perhaps best characterized by the presence of a productive moose herd and wolf pack, the occasional wolverine and a healthy population of brown and black bears. There are over 561 species of vascular plants (Lichvar and Racine 1997), 46 mammals and 122 species of birds (Andres 2005) currently recorded on the post. Beluga whales utilize Eagle River and Eagle Bay on Fort Richardson over the course of the year. NMFS published a proposed rule on 20 April 2007 to list the Cook Inlet beluga whale as endangered under the ESA. The ruling was finalized on 22 October 2008 and took effect on 22 December 2008.

The quality of surface water on Fort Richardson is assumed to be very good. There are no indications of changes in the quality of surface water since Army occupation of the land. There is localized contamination of groundwater from past Army activities, mostly within the cantonment area. These areas of groundwater contamination, however, are not considered drinking water sources (drinking water on post comes from upper Ship Creek) and thus are not thought to affect human health.

The majority of Fort Richardson (63% of post) is classified as having a low or negligible erosion risk. Areas classified as having a medium (14% of post) to high (22% of post) erosion risk are located predominantly in the alpine training areas (Jorgenson et al. 2004). Currently, light training occurs in these high risk areas.

At the present time there are roughly 40,000 acres of native forests on Fort Richardson. Although some projects outlined in this INRMP will require removal of forest, this will be on a small scale. The forested areas of white spruce killed by the spruce bark beetle (*Dendroctonus rufipennis*) will regenerate. There are no immediate plans to develop commercial sales of timber or forest products because the market for these products is poor. The forest cover on Fort Richardson provides a superb natural setting and realistic stage for the Army's training mission.

The ability of the ecosystems on Fort Richardson to support hunting and fishing improved with the Army's occupation of the land. In 1958, the Army built a fish hatchery on Fort Richardson property. This hatchery, while still on Army land, is currently operated by the State of Alaska Department of Fish and Game. Together with the hatchery on nearby Elmendorf Air Force Base, the Fort Richardson hatchery supplies over half of Alaska's stocked fish. Agriculture is not an option on Fort Richardson, as two-thirds of the land is forested coastal plain, while the remaining third is steep mountain slopes and alpine tundra unsuitable for agricultural use.

The most negative effect of Army activities over the last 40 years has been the contamination of soils in the Eagle River Flats Impact Area with white phosphorus and the subsequent impacts on waterfowl. Mortality of waterfowl occurs after the birds ingest white phosphorus pellets mistaken for food. This area has been declared a "Superfund" site under the Comprehensive Environmental Response, Compensation, and Liability Act and is now undergoing cleanup. The capability of supporting the current and future training missions on Fort Richardson is highly dependent on the Command's ability to retain all remaining lands for their intended military training purposes.

Partnerships

This Integrated Natural Resources Management Plan (INRMP) cannot be implemented by USAG-AK alone. In accordance with land withdrawal legislation and the ecosystem management philosophy,

USAG-AK is forging partnerships with various agencies to manage its natural resources. Major partners in the implementation of this plan are the Bureau of Land Management, U.S. Fish and Wildlife Service, and the Alaska Department of Fish and Game. Other partners in this effort include the Alaska Department of Natural Resources, universities, other federal and state agencies, native groups, contractors, and private citizens.

Unresolved Issues

The Army Campaign Plan outlines transformation of Army forces worldwide. The International Global Positioning and Basing Strategy is moving Army units around the world. Two additional units have been stationed in Alaska during the last two years: the Infantry Brigade Combat Team (Airborne) and the Aviation Task Force. The potential is high that additional changes to the structure of Army forces in Alaska will occur, which can affect natural resources management.

The Base Realignment and Closure Commission also recommended changes to the military in Alaska. Fort Wainwright will be gaining units, while Eielson Air Force Base is realigning, and Kulis Air National Guard Base is slated to close. Assumption of Fort Richardson installation management responsibilities by Elmendorf Air Force Base may result in significant reorganization of the natural resource program. Currently, many natural resources personnel located at Fort Richardson have responsibilities for natural resource management on Fort Wainwright and Donnelly Training Area. If changes are significant, the INRMP may need to be revised to reflect organizational changes.

Another unresolved issue is the determination of what military operational activities have exemption status for the incidental "taking" of migratory birds as authorized under the 2003 National Defense Authorization Act, which amended the Migratory Bird Treaty Act. The Authorization Act requires the Department of the Interior to promulgate regulations to exempt the Armed Forces for the incidental taking of migratory birds during military readiness activities. The Final Rule, anticipated to be released in late 2006, is expected to clarify which (if any) natural resource management, range management, or construction activities affecting migratory birds might be exempted.

The U.S. Army is developing a new environmental funding process, no longer based on compliance but rather focused on sustainability. At this time there is no effective way of communicating new natural resource requirements to the Army for funding. While the INRMP is always "subject to the availability of funding" as required by the Anti-Deficiency Act, the likelihood that the projects contained in this plan will be funded is lower than in previous years. The ongoing global war on terrorism has significantly impacted the Army's ability to maintain its resources, including natural resources in the United States.

Plan Components

This document guides the natural resources management program at USAG-AK. It outlines goals, objectives and policies in five general areas: stewardship, military readiness, quality of life, compliance, and program integration. It explains the U.S. Army Alaska military missions in general terms, including the missions' impacts on natural resources. It describes USAG-AK's climate, land base, facilities, and natural resources, including a brief legal and administrative history of natural resources management on USAG-AK lands. The plan also lists agencies, organizations, and individuals involved in the implementation of this INRMP.

This plan is organized to promote integrated management of mission and natural resources. Volume I contains the main portion of the plan. Chapter 1 is an introduction and overview of the USAG-AK natural resources program. Chapter 2 describes the U.S. Army Alaska mission and USAG-AK lands. Chapter 3

describes natural resources management strategy and mission sustainability, and Chapter 4 describes implementation of the plan. Volume II, Annexes A through F, contains management component plans, which are much more detailed than the main body of the plan. Volume III, Supplements, contains standard practices and methods. Volume IV, Prescriptions, contains goals, objectives, and specific management prescriptions for each major ecosystem management unit. The environmental assessment for the USAG-AK INRMP (2007 - 2011) focuses on proposed changes in this INRMP.

Ecosystem management is the underlying philosophy of the plan. This approach is consistent with changes in laws and Department of Army policies. The INRMP will serve as a tool to help natural resources personnel implement ecosystem management philosophies on USAG-AK lands. Ecosystem management will continue to allow for the use of natural resources on USAG-AK lands for both military and other human-related values and purposes. Ecosystem management protects properties and functions of natural ecosystems. Since these ecosystems often go beyond installation boundaries, management of USAG-AK's natural resources will include more emphasis on partnerships with its neighbors.

The Sikes Act Road Map found at the beginning of this document references the chapters and paragraphs which are cross referenced to the thirteen criteria points required by the Sikes Act. Stakeholders and interested parties can use the road map to quickly check the location and effectiveness of this INRMP in meeting Sikes Act requirements.

Ongoing Planning Activities

The 2007 - 2011 INRMP utilizes existing information as a basis to continue and improve natural resources management while planning continues. An INRMP is required to be prepared and implemented with updates occurring every five years, regardless of the stage of program development. The INRMP is not a final product; rather, it is a dynamic mechanism to guide program operation for the next five years (2007 - 2011).

Proposed Changes from Previous Plan

The following changes and additional topics are proposed for the 2007-2011 Integrated Natural Resources Management Plan and are discussed in greater detail in Section 1.11.8.

- Format Change
- Added Standard Procedures
- Separate Programmatic Environmental Assessment
- Revised Fish and Wildlife Cooperative Plan
- Revised Natural and Cultural Resources Memorandum of Agreement
- Revised Forest Timber Policy
- House Log Program
- Integrated Wildland Fire Management Plan
- Beluga Whale Protection
- Bison Protection
- Recreational Access
- Recreational Use Management Areas
- Tanana Flats Recreational Use Policy
- Special Interest Area
- Subsistence
- Ecosystem Management Prescriptions

Benefits and Costs

Military Mission Benefits: Implementation of this plan will improve the quality of USAG-AK's training lands and will improve long-range planning at USAG-AK. The INRMP will improve mission sustainability by enhancing training areas, as well as providing for more intensive planning of missions.

Environmental Benefits: The plan provides the basis for the conservation and protection of natural resources. It will reduce vegetation loss and soil erosion due to military activities, reduce the potential for environmental pollution and provide for biodiversity conservation. Certain sensitive areas and species will be protected from unacceptable damage or degradation. Plan implementation will increase overall knowledge of USAG-AK's ecosystems through surveys and monitoring.

Other Benefits: Soldier sustainable range awareness will be enhanced for military training at USAG-AK posts. Both community relations and USAG-AK's environmental image will be enhanced. Quality of life for the USAG-AK communities and its neighbors will be improved. Plan implementation will decrease long-term environmental costs and reduce potential liabilities from environmental noncompliance.

Costs: It will cost about $8,746,000 (adjusted for inflation increases) annually during 2007-2011 to implement this INRMP. Funding will be provided primarily either from environmental conservation funds or training funds designated for implementation of the Integrated Training Area Management program. Other dollars will be from special natural resources funds, forestry, and fish and wildlife permit fees. Plan implementation will require staffing at the same level as in recent years, with the exception of additional contract personnel to implement integrated training area management and other new programs.

Summary

The actions within this INRMP will comply with environmental laws, conserve and protect USAG-AK's natural resources, improve its relationship with the public, and enhance the military mission. While this plan will not resolve all existing and/or future environmental issues, it does provide the guiding philosophy, personnel, and means to work toward the resolution of such issues.

CHAPTER 1. INTRODUCTION AND OVERVIEW

The United States Army must maintain the capability, through a total force effort, to put overwhelming land combat power on any future battlefield and defeat any potential enemies. A decisive victory depends on the ability to rapidly deploy, fight, self-sustain, and win quickly with minimum casualties.

The United States has adopted an international political and military strategy that requires the nation's military forces to be ready to deploy on short notice for engagement anywhere in the world. The American people rightly expect these forces to be highly trained and equipped with the highest performance materiel and technology available. Ready, capable forces result from constant training and new or modified weaponry, and other equipment must be field-tested before being placed with the using units.

Because of the speed and maneuverability of modern armaments, today's and tomorrow's armed forces require large tracts of land for training and weapons testing. Changes in tactical doctrine and weapons technology, designed to dissuade any would-be aggressor, win battles, and minimize casualties to American and allied forces in the event of armed conflict, are increasing the need for such land despite reductions in the size of the United States military since the Cold War and the closure of some military installations.

In the 21st century, the Army faces unprecedented challenges to its ability to train. Increased environmental regulation of training lands and ranges coupled with increased economic development around Army installations contribute to a more challenging training climate. A sound land management program that provides economical and acceptable planning and execution is mandatory to protect that land as an essential training asset.

Implementing this INRMP would continue to provide a sound land management program that conserves land as an essential training asset, excellent stewardship, compliance with environmental laws, and recreational opportunities that contribute to quality of life.

1.1 Integrated Natural Resources Management Plan Vision

The Army will be a national leader in environmental and natural resource stewardship for present and future generations as an integral part of our mission.[1]

The Army's commitment to natural resources management is reflected in the U.S. Army environmental strategy for the 21st century. The Army environmental strategy is depicted as a building established on a solid foundation with four pillars supporting the environmental stewardship vision and the Army mission. The four pillars symbolize the Army environmental program and represent the four major areas of activity: compliance, restoration, pollution prevention, and conservation. The conservation pillar focuses on responsibly managing Army lands to ensure long-term natural resource productivity so the Army can achieve its mission.

The Army's commitment to natural resources management is emphasized in Army Regulation 200-3 (*Natural Resources–Land, Forest, and Wildlife Management*), which requires that INRMPs be developed and maintained for all Army installations. This INRMP is a tool to help natural resources personnel implement ecosystem management at United States Army Garrison Alaska (USAG-AK). The INRMP

[1] Army Environmental Policy Institute. 1992. *U.S. Army Environmental Strategy into the 21st Century*. U.S. Government Printing Office 1993-747-677, 38 p.

looks at how USAG-AK's natural resources program objectives fit within the framework of the military mission and integrates with the environmental program as a whole, outdoor recreation, the National Environmental Policy Act, cultural resources, surrounding communities, and neighboring lands. It is also a source of information for responsible or interested parties that are not directly managing USAG-AK's natural resources. The INRMP is a component of and fits within the framework of the USARAK Range and Training Land Program Development Plan.

1.2 Strategic Goals and Objectives

The main goal of this INRMP is to support U.S. Army Alaska and USAG-AK's military and nonmilitary activities while maintaining a functional, healthy ecosystem. Over the next five years this document and the programs outlined here will be refined as the situation warrants. Ecosystem management is an evolving management scheme. As new information and ideas are gleaned from current research, USAG-AK's management will change to reflect the best information available.

The following general goals and objectives are USAG-AK's commitment to manage natural resources. All five goals not only support management of natural resources but also support the overall military mission. Statements listed below represent general USAG-AK objectives for attaining those goals. These statements will serve as a checklist for monitoring the plan's success. More specific objectives and tasks are proposed for each USAG-AK land area in Volume IV, Prescriptions.

Military Readiness

Goal: Provide quality natural resources, as they are critical training assets for accomplishing the military mission of U.S. Army Alaska.

Objectives:

- Ensure no net loss in the capability of USAG-AK's lands to support existing and projected military missions.
- Maintain quality training lands through damage minimization, mitigation, and restoration.

Stewardship

Goal: Manage natural resources at USAG-AK to ensure good stewardship of public lands that are entrusted to the Army's care.

Objectives:

- Use ecosystem management philosophies to protect, conserve, and restore native fauna and flora with an emphasis on biodiversity enhancement.
- Monitor and manage soils, water, vegetation, and wildlife on USAG-AK's lands with a consideration for all biological communities and human values associated with these resources.
- Provide economic and other human-valued products of renewable natural resources when such products can be produced in a sustainable fashion without significant negative impacts on the military training mission.
- Provide professional enforcement of natural resource laws.
- Involve the surrounding community in USAG-AK's natural resources program.
- Ensure the USAG-AK's natural resources program is coordinated with other agencies and conservation organizations with similar interests.

Quality of Life

Goal: Improve the quality of life for the USAG-AK communities and the general public through development of high quality natural resources-based recreational opportunities.

Objectives:

- Provide opportunities for consumptive uses of natural resources within the biological and recreational carrying capacities.
- Provide natural resources-based opportunities for other outdoor recreation such as hiking, snowmobiling, boating and birding.
- Provide conservation education opportunities to the military and civilian community.
- Establish and maintain an environmental setting conducive to a healthy and satisfying lifestyle for the military community.

Compliance

Goal: Comply with laws and regulations that pertain to management of USAG-AK's natural resources.

Objectives:

- Manage natural resources within the spirit and letter of environmental laws, particularly the Sikes Act, upon which this INRMP is predicated.
- Manage to protect, restore, maintain or enhance sensitive species, wetlands, and unique areas.
- Use the NEPA process to make informed decisions that include natural resources considerations, mitigation, and agency and public involvement.
- Ensure that USAG-AK's natural resources program is consistent with the protection of cultural and historic resources.
- Implement this INRMP within the framework of Army policies and regulations.

Integration

Goal: Comply with laws and regulations that pertain to management of USAG-AK's natural resources Integrate elements of natural resources management into a single program that in turn is integrated into Forts Richardson and Wainwright's environmental and military training programs.

Objectives:

- Ensure the integration of, and consistency among, the various activities identified within this INRMP.
- Ensure that natural resources management is consistent with principles of integrated pest management at USAG-AK posts.
- Ensure the integration of new military infrastructure development with the principles and guidelines of this plan.
- Coordinate the implementation of natural resources management with the overall USAG-AK's environmental programs.
- Use the natural resources program to support and enhance other elements within the USAG-AK's environmental programs.
- Provide the command with information needed to make decisions, which include natural resources-related values.

1.3 Military Mission

U.S. Army Alaska's mission is to deploy combat ready forces to support joint military operations worldwide and serve as the Joint Force Land Component Command to support Joint Task Force Alaska. Other missions of U.S. Army Alaska are the defense of Alaska, and coordination of Army National Guard and Reserve activities in the state.

U.S. Army Alaska is presently comprised of two brigade combat teams (one at Fort Richardson and one at Fort Wainwright), a combat aviation task force at Fort Wainwright, and other supporting battalion and company-sized supporting units split between the two installations. U.S. Army Alaska is a subordinate command of U.S. Army, Pacific. The 172nd Infantry Stryker Brigade Combat Team is located at Fort Wainwright, the 4/25th Infantry Brigade Combat Team (Airborne) is located at Fort Richardson, and an Aviation Task Force is being stationed at Fort Wainwright.

In 2004, as a part of the overall transformation of the armed forces, the U.S. Army split off installation management functions from U.S. Army Alaska and created U.S. Army Garrison Alaska (USAG-AK). USAG-AK's mission is to provide equitable, effective, and efficient management of Army installations in Alaska to support mission readiness and execution, enable the well-being of Soldiers, civilians, and family members, improve infrastructure and preserve the environment. USAG-AK supports infrastructure and operational requirements of combat forces assigned to U.S. Army Alaska. USAG-AK is responsible for all installation management requirements to include public safety and security, environmental stewardship, resource management, services and programs to enable combat readiness, and community/family support services and programs. Environmental and natural resources management now falls under U.S. Army Garrison Alaska.

In 2001, Space and Missile Defense Command took command of Fort Greely. Fort Greely was reduced to approximately 7,000 acres comprising the Fort Greely cantonment area. The remainder of the 660,000 acres formerly known as Fort Greely was transferred to Fort Wainwright and is now known as Donnelly Training Area.

The U.S. Air Force is a major user of Fort Wainwright and Donnelly Training Area for routine training and Major Flying Exercises. The U.S. Air Force uses Fort Wainwright's Stuart Creek Impact Area and Donnelly Training Area's Oklahoma and Delta Creek impact areas as tactical air-to-air and air-to-ground weapons ranges, for low and high altitude bombing by B1 and B52 aircraft. The Yukon Measurement and Debriefing System, a computerized system that can create "air wars" of up to 36 aircraft simultaneously, has been installed on Yukon and Donnelly Training Areas. U.S. Air Force pilots are debriefed to show how they reacted to enemy aircraft and various other simulated conditions. The Stuart Creek and Oklahoma Impact Areas are equipped with U.S. Air Force targets, manned radar emitters, anti-aircraft threat simulators, and electronic scoring sensors.

The Army Campaign Plan is driving changes to future mission requirements. The Army is continuing its restructuring from a division based force to a brigade based force. The impacts of the continued withdrawal for military use of Forts Richardson, Wainwright, Greely and Donnelly Training Area were analyzed in the *Alaska Army Lands Withdrawal Renewal Final Legislative Environmental Impact Statement* (U.S. Army Alaska 1999). In the *Transformation of U.S. Army Alaska Environmental Impact Statement* (U.S. Army Alaska 2004) U.S. Army Alaska military mission impacts were analyzed. The Transformation EIS addressed the regular ongoing impacts of the current mission as well as the predicted impacts due to the transformation of the 172nd Brigade (Separate) into a Stryker Brigade Combat Team. Future Army force restructuring may bring about changes to the military mission in Alaska. Impacts of ongoing and future training activities would be considered in separate environmental documents.

1.4 Land Use Planning

Encroachment is the primary issue in land use planning. The Department of Defense has defined encroachment as the cumulative result of any and all outside influences that inhibit normal military training and testing. Similarly, the Army considers encroachment as any external and / or internal actions or requirements that restrict training. Encroachment is an everyday reality for most installations, but it is important to recognize that it does not occur instantaneously. Encroachment reflects the cumulative result of a slow but steady increase in influences affecting the use of installation ranges. Societal demands near and around installations are constantly changing and the Army needs innovative methods to deal with that change. As a land-based force, the Army needs land area to train. It faces a paradox. The platforms, weapons, and systems it uses are becoming more technologically advanced. When combined with the changes in doctrine and tactics, this creates requirements for more training space. Conversely, encroachment reduces the size of the area available for military training.

Over the last 10 years, USAG-AK has been inundated with numerous requests and proposals from state, federal, and municipal government agencies, businesses, utilities, clubs, organizations, and individuals for authorization or permission to use Army lands for nonmilitary purposes. Requests have included commercial or long-term real estate interests involving rights-of-way, easements, land use permits, leases, outgrants, land transfers, exclusive use areas, and special concessions, many of which have detrimental effects on current or future military training on USAG-AK posts. It is anticipated these requests will probably increase in the future as the populations of Anchorage, Fairbanks and their satellite communities continue to grow.

The policy of USAG-AK is to favor temporary, noncommercial low-impact uses of USAG-AK's lands by the local communities as long as the posts' natural resources or their ability to fulfill their missions will not be adversely impacted. In general, USAG-AK's policy is to deny requests for nonmilitary uses of USAG-AK properties if those requests include or involve a requirement for long-term real estate commitments such as leases, easements, or land transfers, or if they create a potential adverse impact on the military mission or the environment. The only exception to this would be when such actions clearly result in tangible benefits to the military training mission or to the environment.

1.5 Partnership

A partnership is defined as a process by which two or more organizations with shared interests act as a team to achieve mutually beneficial goals. USAG-AK undertakes management of its lands with a number of federal, state, local, and public partners. Land management issues do not stop at property boundaries, but instead have an ecosystem or watershed dimension. All agencies are tied by policy to an ecosystem management approach to land management. Cooperative relations among the military services and other land management agencies foster regional approaches to dealing with stewardship issues that provide benefits beyond what could be achieved by each agency separately.

1.5.1 Federal Agencies

USAG-AK partners with other federal agencies for natural resources management support, including the Department of Interior (U.S. Fish and Wildlife Service, Bureau of Land Management, U.S. Geological Survey, and Office of Aircraft Services), Department of Agriculture (U.S. Forest Service and Natural Resources Conservation Service), as well as other Department of Defense agencies (U.S. Army Corps of Engineers Research and Development Laboratories). Accredited conservation representatives of federal agencies furnishing professional advice and technical assistance under this plan will be allowed access to the installation, in accordance with appropriate arrangements.

The U.S. Fish and Wildlife Service is a partner, along with the Army and the Alaska Department of Fish and Game, in the management of fish and wildlife on USAG-AK lands. The Department of Interior, Bureau of Land Management is a signatory and cooperator in implementation of this Integrated Natural Resources Management Plan (INRMP). The Bureau of Land Management is the Secretary of Interior's authorized delegate for jurisdiction responsibilities regarding vegetative (i.e., timber) and mineral resources on specific USAG-AK lands. The U.S. Forest Service provides technical assistance for forest management on USAG-AK's lands. The Natural Resources Conservation Service cooperates in land management and soil conservation on USAG-AK posts. The U.S. Geological Survey is an independent fact-finding federal agency that collects, monitors, analyzes, and provides scientific understanding about natural resources conditions, issues and problems. The Department of Interior, Office of Aircraft Services provides reimbursable contract aircraft for implementation of this INRMP. U.S. Army Engineer Research and Development Laboratories - Cold Regions Research and Engineering Laboratory provides cooperative support in water quality, hydrology, vegetative, and permafrost studies.

1.5.2 State Agencies

USAG-AK also partners with a number of state agencies with expertise in natural resources management. The Alaska Department of Fish and Game, Alaska Department of Natural Resources, Alaska Department of Environmental Conservation, and universities all play significant roles supporting natural resource management on USAG-AK lands. Garrison Commanders provide installation access, subject to safety requirements and military security to designated State fish and wildlife or conservation officials at such times and under such conditions as mutually agreed between the Garrison Commander and the appropriate designated official of the state in which the installation is located.

The Alaska Department of Fish and Game is a signatory and cooperating agency in the implementation of this plan as required by the Sikes Act. It is also the primary state agency for fish and wildlife management in Alaska. The Alaska Department of Natural Resources, Division of Forestry, is a cooperating agency for forest management on USAG-AK lands. USAG-AK partners with the Palmer Soil and Water Conservation District for enhancing, rehabilitating, and maintaining Fort Richardson training lands to ensure their continued long-term use and effectiveness. USAG-AK also partners with the Salcha-Delta Soil and Water Conservation District for enhancing, rehabilitating, and maintaining Fort Wainwright and Donnelly Training Area training lands to ensure their continued long-term use and effectiveness. The district partners with USAG-AK to conduct Land Rehabilitation and Maintenance, erosion control, and habitat management projects. The Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation is involved with USAG-AK on issues of public access and tourism within the Anchorage area. The Alaska Department of Environmental Conservation regulates air and water quality on all USAG-AK posts and sub installations (including prescribed burning). The Alaska Department of Commerce and Economic Development is a state agency interested in USAG-AK's role in supporting tourism within Alaska.

USAG-AK also partners with universities for natural resources management expertise. Experts from universities have provided specialized knowledge needed to effectively manage natural resources on USAG-AK lands.

1.5.3 Local Government

Local governments are important partners in natural resource management of military lands in Alaska. USAG-AK is primarily involved with the Fairbanks North Star Borough, city of Delta Junction and the municipality of Anchorage.

1.5.4 Tribal Government

Maintaining a working relationship between the Army and Alaska Native tribes has emerged as an important component of the Army's operations in Alaska. Fort Richardson lies within the traditional lands of the Dena'ina northern Athabascan tribes of Cook Inlet. Fort Wainwright and associated training areas lie within the traditional lands of the Tanana Athabascan tribes of interior Alaska. These Army-withdrawn lands hold resources that were traditionally used by Alaska Native tribes and therefore, tribal governments continue to have an interest in the management of these lands.

1.5.5 Non-Governmental Agencies

Non-government organizations play an extremely important role in the management of natural resources on Army lands in Alaska. USAG-AK participates with the Boreal Partners in Flight, a partnership of federal and state agencies, educational institutions, and nongovernmental organizations committed to managing neotropical migratory birds. USAG-AK is a partner with The Nature Conservancy in an effort to evaluate regional ecosystem management. USAG-AK also participates on the state of Alaska Invasive Species Council. Restoration Advisory Boards may at times be used to explain changes in future INRMP planning processes and invite public comment. USAG-AK partners with the Interior Alaska Airboat Association, participates on the Delta Bison Working Group, works with the Tanana – Yukon Historical Society, and cooperates with the Tanana Chiefs Council.

1.6 Joint Management and Stewardship

Almost all of USAG-AK lands are withdrawn from the public domain for military use. The Bureau of Land Management partners with USAG-AK to jointly manage these withdrawn lands. Joint management refers to Congressionally-directed shared responsibility by the Bureau of Land Management and the Department of Defense for organizing, controlling, and supervising activities on certain withdrawn federal lands. Joint use may or may not involve joint management. Both joint use and joint management require joint stewardship.

Joint stewardship refers to the working relationship entered into between USAG-AK and Bureau of Land Management for the care of withdrawn federal lands in Alaska and associated resources used by U.S. Army Alaska for military mission requirements. The United States has adopted an international political and military strategy that requires the nation's military forces to be ready to deploy on short notice for engagement anywhere in the world. The American people rightly expect these forces to be highly trained and equipped with the highest-performance materiel and technology available. Ready, capable forces result from repetitive training. New or modified weaponry and other equipment must be field-tested before being placed with the using units.

Because of the speed and maneuverability of modern armaments, today's and tomorrow's armed forces require large tracts of land for training and weapons testing. Changes in tactical doctrine and weapons technology, designed to dissuade any would be-aggressor, to win battles and minimize casualties to American and allied forces in the event of armed conflict, are increasing the need for such land despite reductions in the size of the U.S. military since the Cold War and the closure of some military installations.

The majority of the land currently used by USAG-AK is on long-term withdrawal from public domain lands originally assigned to the Bureau of Land Management. Provisions for management of these lands are generally specified in each of the public laws, public land orders, executive orders, and other enabling documents. Whenever the military uses withdrawn public land, it incurs legal and moral responsibilities

for the stewardship of the land and its resources. Residual responsibility for USAG-AK withdrawn lands remains with Bureau of Land Management, which retains interest in the stewardship of the transferred parcel, even though the land is under Department of Defense's long-term management.

The reason USAG-AK land is withdrawn from other public use to the military is to enhance military readiness in the interest of national defense. If the land was intended to be managed primarily for multiple uses, it would not be managed by a military service. Under USAG-AK management, land is used primarily for national security purposes (e.g., training and testing) but will also be managed to accommodate additional uses as long as they do not impinge on the primary military readiness mission.

Multiple-use of the lands it manages is an integral part of the mission of the Bureau of Land Management. As defined by Federal Land Policy and Management Act, multiple-use implies that each authorized use of the land has an equal level of priority. Department of Defense, on the other hand, is a single mission agency. As such, it has a single, mission-oriented use for the land it manages: military readiness for national defense. The quality of life of Department of Defense's personnel is also an important component of Department of Defense's national defense mission. In support of their specific missions, Department of Defense's services and agencies implement a variety of land management practices on their installations that support military readiness and quality of life programs. For Department of Defense multiple-use is *an approach to land management* rather than an element of its mission. A variety of land management tools such as hunting, fishing, nature trail maintenance, watchable wildlife programs, and the maintenance of groomed open spaces may be used in the Integrated Natural Resources Management Plan in support of both quality of life programs and military training and testing requirements. By using a mix of these land management tools, Department of Defense undertakes a multiple-use approach to land management while still meeting the single mission use of the land (military readiness for national defense). An important aspect of this type of multiple-use approach to land management, however, is that it is employed only to the extent that it does not conflict with the military training and testing components of the overall national defense/readiness mission of the agency. For instance, USAG-AK manages lands with many of the same protections as wilderness land or wild and scenic rivers. However, a Wilderness Designation or Wild and Scenic Rivers Designation are incompatible with the intent of the military land withdrawals and the military training mission.

As noted earlier, where withdrawal legislation specifies joint management, collaboration between the Bureau of Land Management and Department of Defense is essential. Stewardship, however, is an inherent responsibility of anyone who has activities on the land regardless of legislated land management responsibilities. Stewardship implies acting responsibly in the public interest in the use and, as appropriate, restoration, improvement, preservation, and protection of federal lands and their associated resources. Good stewardship is a fundamental policy of all land management agencies and a mandate for all users of the land.

1.7 Responsibilities

USAG-AK has primary responsibility for military uses of the withdrawn lands in Alaska. Under the Sikes Act, USAG-AK is responsible for preparing, updating, and implementing this Integrated Natural Resources Management Plan (INRMP). Since all uses and projects described in this plan support the overall military mission, implementation of this plan is defined as a military use. The Bureau of Land Management retains stewardship responsibilities and is responsible for all nonmilitary uses. The Bureau of Land Management is the interface with the public for all requests for resources on withdrawn lands and, through the Alaska Fire Service, is responsible for fire suppression on USAG-AK lands. The U.S. Fish and Wildlife Service and Alaska Department of Fish and Game are responsible for the management of fish and wildlife populations on all USAG-AK lands.

Within Department of Defense, many individuals and organizations listed below have responsibilities for the overall implementation of this INRMP. Responsibilities for each program are listed in greater detail in Chapter 3 and the Annexes to this INRMP.

The USAG-AK Garrison Commander is directly responsible for operation and maintenance of Army lands in Alaska, including implementation and enforcement of this INRMP. He is personally liable for compliance with laws pertaining to implementation of this plan. Natural resources are managed through the USAG-AK Directorate of Public Works, Environmental Department, Conservation Branch, under the direction of the Garrison Commander. The Conservation Branch is the primary organization directly responsible for implementing this plan.

The ranges on USAG-AK lands are managed through the Directorate of Plans, Training, and Mobilization and Security, which is also under the direction of the Garrison Commander. Directorate of Plans, Training, and Mobilization and Security has responsibility for managing range complexes; coordinating military training; and releasing training areas for forestry, land rehabilitation, and recreational use. The Directorate of Morale, Welfare and Recreation promotes organization and development of recreational opportunities and facilities. This Directorate manages most outdoor recreation with the exception of hunting, fishing, and trapping. Law enforcement on USAG-AK lands is managed through the Provost Marshal's Office. Implementation of this plan also requires the assistance of other USAG-AK directorates and organizations, including Directorate of Logistics (supply and transportation), Directorate of Resource Management (budget, personnel, and equipment authorizations), Regional Contract Organization, (purchasing), Public Affairs (public awareness programs), and Staff Judge Advocate (legal assistance).

USAG-AK's higher headquarters, Pacific Area Regional Office – Installation Management Command located at Fort Shafter, Hawaii, will assist with development and implementation of conservation programs. The Installation Management Command provides environmental funding for the implementation of this INRMP.

The United States Army Environmental Center, located at Aberdeen Proving Ground, Maryland, provides oversight, centralized management, and execution of Army environmental programs and projects. It provides support capabilities for National Environmental Policy Act, endangered species, cultural resources, Integrated Training Area Management, environmental compliance, and related areas. The United States Army Corps of Engineers, Alaska District, assists USAG-AK by administering contracts for outside or other agency support. It also is responsible for issuing wetlands permits in accordance with Section 404 of the Clean Water Act. The Cold Regions Research and Engineering Laboratory supports northern military installations and has an interest in natural resources management on USAG-AK lands.

1.8 Public Review and National Environmental Policy Act

Public review of this INRMP, as required by the Sikes Act and Army Regulation 200-2 and 200-3, will be accomplished through the National Environmental Policy Act process. USAG-AK has prepared an environmental assessment to analyze the potential consequences of implementing this INRMP. This environmental assessment will be released for a 30 day public review. USAG-AK will collect comments and use this information to improve the INRMP. All comments received will be recorded and addressed.

1.8.1 National Environmental Policy Act of 1969

National Environmental Policy Act (NEPA) requires federal agencies to consider the environmental consequences of proposed major federal actions. The premise of NEPA is to provide environmental

information to public officials and citizens before decisions are made and actions are taken. The process is intended to help public officials and citizens make decisions that are based on timely and scientifically accurate information. The analysis must fully disclose the environmental effects of the action and demonstrate that the project proponent and the decision-maker have taken an interdisciplinary "hard look" at the environmental consequences of implementing a major federal action.

1.8.2 Army Regulations 200-2 and 200-3

32 CFR Part 651 (Army Regulation 200-2, *Environmental Analysis of Army Actions,* dated March 29, 2002) dictates policies, responsibilities, and procedures for integrating environmental considerations into Army planning and decision-making. It implements the Council of Environmental Quality's NEPA regulations and directs installations to integrate environmental analysis as much as practicable with other environmental reviews, laws, directives, and executive orders. This regulation requires that natural resources management plans be evaluated for environmental impacts (32 CFR Part 651 Section 651.10 (b) of Army Regulation 200-2). The requirements of Army Regulation 200-2 will be addressed through the preparation of an environmental assessment on the potential effects of implementing this INRMP on USAG-AK lands.

Army Regulation 200-3, *Natural Resources-Land, Forest and Wildlife Management*, dated February 1995, outlines policy, procedures, and responsibilities for the conservation, management, and restoration of land and the natural resources thereon consistent with the military mission and other applicable national policies. Army Regulation 200-3 states that "Integrated Natural Resources Management Plans require appropriate environmental review according to the National Environmental Policy Act and Army Regulation 200-2; appropriate level of documentation will be determined on an installation by installation basis." Army Regulation 200-3 further states, "It is Army policy to integrate environmental reviews concurrently with other Army planning and decision-making actions to avoid delays in mission accomplishments."

1.8.3 Integrated Natural Resources Management Plan and National Environmental Policy Act Integration

Army Regulation 200-2, (32 CFR Part 651 Section 651.14 (a)), states that "The Army goal is to concurrently integrate environmental reviews with other Army planning and decision-making actions, thereby avoiding delays in mission accomplishment." To achieve this goal, proponents shall complete NEPA analysis as part of any recommendation or report to decision makers prior to the decision (subject to 40 CFR 1506.10). Early planning (inclusions in Installation Master Plans, Integrated Natural Resources Management Plans, Integrated Cultural Resource Management Plans, acquisition strategies, strategic plans, etc.) will allow efficient program or project execution later in the process.

Currently, USAG-AK performs natural resource projects in an ad-hoc fashion without a formal, systematic approach. This INRMP will institute standard operating procedures and best management practices for the natural resource projects to provide consistency among management approaches, increase oversight, and streamline processes and procedures to increase efficiency. Additionally, many natural resource projects utilize construction contractors. Establishing standard operating procedures through the INRMP will ensure standardization of technique, allow prediction of possible impacts and determine efficacy of project procedures.

All natural resource projects must meet applicable regulatory requirements before projects can be implemented. These include National Historic Preservation Act, Archaeological Resources Protection Act, Clean Water Act, Alaska state laws, and U.S. Army Alaska regulations, in addition to NEPA.

Currently, NEPA documentation is inconsistent between natural resource projects. USAG-AK seeks to institute a method to ensure consistent NEPA documentation through a programmatic environmental assessment analyzing the impact of this INRMP and through successive project-specific environmental and cultural analyses.

The INRMP environmental analysis will provide the decision-maker with the information necessary to evaluate the environmental, cultural, and socioeconomic impacts associated with the alternatives as directed by NEPA. The selection of an alternative will take into account technical, economic, and political feasibility; environmental and social issues; and the ability to meet objectives of the mission. The following alternatives have been evaluated for presentation to the decision-maker:

Alternative 1: Continue natural resources management without an updated Integrated Natural Resources Management Plan (No Action)

Alternative 2: Implement natural resources management with revised Integrated Natural Resources Management Plan (Proposed Action)

Alternative 3: Suspend natural resources management

The natural resource standard practices identified in this INRMP, Volume III, Supplements, are the focus of this NEPA analysis. The scope of the environmental analysis includes potential environmental, cultural, and socioeconomic impacts of the proposed action.

1.9 Cultural Resource Protection

Cultural resources protection programs on USAG-AK lands are conducted in accordance with the National Historic Preservation Act (16 U.S.C. Section 470, as amended), the Archeological Resources Protection Act (16 U.S.C. Section 470aa-47011), the American Indian Religious Freedom Act (42 U.S.C.), the Native American Graves Protection and Repatriation Act (25 U.S.C. Section 3001 et seq.), Department of Defense Directive 4710.1 (Archeological and Historic Resources Management, 1984), and Army Regulation 200-4 (*Cultural Resources Management*). The Bureau of Land Management also has responsibility for cultural resources compliance on withdrawn lands.

Natural resource projects are sometimes overlooked as potential causes of adverse impacts to archeological sites. Natural resource and cultural resources managers at USAG-AK will work closely with one another during development of natural resources projects.

Natural resource activities such as vegetation clearing, timber removal, firebreak construction, and training land rehabilitation are potentially damaging to cultural resources. Army Regulation 200-4 and the laws upon which it is predicated require that such undertakings be accomplished in a manner consistent with protection of cultural resources.

Natural resource projects with ground-disturbing activities will be processed through the USAG-AK cultural resources manager to prevent activities from impacting cultural resources. Furthermore, the cultural resources manager will be consulted during long-range policy planning, such as this INRMP.

USAG-AK is currently developing the Historic Preservation Component of the Integrated Cultural Resources Management Plan per guidelines developed under the Army Alternate Procedures to Section 106, National Historic Preservation Act. Natural resource projects will be reviewed and evaluated per the procedures outlined in the USAG-AK Historic Preservation Component. Until the Historic Preservation

Component is approved, the Cultural Resource Manager will continue to review proposed projects by consulting guidelines provided in implementing regulations for the National Historic Preservation Act (36 CFR 800) to determine their effect on cultural resource sites. Any project assessed as having an effect on a cultural resource site will be coordinated with Alaska State Historic Preservation Officer.

1.10 Pending and Unresolved Issues

The Army Campaign Plan outlines transformation of Army forces worldwide. The International Global Positioning and Basing Strategy is moving Army units around the world. Two additional units have been stationed in Alaska during the last two years, the Infantry Brigade Combat Team (Airborne) and the Aviation Task Force. The potential is high that additional changes to the structure of Army forces in Alaska will occur which can affect natural resources management.

The Base Realignment and Closure Commission also recommended changes to the military in Alaska. Fort Wainwright will be gaining units, while Eielson Air Force Base is realigning, and Kulis Air National Guard Base (at the Ted Stevens Anchorage International Airport) is slated to close and assigned units will transfer to Elmendorf Air Force Base. Assumption of Fort Richardson installation management responsibilities by Elmendorf Air Force Base may result in significant reorganization of the natural resource program. Currently, many natural resources personnel located at Fort Richardson have responsibilities for natural resource management on Fort Wainwright and Donnelly Training Area. If changes are significant, the INRMP may need to be revised to reflect organizational changes.

Another unresolved issue is the determination of what military operational activities have exemption status for the incidental “taking” of migratory birds as authorized under the 2003 National Defense Authorization Act, which amended the Migratory Bird Treaty Act. The Authorization Act requires the Department of the Interior to promulgate regulations to exempt the Armed Forces for the incidental taking of migratory birds during military readiness activities. The Final Rule, anticipated to be released in late 2006, is expected to clarify which (if any) natural resource management, range management, or construction activities affecting migratory birds might be exempted.

The U.S. Army is developing a new environmental funding process, no longer based on compliance, but rather focused on sustainability. At this time there is no effective way of communicating new natural resource requirements to the Army for funding. While the INRMP is always “subject to the availability of funding” as required by the Anti-Deficiency Act, the likelihood that the projects contained in this plan will be funded is lower than in previous years. The ongoing global war on terrorism has significantly impacted the Army’s ability to maintain its resources, including natural resources in the United States.

1.11 Integrated Natural Resource Planning

The centerpiece of natural resources planning and resourcing is the Integrated Natural Resources Management Plans (INRMP). An INRMP guides the natural resources management programs at each installation. Implementation of the INRMP measures, maintains, protects, and enhances the ecological integrity of the training lands and the biological communities inhabiting them. An INRMP is prepared to assist installation commanders in their efforts to conserve and rehabilitate natural resources "consistent with the use of military installations to ensure the preparedness of the Armed Forces." INRMPs are intended principally to help Installation Commanders manage natural resources more effectively so as to ensure that installation lands remain available and in good condition to support the installation's military mission (i.e., ensure "no net loss in the capability of military installation lands to support the military mission of the installation").

USAG-AK prepares this INRMP in cooperation with the U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, and the Alaska Department of Fish and Game. This interagency participation results in a document that reflects the mutual agreement of Department of Defense, Department of the Interior, and the State of Alaska concerning conservation, protection, and management of natural resources. USAG-AK also provides an opportunity for the public to review and submit comments on this INRMP. More details regarding the preparation, update and implementation of the INRMP can be found in Volume II, Annex A.

1.11.1 Purpose of the Plan

The primary purpose of this INRMP is to establish natural resources goals, objectives, and policies that USAG-AK will use to manage Army lands in Alaska. It is the intent of Department of Defense to clearly and openly express these goals, objectives and policies to the public through this INRMP. The secondary purpose of this INRMP is to guide USAG-AK natural resources managers and personnel in their decision-making regarding management of military land in Alaska and the implementation of proposed natural resource projects. Implementing this INRMP would provide a land management program that conserves land as an essential asset for training, provides excellent stewardship, complies with environmental laws, and provides recreational opportunities that contributes to the quality of life. A further purpose of this INRMP is to serve as a funding identification document for the management of natural resources on military lands.

1.11.2 Scope of the Plan

The focus of this INRMP will be on the management of natural resources on USAG-AK lands. The management measures have been developed based on the current conditions of the resources, and the military mission and activities as they are anticipated. This INRMP will guide natural resources management of USAG-AK lands for the next five years (2007-2011) and provide a solid foundation from which to build and continue the program beyond the year 2011.

1.11.3 Relationship to Other Plans

1.11.3.1 Bureau of Land Management Resource Management Plans

The Federal Land Policy and Management Act of 1976 require the Bureau of Land Management (BLM) to develop, maintain, and, when appropriate, revise land use plans. Public Law 106-65, which withdraws portions of Fort Wainwright and Donnelly Training Area lands for 25 years from the public domain, requires that BLM prepare a resource management plan for the military withdrawal. The objective of BLM's land use planning is to ensure that public lands are managed under the principles of multiple use and sustained yield. The BLM has developed a comprehensive land use planning base consisting of decisions reached in its resource management plans. The BLM views land management as an ongoing process of decision-making, implementation, monitoring and assessment, and adjustment that allows for continuous corrections and reduces the need for major plan revisions. New information or proposals might necessitate a plan revision or an update to a plan's associated National Environmental Policy Act analysis. BLM's nine-step planning process, in 43 CFR Part 1600, integrates the National Environmental Policy Act decision-making process. New resource management plans and resource management plan revisions require an environmental impact statement. The USAG-AK 2007-2011 INRMP does not conflict with the current BLM resource management plan.

1.11.3.2 Range and Training Land Program Development Plan

The U.S. Army Alaska Range and Training Land Program Development Plan outlines the range development requirements for USAG-AK training lands. The range development plan creates the framework within which natural resources management occurs. The INRMP does not conflict with the range development plan; rather, it complements the siting of new range facilities by providing information that minimizes impact to natural resources.

1.11.3.3 Land Withdrawal and Transformation Environmental Impact Statements

In the *Transformation of U.S. Army Alaska Environmental Impact Statement,* U.S. Army Alaska military mission impacts are addressed. This environmental impact statement addressed the regular ongoing impacts of the current mission as well as the predicted impacts due to the transformation of the 172nd Brigade (Separate) into a Stryker Brigade Combat Team and airborne infantry units into an Airborne Task Force. The Transformation Environmental Impact Statement required full implementation of the INRMP and the natural resources management program as mitigation outlined in the Record of Decision. The Land Withdrawal Legislative Environmental Impact Statement analyzed the impacts of continuing withdrawal of Yukon Training Area and Donnelly Training Area. The Land Withdrawal Legislative Environmental Impact Statement also included a number of natural resources mitigation requirements. The mitigation included in the Legislative Environmental Impact Statement became law with the enactment of PL 106-65, Military Lands Withdrawal Act.

1.11.4 Structure of the Plan

This INRMP is structured to demonstrate direct support of the overall military mission, which includes stewardship of natural and cultural resources, compliance, quality of life, and military training support. Every single project and task in the INRMP is focused to add to the accomplishment of one or more of these natural resources goals.

The standard Army INRMP template incorporates and consolidates all natural resource plans and ensures proper implementation at the installation level. The goal was a template for INRMPs that supports the Army's readiness mission, meets compliance requirements, provides for sustainment and rehabilitation of natural resources, and provides a consistent review process for legislatively mandated cooperators. The new Army template streamlines the INRMP into operational, useable, and smaller documents. The overall INRMP will include the Main Plan, Annexes (component plans), Supplements, and Prescriptions. The sections will be made up of various topics that will fulfill the INRMP purpose.

The INRMP environmental assessment contains the environmental analysis of the proposed INRMP and potential effects upon the environment due to the proposed plan and its alternatives. In addition to evaluating the environmental impacts associated with natural resources management, the environmental assessment affords the public an opportunity to comment on the proposed plan.

1.11.5 Integration

Integrated natural resources planning is accomplished through preparing and updating the INRMP at least every five years. Integrating the many components of natural resources can be a complex challenge. One of the objectives of ecosystem management in USAG-AK is to develop a process to objectively identify requirements for all species and users of the environment. In addition, natural and cultural resources projects can only be classified as military use (and therefore valid expenditures of military funds) if there is a direct link back to the accomplishment of the overall military mission. INRMPs shall be prepared in coordination with the installation's master plan, range development plan, training plan, Integrated Cultural Resources Management Plan, pest management plan, installation restoration plan that address contaminants covered by Comprehensive Environmental Response, Compensation, and Liability Act and

related provisions, and other appropriate plans and offices. It is not intended that INRMPs will function as a comprehensive compilation of detailed information on all these related topics. Rather, the INRMP should briefly summarize the key interrelationships with these plans, reference where the plans may be obtained, and describe where detailed information can be found.

1.11.6 Revisions

The INRMP will be reviewed annually by the installation and a determination made if the plan must be updated to attain Army objectives for mission and stewardship. Any revision will utilize binders that facilitate page changes. Each updated INRMP shall not be considered approved or executable until approved by the Installation Management Command. INRMPs must be updated by the installation and approved by the Installation Management Command at least every five years. The Installation Management Command must ensure that revised plans are based on current information, including updated planning level surveys. Landscape planting plans will be revised as needed. Information relating to soils, natural vegetation and environmental data, not requiring revision, should be retained in the plan.

1.11.7 Review and Approval

Cooperative efforts, among the U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, and Army shall be accomplished within the framework of the INRMP, starting at the draft INRMP stage. The draft plan and any major revisions thereof shall be forwarded to the Installation Management Command for approval. Installation Management Command natural resources staff, real property management staff, and mission operations staff will review the draft plan for its adherence to stewardship requirements (environmental staff), consistency with real property master plans (master planning staff), and focus on integration with the primary activity (operations staff). After incorporation of Installation Management Command requirements, the draft INRMP is subject to public comment through the National Environmental Policy Act process, finalized by the installation (Final INRMP), signed by the Garrison Commander, and, on the fish and wildlife aspects of the INRMP, signed (or concurred with in coordination letter) by the Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service. The signed INRMP is provided to the Installation Management Command and is executable after notification from the Installation Management Command.

INRMPs shall be reviewed annually by installations in cooperation with other parties to the plan. The review shall be used in place of an annual Environmental Performance Assessment review. Annual reviews will be documented by the USAG-AK Commander responsible for the INRMP by a letter to the U.S. Fish and Wildlife Service Anchorage and Fairbanks office, the U.S. Fish and Wildlife Service Region 7 Director, the south-central and Interior offices of Alaska Department of Fish and Game, the Alaska Department of Fish and Game Director, and by a memorandum to Installation Management Command Pacific Area Regional Office. Annual reviews may be used, as appropriate, to determine if INRMP revisions are necessary. The annual reviews may be used to expedite the more formal review for operation and effect, or, if comprehensive and supported with documentation that ensures mutual agreement of the three parties, may accomplish the more formal review for operation and effect.

1.11.8 Changes from the Previous Integrated Natural Resources Management Plan

The following changes are proposed for the 2007-2011 USAG-AK Integrated Natural Resources Management Plan.

1. Format Change. The entire format of the USAG-AK Integrated Natural Resources Management Plan (2007-2011) has been changed from the previous 2002-2006 U.S. Army Alaska Integrated Natural Resources Management Plan format. This current format has been changed to meet the proposed U.S. Army Environmental Center and Department of Defense guidance for INRMPs so that all branches of service will have similarly formatted INRMPs. Even though the format has changed, most of the content of the older version of the plan has remained.

2. Standard Procedures. Standard procedures for natural resource project work have been added to the 2007-2011 Integrated Natural Resources Management Plan. Since planning for five years of natural resource management projects is difficult and frequently changes during the year of execution due to changing mission priorities, the focus in this plan will be on standard natural resources management procedures which can be evaluated with programmatic National Environmental Policy Act documentation. Natural resource standard management procedures can be found in Volume III, Supplements.

3. Separate Programmatic Environmental Assessment. A programmatic environmental assessment will be created as a separate document and not integrated into this plan. The environmental assessment will evaluate programmatic impacts from the INRMP and the proposed action will focus on changes from the 2002-2006 version of the plan. Volume II, Annex A will contain potential projects to be implemented during 2007-2011; however, these projects serve as examples of site specific projects. Before actual site specific projects are completed, USAG-AK will complete individual National Environmental Policy Act documentation tiered or based off of the programmatic INRMP environmental assessment.

4. Fish and Wildlife Cooperative Plan. The Fish and Wildlife Cooperative Plan summarizes specific items of cooperation and agreement between Sikes Act required signatory partners USAG-AK, U.S. Fish and Wildlife Service and Alaska Department of Fish and Game. The Fish and Wildlife Cooperative Plan has been revised to clarify fish and wildlife protection, nuisance control, and off-road vehicle procedures.

5. Natural and Cultural Resources Memorandum of Agreement. Included in this INRMP is a revised Memorandum of Agreement between Bureau of Land Management and USAG-AK clarifying natural and cultural resources and authority on withdrawn lands. Authority for vegetation management between the Bureau of Land Management and USAG-AK is not clear. Most of USAG-AK lands are withdrawn from public domain either indefinitely or on a renewable basis. In some cases, vegetation management authority is expressly written in the public law, land order or executive order, but in most cases, it is not. This Memorandum of Agreement (Volume II, Annex A, Appendix AA.3) will resolve any authority issues, improve the management of forest vegetation, and maximize funding returning to these withdrawn lands for forest management.

6. Forest Timber Policy. A forest timber policy has been revised in the 2007-2011 Integrated Natural Resources Management Plan. Forest resources are protected on USAG-AK lands through this plan as well as through local and Army wide regulations. This INRMP establishes best management practices (see Volume III, Supplements) during the conduct of timber sales, clearing or construction activities to protect surrounding forest resources, wetlands, surface water and wildlife. If construction activities cannot avoid clearing forest resources, construction activities must follow correct procedures to minimize impact and effectively utilize forest products as specified in Volume II, Annex C, Section C2.1.3.

7. House Log Program. In recent years there has been growing interest from the public to harvest house logs in the Tanana Flats Training Area of Fort Wainwright. USAG-AK has initiated a house log program in response to public request. The program closely follows guidelines set by the State of Alaska Division of Forestry's House Log Program. The USAG-AK house log program procedures are listed under Volume II, Annex C, Section C2.1.5.5.

8. Integrated Wildland Fire Management Plan. For many years USAG-AK and Bureau of Land Management, Alaska Fire Service have worked cooperatively to prepare and update a wildfire management plan for USAG-AK lands. This update of the INRMP meets the new Army requirement for an Integrated Wildland Fire Management Plan. The Integrated Wildland Fire Management Plan is found in Volume II, Annex C, Section C2.2.

9. Beluga Whales. USAG-AK proposes to enhance beluga whale protection through increased beluga monitoring, beluga habitat protection in and around Eagle Bay, and limiting indirect fire weapons in Eagle River Impact Area when beluga whales are present. Beluga whales are discussed in greater detail in Volume II, Annex D, Section D2.3.1.6.3; Volume II, Annex D, Section D2.3.1.7.6; and Volume II, Annex F, Section F2.2.1.3.2.

10. Bison. USAG-AK proposes to clarify bison protection procedures on Donnelly Training Area during training exercises. The stationing of additional troops in Alaska, analyzed in the U.S. Army Alaska Transformation Environmental Impact Statement (U.S. Army Alaska 2004), has increased use of bison habitat within Donnelly Training Area and has led to a need to better define the specific procedures necessary to protect the bison (especially during calving) while sustaining the military mission. Bison are discussed in greater detail in Volume II, Annex A, Appendix AA; Volume II, Annex D, Section D2.3.1.6.1; Volume II, Annex D, Section D2.3.1.7.3; and Volume II, Annex F, Section F2.3.2.2.1.

11. Recreational Access. Another change from the 2002-2006 plan involves recreational access. USAG-AK has established the U.S. Army Recreation Tracking (USARTRAK) system to facilitate recreational access onto military lands. All persons (civilian and military) desiring to recreate on Army lands in Alaska must obtain a Recreational Access Permit and must use the USARTRAK system (per USAG-AK Access Policy effective 15 November 2004). USARTRAK is an automated access system that allows registered users (Recreational Access Permit holders) to telephonically access range opening data and to check-in to areas open to recreation. This new system for recreational access to military lands is designed to streamline both the reporting process for USAG-AK and the check-in process for the user. Recreational access is discussed in greater detail in Volume II, Annex E, Section E2.5.6.

12. Recreational Use Management Areas. USAG-AK lands are managed for a number of different types of public recreational use. All areas that are determined open for recreational use may be closed temporarily during periods of military use. USARAK Regulation 190-13 (Appendix D), and the Fort Wainwright, Donnelly Training Area, and Fort Richardson Supplements address areas open and closed to off-road recreational vehicle use on USAG-AK lands. USAG-AK proposes the following classification system to describe recreation areas on the installation: Open Use Areas, Modified Use Areas, Limited Use Areas, Special Use Management Areas, and Closed Areas. Recreational management areas are discussed in greater detail in Volume II, Annex E, Section E2.5.6 and are delineated for each USAG-AK land area in Volume IV, Prescriptions.

13. Tanana Flats Special Use Recreational Management Area. USAG-AK proposes to designate the area on Tanana Flats Training Area between Salchaket Slough, Bonnifield Trail, Willow Creek, and the Tanana River as a special use recreational management area. This area is divided in to the upper and lower fens (commonly known as the “upper swamp” and “lower swamp”). The Tanana Flats Special Use Management Area is open to hunting during valid state seasons. The special use management area is open to all types of off-road recreational vehicles with no restrictions for off-road vehicles when soil is frozen. All off-road recreational vehicles must stay on existing trails during unfrozen conditions. Off-road recreational vehicle access into both the upper and lower fens between 1 April and 15 July is not permitted. Motorized watercraft are permitted access with no restrictions between August 16 and April 1. Access into the fens (both upper and lower swamp) between 1 April and 15 July is not permitted. Access

into the upper or lower fens during 15 July and 15 August is dependent on water level. Access is permitted with no restrictions between August 16 and April 1. The Tanana Flats Special Use Recreational Management Area is open to all other recreational activities year-round. Recreational impacts and the Tanana Flats Special Use Recreational Management Area are discussed in greater detail in Volume II, Annex E, Section E2.5.6.4.

14. Special Interest Areas. USAG-AK will continue to manage special interest areas during the period 2007-2011. Areas are designated as "special interest areas" if they contain unique or sensitive habitats or species which require different or additional rules for management and use. USAG-AK proposes to create one new area in Tanana Flats Training Area and proposes to de-list several other areas designated in previous INRMPs. These areas are being removed from special interest area not because of the lack of sensitivity of species or habitats (or a loss of importance), but because the rules for managing and protecting those sensitive species or habitats are no different than the rules for everywhere else in USAG-AK. This INRMP will only continue to designate special interest areas where the rules for protection are truly different for that particular area. Special interest areas are discussed in greater detail in Volume II, Annex F, Section F3.1.3.

15. Subsistence. Because of the unresolved discrepancies between state and federal subsistence laws, the State of Alaska and United States governments each maintain separate programs for providing for subsistence on their separate lands and waters within the state. This INRMP does not attempt to solve these discrepancies or differences. Rather, this INRMP attempts to explain the differences between the federal subsistence program and the state subsistence program, discuss traditional subsistence and then explain how each of those programs apply to USAG-AK lands (Main Plan, Section 3.5.4 and Volume II, Annex E, Section E2.4).

16. Ecosystem Management Prescriptions. USAG-AK proposes new site specific goals, objectives, and projects for each USAG-AK land area during 2007-2011. These can be found in Volume IV, Prescriptions.

1.11.9 Plan Implementation

The Sikes Act Improvement Act requires not just preparation and update of an INRMP, but "implementation" of the plan. The following section discusses the definition and funding implications of implementation. Implementation anticipates the execution of all "must fund" projects and activities in accordance with specific timeframes identified in the INRMP.

An INRMP is considered to be implemented if an installation:

- Actively requests, receives, and uses funds for "must fund" projects and activities.
- Ensures that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the INRMP.
- Coordinates annually with all internal and external cooperating offices.
- Documents specific INRMP action accomplishments undertaken each year.

Natural resource requirements defined by the Office of the Secretary of Defense as environmental "must fund" are those projects and activities required to meet recurring natural resources conservation management requirements or current natural resources compliance needs. The Army equivalent to Office of the Secretary of Defense 's "must fund" projects are projects as described in classes 0, 1 and 2 High in current Army policy and guidance for identifying environmental program requirements.

All projects listed in an INRMP are not necessarily “must fund.” Implementation of INRMPs is a shared responsibility among those activities that use the land (e.g., trainers, facility managers, provost marshal) as well as those who ensure compliance and provide overall program oversight. Accordingly, projects necessary to implement INRMPs are not limited to environmental funds. However, INRMPs should include all projects.

Projects are contained in Appendix AA2 of this INRMP and will be reviewed and updated annually upon completion of Army review and validation processes.

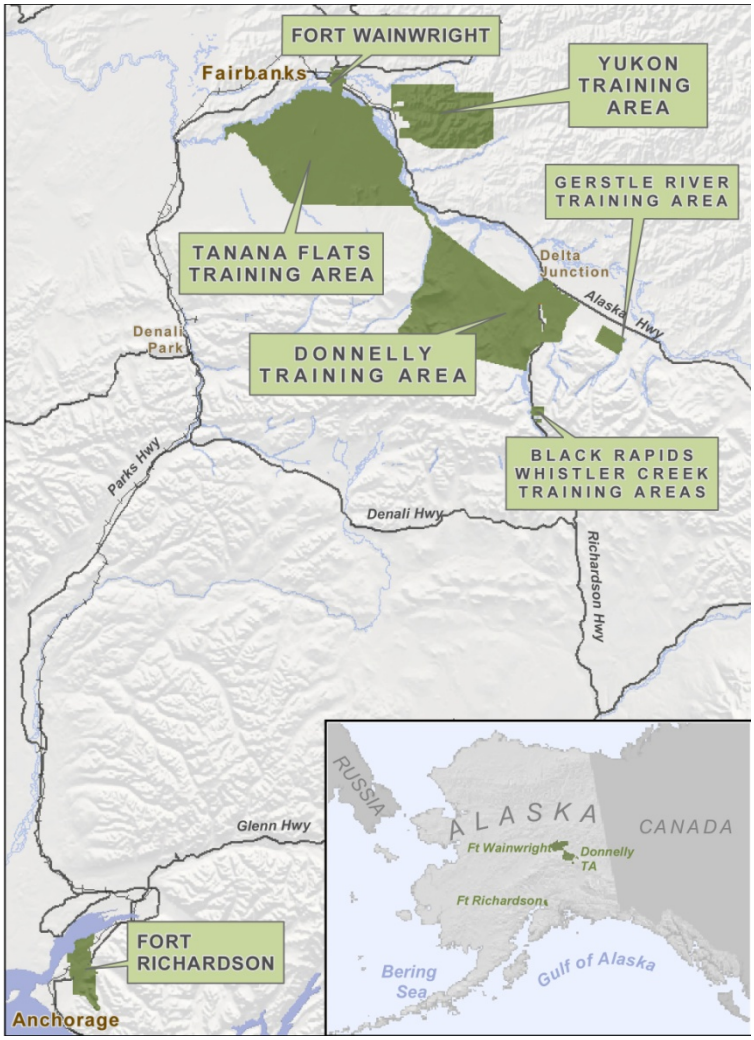
CHAPTER 2. INSTALLATION DESCRIPTION AND MISSION

Alaska is a state of extraordinary beauty with a wealth of natural resources. Its area of 586,412 square miles is roughly equal to one-fifth the size of the continental United States. Because of its strategic location, the Army has maintained a presence in Alaska since 1867. The land in Alaska controlled by the Army comprises almost 10% of the total training land available to the Army. The following chapter describes the installation setting and the mission for the U.S. Army in Alaska.

2.1 Installation Description

USAG-AK is made up of two primary installations: Fort Wainwright and Fort Richardson. Fort Wainwright includes Main Post, Tanana Flats Training Area, Yukon Training Area, Donnelly Training Area, Gerstle River Training Area, and Black Rapids Training Area. Fort Richardson is divided into North and South Posts. Fort Greely is not part of USAG-AK but lies embedded within Donnelly Training Area south of Delta Junction, Alaska. Fort Greely is approximately 7,200 acres consisting of cantonment area, airfield and missile fields. A general location of each installation with sub-installations is shown in Figure 2-1.

Figure 2-1. Location of USAG-AK Lands in Alaska.



2.1.1 Fort Wainwright

2.1.1.1 Location and Neighbors

Fort Wainwright is located in central Alaska, north of the Alaska Range in the Tanana River Valley. The post lies 120 miles south of the Arctic Circle near the cities of Fairbanks and North Pole in interior Alaska in the Fairbanks North Star Borough. The installation consists of the Main Post, Tanana Flats Training Area, Yukon Training Area, Dyke Range, Donnelly Training Area, Gerstle River Training Area, Black Rapids Training Area, and Whistler Creek Rock Training Area. Fort Wainwright is the fourth largest Army training area in the United States. Tanana Flats Training Area is across the Tanana River from the Main Post. Tanana Flats Training Area occupies most of the land between the Wood and Tanana rivers, stretching 32 miles south of the Main Post (Johnston 1988). Yukon Training Area is 16 miles east-southeast of Fairbanks, adjacent to Eielson Air Force Base. The Yukon Training Area is roughly rectangular, stretching 28 miles east-to-west and 17.5 miles north-to-south. Yukon Training Area

encompasses much of the land between the Chena and Salcha rivers, northeast of the Richardson Highway (Bureau of Land Management and U.S. Army 1994b).

Fort Wainwright is within the Fairbanks North Star Borough, which is populated with several scattered developments. Fairbanks, on the western boundary of Fort Wainwright, is the largest city in the borough with a population of over 30,000, making it the second largest city in the state (2000 census data). The Fairbanks North Star Borough's population is over 82,000. The main cantonment area of Fort Wainwright lies within Fairbanks city limits. Residential developments have grown eastward, abutting the installation boundary along the North Post, the main cantonment area, and the western side of the small arms range complex. A majority of the land surrounding Fort Wainwright is state of Alaska-owned land. Principal land use management categories include fish and wildlife habitat, public recreation, forestry, agricultural sale, and settlement. The Chena River State Recreation Area lies adjacent to Yukon Training Area's northern boundary and is managed for public recreation. Eielson Air Force Base adjoins the western boundary of the Yukon Training Area. The Tanana Valley State Forest lies north of Fort Wainwright with private and Fairbanks North Star Borough-owned land parcels to the south. Parcels of native-owned land also border Fort Wainwright. Both Tanana Flats Training Area and Yukon Training Area are relatively isolated and reasonably protected from boundary encroachment, except for remote homesteads. Other developed areas include Fox and Chatanika to the north, and North Pole and Eielson Air Force Base to the east and south. Fort Greely is 90 miles to the southeast. The George Parks Highway, Steese Highway, Richardson Highway, Alaska Railroad, and the Trans-Alaska Pipeline bisect the area.

Donnelly Training Area is located 107 road miles southeast of Fairbanks and six road miles south of the junction of the Alaska and Richardson highways. Donnelly Training Areas is separated from Delta Junction by Jarvis Creek. Southeast Fairbanks Census Area's (a non-incorporated borough which covers a large area around Donnelly Training Area) population is over 6,000. Delta Junction's (located adjacent to Donnelly Training Area) population, the largest community in the area, has 840 residents (2000 census - compared to 703 in 1970) (Bureau of Land Management and U.S. Army, 1994a). Other developed areas include Big Delta to the north and the Clearwater farming and ranching area to the east. The Donnelly Training Area lies within the central valley and hill area, bordered by the Yukon Tanana Uplands to the north and the Alaska Range to the south. The entire region lies within the Tanana River Valley. Gerstle River Training Area lies between Granite Mountain and Gerstle River. It is 29 miles southeast of Delta Junction and about three miles southwest of the Alaska Highway; the rectangular area is oriented northwest to southeast and measures about five miles, north to south, and nine miles, east to west. Black Rapids Training Area and Whistler Creek Rock Training Area are 39 miles and 43 miles, respectively, south of Delta Junction and east of the Richardson Highway.

2.1.1.2 Infrastructure

The Fort Wainwright Main Post area consists of the cantonment and the Main Post training areas. Immediately to the south of the main fort area is the Range Complex where the majority of small arms ranges for Fort Wainwright are located. The Tanana Flats Training Area contains dudded impact areas and light maneuver training areas. The Yukon Training Area has seven maneuver training areas, numerous artillery and mortar firing points, two drop zones and a dudded impact area. Donnelly Training Area is composed of a range complex with small arms ranges, dudded impact area, weapons testing ranges, maneuver ranges, drop zones and other types of training ranges. Donnelly Training Area is composed mainly of maneuver training areas and drops zones. Black Rapids and Whistler Creek Rock training areas are the training area and home of the Northern Warfare Center. Gerstle River Training Area is used for maneuver training and non-dudded small arms firing.

Fairbanks is a transportation center for much of central, northern, and northwestern Alaska. There are 841 miles of paved highways and over 1,000 miles of unpaved highways in and around Fairbanks. The

George Parks, Steese, and Richardson highways bisect the area. The Parks Highway links Fort Richardson to Fort Wainwright, and the Richardson Highway links Fort Greely to Fort Wainwright. The Richardson Highway also connects Alaska with the Canadian road system via the Alaska Highway. The Richardson and Alaska highways also serve Donnelly Training Area and the Delta Junction area. Both are maintained year-round. The Richardson Highway is a two-lane primary road that connects the port of Valdez to the south, with Fairbanks to the north. It intersects the Glenn Highway at Glenallen, thus providing a direct link with Anchorage. Thus, the Richardson Highway links Fort Greely and Donnelly Training Area to both Fort Richardson and Fort Wainwright, and it links with the Alaska Highway, connecting Alaska with the Canadian road system.

The Alaska Railroad provides rail service to Fort Wainwright. Alaska Railroad's main line passes through the Main Post, with spur tracks serving the central heating and power plant and warehouse circle. The track also connects with the Fairbanks industrial spur. The Alaska Railroad provides seasonal passenger and year-round freight and vehicle service between Anchorage and Fairbanks. There is no rail service to Donnelly Training Area, nor are there navigable waterways for waterborne transportation. The nearest rail service is at Eielson Air Force Base, about 70 miles north. The Alaska Railroad provides year-round passenger, freight, and vehicle service between Anchorage and Fairbanks. Most northbound freight arrives by sea at either the port of Anchorage or the port of Whittier for transfer to the railroad. The Alaska Railroad provides a connection to Seward, 80 miles to the south of Anchorage, the nearest port with intermodal capability.

Ladd Army Airfield and Eielson Air Force Base, about 17 miles southeast of Fort Wainwright, can support any type of military aircraft including Galaxy C5s. In addition, Allen Army Airfield at Fort Greely can support C17 and C130 aircraft in the winter, but during the summer there is a 250 ton weight limit. Fairbanks International Airport, five miles west of Fort Wainwright, is the nearest commercial airport. It is one of three international airports in Alaska and is served by several U.S. and international passenger and cargo airlines.

2.1.1.3 Climate

Fort Wainwright's weather is typical of a northern continental climate, with short moderate summers and long cold winters with little precipitation. Weather is influenced by mountain ranges on three sides that form an effective barrier to the flow of warm, moist maritime air during most of the year. Surrounding upland areas tend to aid drainage and the settling of cold Arctic air into Tanana Valley lowlands. Daylight conditions on Fort Wainwright vary depending on the season. During the summer, daylight hours peak during solstice (June 21st) at almost 22 hours of sunlight. During winter solstice (December 21st) daylight hours total only 3 hours and 42 minutes.

The Fort Wainwright area receives very little annual precipitation (10.4 inches), which during the winter is in the form of snowfall averaging 67 inches. Overcast days with cloud ceiling of 1,700 feet to 3,400 feet above ground level can stop small arms training, depending on the specific caliber of the weapon and ceiling. Most thunderstorms occur in June and July and can occasionally be extensive. Fog is a significant weather detractor during the winter. December and January average four foggy days a month. Also ice fog can form any time the temperature is below -30°F. Average annual precipitation at Donnelly Training Area is 11.12 inches, which falls over 90.4 days, mostly during summer and early fall. Average monthly precipitation ranges from a low of 0.24 inches in April to a high of 2.38 inches in June. Average annual snowfall is 40.5 inches, with a record 99.7 inches in 1945. Average annual relative humidity is 55% with lowest levels occurring during spring and early summer (38% during mid-afternoon in May) (U.S. Army Alaska 1979).

The average annual temperature at Fort Wainwright's Main Post is 26°F. January is usually the coldest month with an average temperature of -11° F. July is normally the warmest month with an average temperature of 61°F. Average monthly temperatures in Fairbanks range from -11.5°F in January, to 61.5°F in July, with an average annual temperature of 26.3°F. The record low temperature is -66°F, and the record high is 98°F for Fairbanks. The average frost-free period is 95-100 days. Average monthly temperatures at Donnelly Training Area range from -6.4ºF in January to 60.0ºF in July, with an average annual temperature of 27.4ºF. The record low temperature is -63ºF, and the record high is 92ºF. The average frost-free period is 95-100 days (27 years of Alaska Meteorological Team data).

Prevailing winds at Fort Wainwright's Main Post, Yukon Training Area, and Tanana Flats Training Area are from the southwest in summer and from the north and northeast in winter. Average wind velocity is 5.7 miles per hour (mph). The greatest average wind speed is in spring, with a high of 40 mph recorded in Fairbanks. Winds are 5 mph or less 60% of the time. Prevailing winds at Donnelly Training Area are from the east-southeast from September through March and from the west, southwest, or south from April through August. Average wind velocity is 8.2 miles per hour. The greatest wind speeds occur during winter, with a high of 104 mph recorded in February. During winter, "Chinook" winds often blow from the south, out of the Alaska Range, and can bring + 50°F temperature readings in January. At other times, easterly winds blow from Canada and the upper Tanana Valley and bring wind chill equivalent of -80°F to -100°F. Winds are 5 mph or less only 13.6% of the time, and wind speeds greater than 60 mph have been recorded in every month. Thunderstorms are infrequent and occur only during summer).

2.1.1.4 Physical Resources

2.1.1.4.1 Topography

Fort Wainwright lies north of the Alaska Range, within the Tanana River valley. The Main Post and Tanana Flats Training Area lie within the Tanana-Kuskokwim Lowland. This depression was subsiding as the Alaska Range was rising to the south, and filling with sediments from those mountains. The area is bounded by uplands to the north, the Alaska Range to the south, and consists of alluvial fans extending northward from the mountains. The Tanana River flows along the northern edge of the lowland. The terrain is generally flat lowland, ranging from 128 to 512 feet above sea level (Nakata Planning Group 1987). Elevation gradients range from 40 to 50 feet/mile along upper portions of fans, to 6 to 7 feet/mile in the Tanana Flats (Racine et al. 1990). Yukon Training Area lies within the Yukon-Tanana Uplands, which consists of rounded, even-topped ridges with gentle side slopes, broad divides, flat-topped spurs, and gently sloping plains. Ridges occupy nearly 10% of the area, oriented in a northeast-southwest direction (Bonito 1980). Elevations range from 192 to 3,285 feet.

Donnelly Training Area lies north of the Alaska Range, in the Tanana River watershed. The area has a number of features associated with past and present glacial activities, including terminal moraines, outwash fans, braided streams, kettle lakes, and loess deposits. The southern half of the West Training Area primarily lies within the Northern Foothills of the Alaska Range. The area is characterized by flat-topped ridges that are oriented west to east and range from 2,000 to 4,500 feet in elevation. Ridges are three to seven miles wide and five to twenty miles long, and are separated by rolling lowlands ranging from 700 to 1,500 feet in elevation, and spans two to ten miles in width. The foothills are largely unglaciated, although glaciers from the Alaska Range widened valleys. In the southwestern portion of the West Training Area, elevations range from 4,000 to 6,200 feet, and some valley glaciers extend onto the installation.

2.1.1.4.2 Geology

Central Alaska was not glaciated during the last ice age, but during glacial advances, glaciers surrounded the area. Climatic fluctuations during the Quaternary Period caused glacial expansion and recession (Racine and Walters 1991). Rivers flowing from glaciers deposited several hundred feet of silt, sand, and

gravel in the Tanana and Yukon valleys. Most of the area is covered by a layer of loess ranging from several inches to more than 128 feet thick. Gravel deposits along the Tanana River range in thickness up to 154 feet and are a significant source of groundwater (Nakata Planning Group 1987).

Fort Wainwright Main Post is in the Salcha seismic zone, a distinct northeast-trending band of epicenters about 50 kilometers long (Page et al. 1991; Alaska Earthquake Information Center and U.S. Geological Survey 1997). Although the epicenters form a conspicuous pattern, no associated fault movement has been identified (Page et al. 1991). Donnelly Training Area lies in a 200-mile wide seismic zone that extends from Fairbanks southward through Prince William Sound. The Denali Fault extends through the Alaska Range just south of the installation, and slip on this fault is on the order of 1 centimeter per year (Matmon et al. 2004).

Most of the Main Post area is Chena alluvium, an unconsolidated silt-gravel mixture. Discontinuous permafrost lies just under the surface in some areas. The unconsolidated silt-gravel mixture freezes perennially. It has a high bearing strength when frozen, but it is subject to sliding and is difficult to compact when thawed. Northernmost portions of the post are in the foothills of the Yukon-Tanana Upland and consist of bedrock covered by muck and loess. Muck inhibits drainage, largely due to the presence of impermeable permafrost below the surface, and has very low bearing strength when thawed. Swale deposits, made up of poorly stratified silt, sand, and organic matter, are scattered along the Richardson Highway and in parts of South Post. These deposits have high ice content and freeze perennially (Nakata Planning Group 1987). Many glacial deposits in the Donnelly Training Area are good sources of sand and gravel for aggregate or base course materials. They were used for construction of the Richardson and Alaska highways and the Trans-Alaska Pipeline. Granitic plutons occur near the eastern and western borders of Donnelly Training Area. Elsewhere in Alaska, these features are associated with thermal springs. Donnelly Training Area is classified as having moderate potential for geothermal resources (Bureau of Land Management and U.S. Army 1994a).

Yukon Training Area has a low potential for oil or gas deposits, and no known potential for coal and oil shale. Yukon Training Area has no potential for concentrations of phosphate, sodium, potassium, or gilsonite, and moderate potential for geothermal resources (Bureau of Land Management and U.S. Army 1994). In 1942, a gold and molybdenum deposit was found along Ptarmigan Creek in the southwestern portion of the Donnelly West Training Area. Ore was mined from this deposit, but it was never shipped. Other deposits of gold, lead and tin have been reported from areas surrounding the post (Bureau of Land Management and U.S. Army, 1994). Portions of the withdrawn lands have moderate to high potential for placer gold deposits. Localized placer deposits may also occur in streams draining the Granite Mountains and Tertiary-age gravel benches (Center for Ecological Management of Military Lands 1998).

2.1.1.4.3 Soils

A soil survey exists for the Main Post area of Fort Wainwright (2000). This survey is included in the Greater Fairbanks Soil Survey and can be accessed via the internet at http://soildatamart.nrcs.usda.gov or via compact disk. Most of the Main Post area is Chena alluvium, an unconsolidated silt-gravel mixture. Discontinuous permafrost lies just under the surface in some areas. The unconsolidated silt-gravel mixture freezes perennially. It has a high bearing strength when frozen, but is subject to sliding and is difficult to compact when thawed. Northernmost portions of the post are in the foothills of the Yukon-Tanana Upland and consist of bedrock covered by muck and loess. Muck inhibits drainage, largely due to the presence of impermeable permafrost below the surface, and has very low bearing strength when thawed. Swale deposits, made up of poorly stratified silt, sand, and organic matter, are scattered along the Richardson Highway and in parts of South Post. These deposits have high ice content and freeze perennially (Nakata Planning Group 1987).

A soils survey was conducted for Tanana Flats Training Area in 2000. Tanana Flats Training Area comprises different units of unconsolidated material, distributed in broad basins and elongated meander scars. Deposits grade from coarse gravel at heads of fans nearest the Alaska Range, to sand and silt at the bases of fans in the northern part of the basin. Coarse sediments on upper fans are well drained, but fine-grained sediments of lower fans are poorly drained. Frozen ground is within 20 inches of the surface in places and nearly 128 feet thick. Permafrost is absent beneath rivers and lakes, but is common wherever surface water or circulating groundwater is absent (Racine et al. 1990).

Soils on Yukon Training Area have been mapped in detail. South slopes consist of well-drained silt loams and are generally free of permafrost. Loams grade from shallow, gravelly silt near ridge tops, to silt loams on mid-slopes, to deep, moist silt loams on lower slopes. Drainage bottoms and depressions are occupied by shallow, gravelly silt loam covered with a thick layer of peat and underlain by permafrost. Soils on north-facing slopes are shallow, gravelly silt loams with thick covers and permafrost (Bureau of Land Management and U.S. Army. 1994b). The initial mapping of the Yukon Training Area has been completed. The final product is scheduled to be completed by late fall of 2006.

A comprehensive soil survey for Donnelly Training Area was completed during 2005. Information can be accessed via the internet at http://soildatamart.nrcs.usda.gov or via compact disk. The soils on Donnelly Training Area have been mapped in detail. The cantonment area and surrounding land east of the Delta River have been mapped at a scale of 1:25,000. The area west of the Delta River has been mapped at a scale of 1:63,000. In general, soils are derived from glacial actions and modified by streams and discontinuous permafrost. The Natural Resources Conservation Service identified 12 soil associations in the area of Donnelly Training Area. Soils in the northern, west-central, and eastern portions of the Donnelly West Training Area are silt loam associations, while the Donnelly East Training Area is predominantly shallow silt loam over gravelly sand. Soils in the river floodplains consist of alternate layers of sand, silt loam, and gravelly sand. Highly organic wet soils, underlain by permafrost, and having a high water table characterize muskeg soils. Upland foothills have moist, loamy soils, while mountain soils are rocky, steep, and unvegetated.

2.1.1.4.4 Water Resources

Fort Wainwright's surface water resources are diverse and include numerous rivers, streams, ponds, and lakes. The Tanana and Chena rivers drain Main Post. Tanana Flats Training Area is drained by several streams: Wood River, Crooked Creek, Willow Creek, Clear Creek, McDonald Creek, and Bear Creek among them, which all drain into the Tanana River directly, or by way of Salchaket Slough. Northern and northeastern portions of Yukon Training Area are drained by the Chena River and its tributaries: the South Fork Chena River, Hunts Creek, and Horner Creek. The southern portion of Yukon Training Area is drained by Ninety-Eight Creek, a tributary of the Salcha River and the Little Salcha River. Streams draining the western portion of Yukon Training Area flow directly, or by way of Piledriver Slough, into the Tanana River. All streams originating on Yukon Training Area have their headwaters in the Yukon-Tanana Uplands, in rolling glacier-free terrain (Bureau of Land Management and U.S. Army 1994). The volume of flow fluctuates dramatically by season. During the long period of freeze, usually from October to May, flow is limited to seepage of groundwater from aquifers into streams. Many small streams freeze solid (zero discharge) during winter. Snowmelt typically begins in March or April and reaches its peak in June. Flow is greatest during June and July. By the end of July, most snow has melted, and a steady flow during August and September is sustained by rainfall. The Chena River is nonglacier-fed and reaches peak flow before the Tanana River, which is fed by melt water from glaciers and snowfields in the Alaska Range (Nakata Planning Group 1987).

Donnelly Training Area's surface waters are diverse and include numerous rivers, streams, ponds, and lakes. Donnelly Training Area lies entirely within the Tanana River drainage basin. Surface water from around the Main Post drains into the Delta River and Jarvis Creek. The West Training Area drains into

the Delta River, Delta Creek, East Fork of Little Delta River, Buchanan Creek, and the Little Delta River. The Delta River, Delta Creek, and Little Delta River all drain directly into the Tanana River. Surface water from the East Training Area drains into the Delta River, and Granite, Ober, and Jarvis creeks. The Gerstle River Training Area drains into the Gerstle River and Sawmill Creek, both of which drain into the Tanana River. Glaciers that lie along or just south of the installation's southern boundary feed most rivers, streams, and creeks. Glacial melt waters feed the Delta River, Delta Creek, and the Little Delta River from the Alaska Range. Principal glaciers include Canwell, Castner, and Black Rapids (which drain into the Delta River); Trident and Hayes (which drain into Delta Creek); and Hayes and Gillam (which drain into the Little Delta River). Jarvis Creek is fed by melt water from glaciers on Mt. Silvertip (U.S. Army Alaska 1979). The volume of surface water flow fluctuates dramatically by season. From October to May, flow is limited to groundwater seepage from aquifers into streams, and many small streams freeze solid (zero discharge). Snowmelt typically begins in May and reaches its peak in June. Flows are greatest during June and July. After July, most of the snow has melted, and a steady flow during August and September is sustained by rainfall.

With the exception of naturally occurring metals, groundwater quality is good in the Fort Wainwright Main Post area. Much of Fort Wainwright is underlain by an alluvial aquifer. Groundwater in the aquifer is recharged by the Tanana River, while the Chena River and direct infiltration of precipitation contribute small amounts. Groundwater potential is best along the alluvium of the Tanana River, where wells are capable of yielding 3,000 gallons per minute at less than 200 feet in depth. The lowest potential is in the rolling hills of Yukon Training Area, where wells produce around 50 gallons per minute at the same depth (Nakata Planning Group 1987). Groundwater in the Fort Wainwright area tends to have relatively high, naturally occurring levels of metals, especially iron and arsenic. Elevated arsenic levels are prevalent in the upland areas. These are not related to human-caused pollution (Harding Lawson Associates 1996).

Potential groundwater supply is greatest in the floodplain alluvium along the Little Delta River, Delta River, Delta Creek, and Jarvis Creek, and in the alluvial fans extending along the northern flanks of the Alaska Range. The surface to groundwater depth at Donnelly Training Area is between 100 and 210 feet. Most wells on the post tap unconfined aquifers found in unconsolidated alluvial deposits. Groundwater recharge is from influent seepage of glacier-fed streams.

2.1.1.5 Biological Resources

2.1.1.5.1 Flora

Fort Wainwright has four vegetation types: moist tundra; treeless bogs/fens; open, low-growing spruce forests; and closed spruce-hardwood forests. The white spruce-paper birch forest of interior Alaska is often called the boreal forest or taiga. Vegetation types of interior Alaska form a mosaic and reflect fire history, slope and aspect, and presence or absence of permafrost (Viereck and Little 1972).

A comprehensive survey of rare plants was included as part of the floristic inventory for Fort Wainwright conducted in 1995. A report released in 1996 indicated that there were no federally listed endangered or threatened plant species on Fort Wainwright (Tande et al. 1996). There were 491 plant species identified by the inventory (Racine et al. 1997a) of which 16 species are currently recognized as "rare" by the Alaska Natural Heritage Program (2006). A floristic survey of Donnelly Training Area was conducted in 1997. There were 497 plant species identified of which 17 species are currently recognized as "rare" by the Alaska Natural Heritage Program (2006).

Wetlands on Fort Wainwright consist of freshwater marshes and shrub wetlands. Fort Wainwright has two wetlands surveys completed: the National Wetlands Inventory and the Waterways Experiment Station inventory. Shrub wetland is the dominant wetland variety found on Donnelly Training Area. Little Delta

Training Area, located in the northwest portion of Donnelly West Training Area, is predominantly covered by scrub-shrub or forested palustrine wetland systems.

The total forested land area on Fort Wainwright is 374,678 acres (Tanana Chiefs Conference 1993). Of this, limited areas are currently available for cutting fuel wood and Christmas trees (or any commercial harvest by the Army). Mapping by the Joint Federal-State Land Use Commission indicated that about 20,800 acres of Donnelly Training Area are covered by spruce-poplar forest. The total area determined to have commercial forest potential on Donnelly Training Area that was inventoried was 158,487 acres or about 40%, while 54% was classified as non-forested land, 3% as rivers, and 3% as other waters (Tanana Chiefs Conference 1993).

2.2.1.5.2 Fauna

Most vertebrate species indigenous to central Alaska can be found on Fort Wainwright. Moose are the largest, most abundant, and most sought-after species among hunters and wildlife viewers (Gossweiler 1984; Bennett 1982). Fort Wainwright supports the state's largest moose harvest. Although not considered good winter moose habitat, Tanana Flats Training Area supports high concentrations during spring and fall, and is the largest known moose calving area in interior Alaska (Nakata Planning Group 1987). Moose are also present on Main Post and found in larger numbers in Yukon Training Area and Donnelly Training Area.

Black bear and grizzly bear (*Ursus arctos*) are found throughout Yukon Training Area and Tanana Flats Training Area. Both are actively hunted under the regulation and management of Alaska Department of Fish and Game. Fort Wainwright is part of the historic range of the Fortymile caribou herd, but rarely are caribou (*Rangifer tarandus*) now found on the post. The Fortymile herd is traditionally found in Game Management Unit 20B. The Delta caribou herd is found in Game Management Unit 20A, and is found on Donnelly Training Area West. Traditional calving grounds have also been found on Donnelly Training Area West.

Bison were introduced into the Big Delta-Delta Junction area in 1928 after they were extirpated from the area 450-500 years ago. There are now four herds in Alaska; one at Donnelly Training Area and the other three originating from this herd stock. Dall sheep (*Ovis dalli*) are found in the Molybdenum Ridge area in the southwestern portion of the Donnelly West Training Area.

Several small game and related species are found on Donnelly Training Area, including willow (*Lagopus lagopus*) and rock (*L. mutus*) ptarmigan; spruce, sharp-tailed (*Tympanuchus phasianellus*), and ruffed (*Bonasa umbellus*) grouse; swans; ducks; geese; and cranes. Waterfowl nest on Donnelly Training Area pothole lakes and are absent from the area during winter. There are no accurate harvest or population data for these species. Small game and furbearers found on Tanana Flats Training Area, Yukon Training Area, and Fort Wainwright Main Post include coyote (*Canis latrans*), wolf (*Canis lupus*), Lynx (*Lynix canadensis*), red squirrel (*Tamiasciurus hudsonicus*), snowshoe hare (*Lepus americanus*), hoary marmot (*Marmota caligata*), marten (*Martes americana*), beaver (*Castor Canadensis*), river otter (*Lutra Canadensis*), wolverine (*Gulo gulo*), red fox (*Vulpes vulpes*), porcupine (*Erethizon dorsatum*), mink (*Mustela vison*), ruffed grouse, spruce grouse (*Falcipennis Canadensis*), sharp-tailed grouse (*Tympanuchus phasianellus*), rock ptarmigan (*Lagopus mutus*), and willow ptarmigan (*Lagopus lagopus*). All are trapped and or hunted under the regulation and management of the Alaska Department of Fish and Game.

Sixteen species of fish are found in lakes and waterways on Tanana Flats Training Area, Yukon Training Area and Fort Wainwright Main Post. Fort Wainwright is part of the Fairbanks Area Management Unit for fisheries administered by the Alaska Department of Fish and Game. The Alaska Department of Fish and Game periodically stocks rainbow trout (*Oncorhynchus mykiss*), landlocked salmon (*Oncorhynghus*

spp.), Arctic grayling (*Thymallus arcticus*), and arctic char (*Salvelinus alpinus*) in the five managed lakes and maintains records of fish harvested from post streams and rivers. Species of game fish occurring in these waterways include silver salmon (*Oncorhynchus Kisutch*), king salmon (*Oncorhynchus tshawytsha*) and chum salmon. The Chena River also supports Arctic grayling, whitefish, pike, longnose suckers, burbot (*Lota lota*) and the slimy sculpin (*Cottus cognatus*). The Delta River is important fall chum salmon (*Oncorhynchus keta*) and coho (*Oncorhynchus kisutch* [Walbaum]) spawning habitat, although the latter are more common in Clearwater Creek. Salmon spawn at the mouth of the Delta River and do not occur in upstream sections including Donnelly Training Area. Major streams on Donnelly Training Area (e.g., Delta River, Delta Creek, Jarvis Creek) support Arctic grayling throughout the open water season. A few clear streams flowing into these larger streams provide summer habitat for grayling, but none are important for spawning grayling (Bureau of Land Management and U.S. Army 1994a).

Bird diversity includes waterfowl like trumpeter swans (*Cygnus buccinator*), shorebirds like solitary sandpipers, neotropical migrants like the olive-sided flycatcher, raptors like bald eagles (*Haliaeetus leucocephalus*) and great grey owls (*Strix nebulosa*), woodpeckers like northern flickers (*Colaptes auratus*), and the sandhill crane (*Grus canadensis*). No reptiles are known to occur on Fort Wainwright, and only one species of amphibian, the wood frog, is found on the post. The frog is common in bogs, freshwater marshes, and lake margins. The frog is an important prey species for migrating sandhill cranes (CH2M Hill 1994). Some common nongame birds observed on Donnelly Training Area include the alder flycatcher (*Empidonax alnorum*), American kestrel (*Falco sparverius*), hawk owl (*Surnia ulula*), great-horned owl (*Bubo virginianus*), yellow-rumped (*Dendroica coronata*) and orange-crowned warbler (*Vermivora celata*), common (*Carduelis flammea*) and hoary redpoll (*Carduelis hornemanni*), dark-eyed junco (*Junco hyemalis*), hairy woodpecker (*Picoides villosus*), black-backed woodpeckers (*Picoides arcticus*), red-tailed hawk (*Buteo jamaicensis*), mew gull (*Larus canus*), gray jay (*Perisoreus canadensis*), common raven (*Corvus corax*), black-capped chickadee (*Poecile atricapilla*), American robin (*Turdus migratorius*), varied thrush (*Ixoreus naevius*), hermit thrush (*Catharus guttatus*), Swainson's thrush (*Catharus ustulatus*), gray-cheeked thrush, Bohemian waxwing (*Bombycilla garrulus*), snow bunting (*Plectrophenax nivalis*), and cliff swallows (*Petrochelidon pyrrhonota* [*Hirundo pyrrhonota*]) (U.S. Army Alaska 1979). Sandhill crane habitat exists on Donnelly Training Area.

2.1.1.6 Restoration Sites

Army-related industrial activity in the Main Post caused groundwater pollution, generally associated with underground storage tanks, facilities where chemicals were stored and places where chemicals were dumped during the early history of the post. These areas are being intensively monitored. Pollution is generally localized, and there is no indication of deep groundwater pollution. Practices that have led to this contamination have been discontinued; for example, underground storage tanks have been removed. All petroleum, oils, and lubricants are now stored in aboveground tanks surrounded by containment berms. Due to past contamination of localized areas within the Main Post area, Fort Wainwright is classified as a Comprehensive Environmental Response, Compensation, and Liability "Superfund" site. Remediation is ongoing. There are no active Superfund sites on Donnelly Training Area. Gerstle River Training Area has a Formerly Used Defense Site located adjacent to it.

2.1.1.7 Acreage, Acquisition, and Land Status

2.1.1.7.1 Acreage

Fort Wainwright's Main Post, Yukon Training Area, and Tanana Flats Training Area comprise 928,017 acres. Fort Wainwright Main Post is 13,756 acres, including the small arms complex (Johnston 1988). It contains 818,710 acres of maneuver land and 65,964 acres of impact areas on both Tanana Flats Training Area and Yukon Training Area (Johnston 1988). Donnelly Training Area is composed of two sections. Donnelly West Training Area (approximately 531,000 acres) is located just south of Delta Junction and

west of the Richardson Highway. Donnelly East Training Area (approximately 93,000 acres) is located just south of Delta Junction and east of the Richardson Highway. There are also three outlying sites: Gerstle River Training Area (20,580 acres), Black Rapids Training Area (4,112 acres) and Whistler Creek Rock Training Area (542 acres).

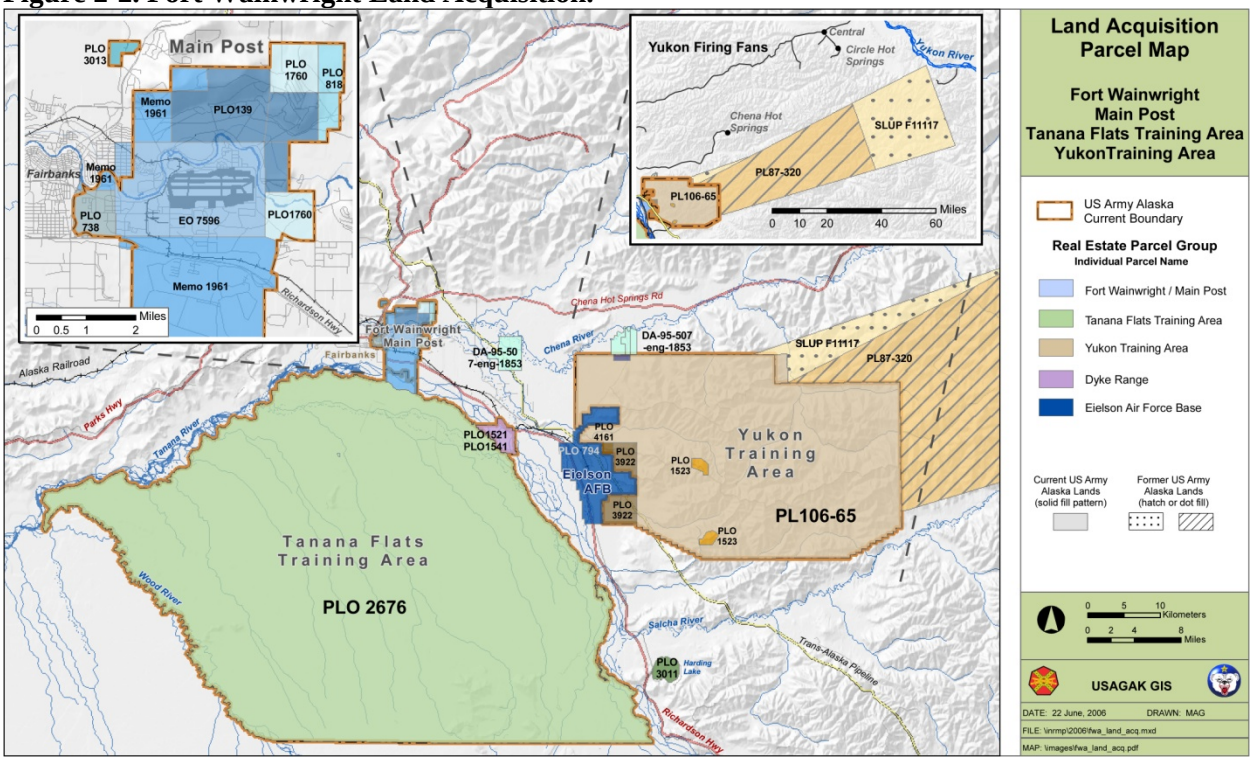
2.1.1.7.2 Land Acquisition for Military Use

Fort Wainwright land acquisition is shown in Figure 2-2. Donnelly Training Area land acquisition is shown in Figure 2-3. Beginning in 1937, the area that is now the Fort Wainwright Main Post was withdrawn indefinitely by Presidential Executive Orders in the following years as listed in parentheses 7596 (1937), 8325 (1940), and 9526 (1940), and Public Land Orders 139 (1943), 690 (1950), 748 (1950), 738 (1951), 818 (1952), 854 (1952), 1760 (1958), and 3013 (1963). An additional 13,623 acres were transferred to the Army in 1961 from the Air Force. Executive Order 3825 and Public Land Order 135 took lands from this area. The Main Post now contains 13,756 acres of withdrawn lands (Center for Ecological Management of Military Lands 1998). Dyke Army Range is located along the Tanana River, between the Main Post and Eielson Air Force Base. This land was withdrawn indefinitely by Public Land Orders 1521 and 1541 in 1957. Dyke Army Range has 2,285 acres (Center for Ecological Management of Military Lands 1998).

Tanana Flats Training Area (654,700 acres) was temporarily withdrawn from public land in 1941 through Executive Orders 8847 and 9526. Three hundred and twenty acres were returned to public use through Public Land Order 796 in 1952. In 1962, Public Land Order 2676 removed the expiration of use from Executive Orders 8847 and 9526. In 1963, Public Land Order 3011 indefinitely withdrew 20 acres on Harding Lake for Army use (Center for Ecological Management of Military Lands 1998).

From 1956 through 1961, the Army obtained a permit from the Secretary of Interior for use of Yukon Training Area. Congress withdrew Yukon Training Area in 1961 for a 10-year term through Public Law 87-326. (After the Engle Act of 1958, all withdrawals of more than 5,000 acres for defense purposes require congressional approval). In 1971, Public Land Order 5240 extended the withdrawal through 1976. The Yukon Training Area withdrawal was renewed again in 1986 (Public Law 99-606) for a 15-year term. Land for two NIKE missile test sites on Yukon Training Area was withdrawn indefinitely through Public Land Orders 1345 (1956), 1523 (1957), and 1917 (1959). Public Land Orders 2768 (1962), 684 (1950), 3922 (1966), and 4161 (1967) adjusted acreage on Yukon Training Area. Acreage on Yukon Training Area now totals 257,275.66 (Center for Ecological Management of Military Lands 1998).

Figure 2-2. Fort Wainwright Land Acquisition.

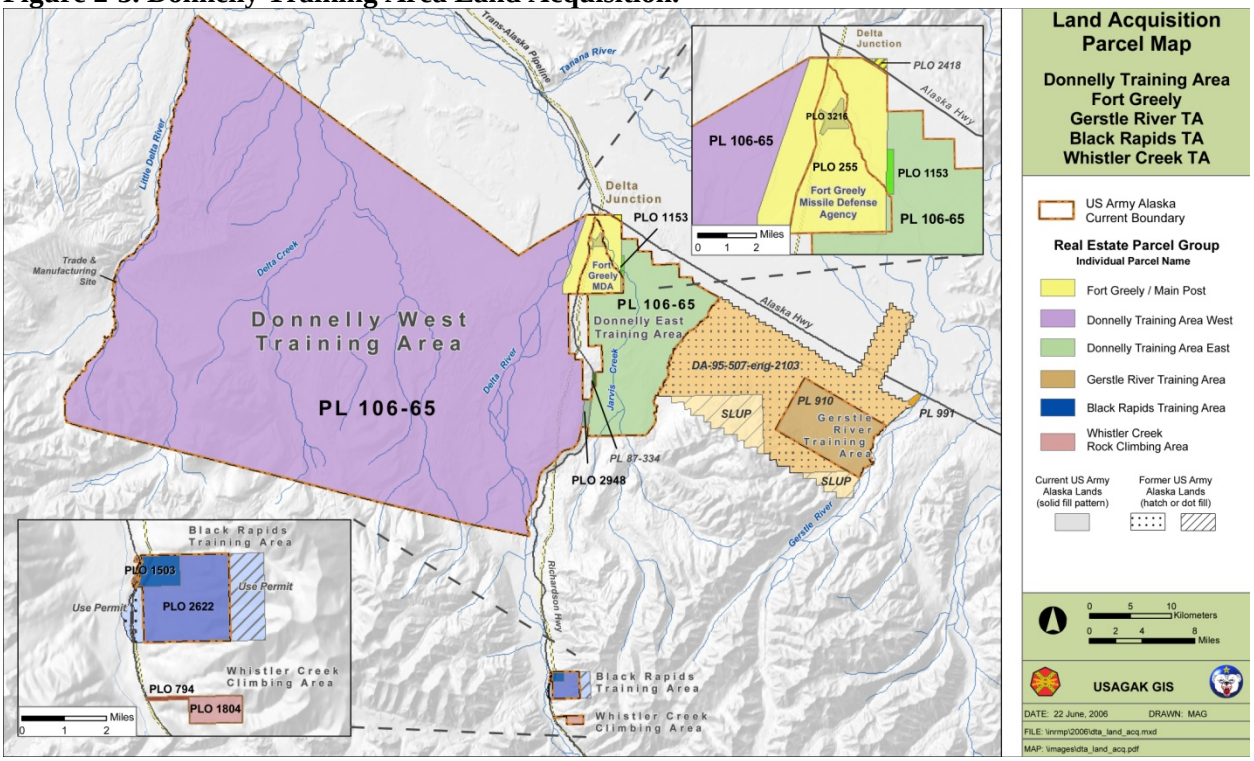


The public lands and interests in lands withdrawn and reserved by Public Law 106-65 include the Donnelly Training Area and the Fort Wainwright Yukon Training Area. This area is comprised of approximately 869,862 acres of land in the Fairbanks North Star Borough and the Unorganized Borough, Alaska, in accordance with Section 3012.

The Trans-Alaska Pipeline System transports crude oil from Prudhoe Bay to Valdez, Alaska. The Trans-Alaska Pipeline System right-of-way extends through the Fort Wainwright Yukon Training Area, East Donnelly Training Area and Black Rapids Training Area. The Trans-Alaska Pipeline System right-of-way was authorized by the Trans-Alaska Pipeline Authorization Act of 1973. Its width is 50 feet plus the ground area occupied by the pipeline, which is approximately four feet. An additional right-of-way for the Alaska Natural Gas Transportation System lies adjacent to the Trans-Alaska Pipeline System right-of-way. The width for the natural gas pipeline is 50 feet. A right-of-way has been approved by the Army and the Bureau of Land Management for the proposed Trans-Alaska Gas System, which runs roughly parallel with the Trans-Alaska Pipeline System and Natural Gas Transportation System.

A right-of-way to Golden Valley Electric Association was granted by the Bureau of Land Management with concurrence from the military to cross Tanana Flats Training Area for a right-of-way grant for the construction, operation, and maintenance of a 230 kilovolt power transmission line between Healy and Fairbanks, Alaska. This right-of-way is 150 feet wide and crosses Tanana Flats Training Area from the southwest boundary at Wood River to the northern boundary at Goose Island. This right-of-way lies approximately one kilometer from the southernmost oxbows of the Tanana River. There are also a number of small outgrants here and there for other things (i.e., towers, power lines, etc.)

Figure 2-3. Donnelly Training Area Land Acquisition.



2.1.1.8 Installation History

Fort Wainwright was originally referred to as the Alaskan Air Base or Alaskan Air Corps Station. It was designated as Ladd Field in December 1939. The original installation served three purposes: the Cold Weather Test Station; an air sub-depot for repair and testing of airplanes; and the central Alaskan station of the Alaskan Wing, Air Transport Command, for transportation of air freight and ferrying Lend-Lease planes to Russia (U.S. Army Alaska 1991). By 1947, the Army Air Corps had separated from the Army to become the Air Force, and what was then known as Ladd Field was transferred to the Air Force. In 1961, the Army reassumed command of Ladd Field and renamed the installation Fort Wainwright, after General Jonathan M. Wainwright (U.S. Army Alaska 1995). On July 1, 1963, Fort Wainwright became the home of the 171st Infantry Brigade, with the 172nd Infantry Brigade established at Fort Richardson. U.S. Army Alaska operated two independent brigades until post-Vietnam era draw downs resulted in disbandment of the 171st Brigade in fiscal year 1973. At that time, the 172nd was headquartered at Fort Richardson with units detached at Fort Wainwright. Further reorganization resulted in U.S. Army Alaska being disbanded on December 31, 1974, with Alaska installations falling under Forces Command (Higginbotham/Briggs & Associates 1991).

In 1986, the newly reactivated 6th Infantry Division (Light) replaced the 172nd Infantry Brigade. The 6th Infantry Division, deactivated in Korea following distinguished service in two world wars, was recalled as a specialized arctic/mountain light contingency force under U.S. Army Pacific. Headquarters was established at Fort Richardson and remained there until 1990 when it was transferred to Fort Wainwright (Higginbotham/Briggs & Associates 1991; Public Affairs Office Undated). Following deactivation of Headquarters, 1st Brigade, 6th Infantry Division (Light) in 1994, Headquarters U.S. Army Alaska became an active component at Fort Richardson. The major unit at Fort Wainwright became the 1st Brigade, 6th Infantry Division (Light). The Arctic Support Brigade, headquartered at Fort Richardson, also had units at Fort Wainwright (U.S. Army Alaska 1995). In 1998, the 6th Infantry Division (Light) was deactivated,

and the 172nd Infantry Brigade (Separate) was activated. In 2004 the 172nd Infantry Brigade was converted to a Stryker Brigade Combat Team.

Donnelly Training Area, formerly known as Fort Greely, originated as Station 17, Alaskan Wing, Air Transport Command, later known as Allen Army Airfield in 1942. In 1949, the installation became the site of the Arctic Training Center (Headquarters, U.S. Army Pacific 1996), because of its extreme winter conditions in interior Alaska and varied terrain, including rivers, lakes, swamps, and open plains. The post was designated as Fort Greely on August 6, 1955. Fort Greely became part of the 172nd Infantry Brigade in 1974, when U.S. Army Alaska was restructured. Fort Greely was realigned as part of the 1995 Base Realignment and Closure (BRAC) process. Some 624,000 acres, which included testing ranges, firing ranges, maneuver training areas and other training facilities were initially transferred to Fort Richardson but within a year were transferred to Fort Wainwright and would become known as Donnelly Training Area. Three outlying training areas, Black Rapids, Gerstle River and Whistler Creek Rock Climbing Training Areas, which were also part of Fort Greely, were also transferred to Fort Wainwright.

2.1.1.9 Historic Natural Resources Program Development

Early efforts at natural resources management involved continuing programs initiated by the Air Force. By 1970, when the first natural resources professional was hired, the installation had developed two natural resources plans (U.S. Army Alaska 1970). At least four succeeding plans have since been developed. In 1978, natural resources specialists from the three Alaska Command installations collaborated to draft a Natural Resources Conservation Program (Quirk et al. 1978). The first natural resources management plan specifically for Fort Wainwright was completed in 1981 (U.S. Army Alaska 1981). At that time, the Fort Wainwright program did not have an installation-specific cooperative plan and was still operating under a cooperative agreement between the 172nd Infantry Brigade, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game.

The *Fort Wainwright Yukon Maneuver Area Proposed Resources Management Plan Final Environmental Impact Statement* was written to fulfill the mandate of the Military Lands Withdrawal Act of 1986. The document was the result of work by a joint Bureau of Land Management-U.S. Army Alaska planning team that consulted with the public throughout the process. The plan proposes a variety of nonmilitary uses while recognizing the primary military purpose of the withdrawn lands. The 1998-2002 Integrated Natural Resources Management Plan (INRMP) used the 1994 *Fort Wainwright Proposed Resources Management Plan Final Environmental Impact Statement* as a base on which proposed management activities are built upon.

The 1998-2002 INRMP was the first INRMP developed and implemented under the new requirements of the 1997 Sikes Act Amendments. The 2002-2006 INRMP updated the 1998-2002 INRMP. Many of the projects identified in the 2002-2006 INRMP were funded and implemented on Fort Wainwright.

2.1.2 Fort Richardson

2.1.2.1 Location and Neighbors

Fort Richardson is located in south-central Alaska, approximately seven miles northeast of downtown Anchorage. At 149˚ 40' west longitude and 61˚ 15' north latitude, Fort Richardson is situated between two prominent natural features—the Knik Arm of Cook Inlet to the north and the Chugach Mountains to the east. Chugach State Park, the post's largest neighbor, lies along Fort Richardson's eastern and southern border. It encompasses approximately one half million acres and is one of the largest state parks in the nation. It provides the public with recreational wilderness experiences such as mountaineering, hiking, fishing, hunting, skiing, and camping.

Fort Richardson borders a number of developed areas, with Anchorage and Elmendorf Air Force Base to the west and the communities of Eagle River, Chugiak, and Birchwood to the northeast. The population of Anchorage exceeds 260,000, which is over 41% of the state population (2000 census data), and continues to grow. Expansion of the city is greatly restricted by Fort Richardson and Elmendorf Air Force Base to the east and north, Knik Arm to the west, Turnagain Arm to the south, and Chugach State Park to the south and east. The 13,215-acre Elmendorf Air Force Base shares many of Fort Richardson's natural features but is more developed. The town of Eagle River, located along Highway 1 (the Glenn Highway), is a suburb of Anchorage.

2.1.2.2 Infrastructure

The cantonment area encompasses 5,760 developed acres located along the Glenn Highway near the center of the post. The post provides housing, community services, medical and dental facilities, excellent churches, schools, libraries, crafts shop, newspaper, theater, golf and ski courses, and cross country trails, along with a post exchange, commissary and a large physical fitness facility. Fort Richardson's remaining 55,000 acres are comprised of maneuver and impact areas (U.S. Army Alaska Undated). The 44,071 acres of maneuver area include 42,898 acres of training area. The post has major ranges in addition to artillery and mortar firing points. These include small arms ranges, large ranges, landing zones, and drop zones.

Fort Richardson is bisected by the Glenn Highway which provides primary access to the post. It is the most heavily used highway in the state, connecting south-central Alaska to the Matanuska Valley. Northeast of Fort Richardson, a few miles south of Palmer, the Parks Highway intercepts the Glenn Highway and provides the only highway link directly north to Denali National Park and Preserve and Fairbanks. Richardson Drive passes through the heart of the cantonment area, connecting Fort Richardson with Elmendorf Air Force Base.

The Alaska Railroad provides rail service to Fort Richardson. Its mainline crosses the post north of the cantonment area and a spur extends to a loading facility and an ammo storage complex. The railroad provides both freight and passenger service with access to Fairbanks and two unique port facilities: (1) the port of Whittier, and (2) Seward, which is a deepwater port at the southern terminus of the railroad. Here, intermodal traffic from Sea-Land Freight Service, Totem Ocean Trailer Express, Alaska Lynden Transport and other sources is transferred to and from ships.

The airfield at Elmendorf Air Force Base provides Fort Richardson's primary air link. Located adjacent to Fort Richardson and roughly 2.5 miles from the center of the cantonment area, the airfield can support any type of military aircraft including C5 Galaxies. Ted Stevens Anchorage International Airport, 15 miles southwest of Fort Richardson, is the nearest commercial airport. Bryant Army Air Field, located adjacent to the cantonment area and the Glenn Highway, has a main, hard-surfaced, north/south 4700 foot runway. The heliport was outgranted to the Alaska Army National Guard as a base for their fixed-wing and rotary aircraft. Large parking aprons and several hangars are located on the airdrome.

Anchorage lies near the head of Cook Inlet at the mouth of the Knik Arm, an important navigable waterway. Access to the inlet was influential in siting original settlements in the Anchorage area. USAG-AK operates a deepwater sea port and fuel terminal on Knik Arm, immediately north of downtown Anchorage.

2.1.2.3 Climate

By Alaskan standards, the Anchorage area has a moderate climate. Fort Richardson is in a transition zone between the northern continental climate of the Alaskan Interior and the maritime climate of the Gulf of

Alaska. The Alaska Range to the north and northwest of the post acts as a barrier to very cold air from the Interior. The Kenai and Chugach Mountains to the south and east prevent the influx of maritime air from the Gulf of Alaska. The waters of the Cook Inlet and the Knik Arm serve to moderate temperatures and provide moisture (Elmendorf Air Force Base 1994). Fort Richardson has a long winter with subfreezing temperatures that usually lasts from mid-October to mid-April. High pressure weather systems during this period may lead to successive days with temperatures below -35 degrees Fahrenheit. The spring is marked by the ice "break-up" starting in mid-April, and lasting until June, characterized by a rapid rise in temperature. Summer lasts from June to early September, and has a daily average temperature of 56 degrees Fahrenheit. Autumn on Fort Richardson is brief, lasting from about mid-September to mid-October.

Prevailing winds come from the west in summer and from the north and northeast in winter. Average wind velocity is six miles per hour (mph). Channeling of south and southeasterly winds passing over the Chugach Mountains, during low pressure systems, winds develop that are called "Chinooks," and they can lead to wind gusts up to 100 mph. Approximately 40% of the 15-inch annual precipitation falls from mid-July to mid-September (Gossweiler 1984). The six months of winter account for another 40% of annual precipitation with an average of 72 inches of snowfall. Spring and autumn combine for only 3 inches of annual precipitation (Elmendorf Air Force Base 1994).

2.1.2.4 Physical Resources

2.1.2.4.1 Topography

Fort Richardson lies between the Turnagain Arm and the Knik Arm of the Cook Inlet in a roughly triangular-shaped lowland. To the east, the Chugach Mountains rise abruptly to elevations over 5,000 feet. From an elevation of 1,000 feet at the base of the mountains, the land declines into the Anchorage plain to the coast. The Anchorage plain is a glacial moraine that extends from the mountain front westward and northwestward. Steep bluffs, broken only by principal streams such as Eagle River, characterize the edge of the plain as it drops sharply to the sea (CH2M Hill 1994b).

2.1.2.4.2 Geology

Geology of the Fort Richardson area was shaped by the formation of the Chugach Mountains in the late Paleozoic and Mesozoic eras and the subsequent flow of sediments into lowlands during the Tertiary period (Gossweiler 1984). Fort Richardson straddles both the alluvial fan of the Anchorage plain and the moraine and glacial alluvium complex near the shore of Knik Arm. The gravel alluvium of the Anchorage plain underlies the main cantonment. Well-bedded and well-sorted gravel and sands provide good foundation conditions and plentiful construction material. The confined gravel aquifer is 200 feet to 400 feet below the surface in this area of the post (Selkregg 1972). Groundwater flow in this confined aquifer is generally west to northwest (CH2M Hill 1994). Just north of the cantonment area is the southern edge of the Elmendorf Moraine, a long series of ridges running east-west across Fort Richardson and Elmendorf Air Force Base, roughly parallel to Knik Arm. Elevations of the moraine rise to more than 300 feet, especially in the west. The moraine is chiefly till and poorly sorted gravel. North of the Elmendorf Moraine is a complex of moraine and glacial alluvium deposits in the form of irregularly shaped hills (CH2M Hill 1994).

The Fort Richardson area is seismically active and has experienced at least nine major earthquakes in the last 85 years. The area has also experienced tremors and ash fall from volcanic eruptions of Mount Spurr, Mount St. Augustine, and Mount Redoubt since 1954. Two faults, the Border Ranges Fault and the Bruin Bay-Castle Mountain Fault, border Anchorage. The Border Ranges Fault bisects Fort Richardson, running parallel to the base of the Chugach Mountains (Elmendorf Air Force Base 1994). Another fault, located in the Chugach Mountains, skirts the Ski Bowl area of the post.

There has been no interest in oil and gas exploration on Fort Richardson because no oil-bearing basins are known to underlie the post. Potentially significant mineral and organic resources on the post include coal, gravel, sand, and peat. The most valuable and desirable mineral resource on Fort Richardson is gravel used in highway, utility, and building construction projects. Small sources of sand can be found on the post. Peat is found in wetlands on the post, and it has been extracted from several areas for use in landscaping applications.

2.1.2.4.3 Soils

Fort Richardson's soils are shallow, immature and deficient in the primary plant nutrients, especially nitrogen and phosphorous. The thin A and B horizons are often irregular or broken. Coarse gravels and larger rock fragments from glacial till are omnipresent in all soil horizons. These soils often exhibit low water retention capability, making them a primary limiting factor for vegetative growth during dry periods. In depressions and saturated areas, such as wetlands, surface horizons may be covered with partially decomposed herbaceous vegetation called peat. Forested soils are acidic and the lower part of the A horizon usually has a thin and often discontinuous layer of grayish-white or ash colored material. The ash-colored layer is the result of highly leached A horizon and is typical of coniferous forest.

2.1.2.4.4 Water Resources

Fort Richardson's surface water resources are diverse and include numerous streams, lakes, ponds, and a saltwater tidal bay. Most streams on Fort Richardson flow from headwaters in the Chugach Mountains to the Cook Inlet (saltwater), and traverse the post in a westerly direction. Eagle River is fed by a glacier. Flow volume of streams fluctuates dramatically from season to season. During the long period of freeze, usually from October to April, flow is limited to groundwater seepage from aquifers into streams. Snowmelt typically begins in April and reaches its peak in June; stream flow is greatest during the months of June and July. After July most of the snow has melted, but the stream flow during the months of August and September remains steady because it is augmented by rainfall (Gossweiler 1984).

On Fort Richardson, Ship Creek is second only to Eagle River in volume. It drains a watershed of 117 square miles, 90 of which are in the Chugach Mountains. The Fort Richardson Dam on Ship Creek forms a sizable reservoir, which provides all the potable water for Fort Richardson and the Elmendorf Air Force Base and nearly half the water for the Municipality of Anchorage. Chester Creek and the North Fork of Campbell Creek are the only other perennial streams on the post. Chester Creek drains a small basin located on the southern portion of Fort Richardson on the western slope of the Chugach Mountains. It flows northwest until it leaves the post. Although it is a shallow creek, it usually has a constant flow of water (Gossweiler 1984). Fort Richardson has numerous lakes and ponds. Four relatively large lakes, Clunie, Otter, Gwen, and Waldon, are managed for recreational fishing.

Roughly 12 miles of shoreline along the Knik Arm of Cook Inlet form the northern border of Fort Richardson. Eagle Bay is located in the southern portion of this area, where Knik Arm merges with the Eagle River. Tidal activity in Eagle Bay has created an estuarine salt marsh encompassing Eagle River Flats Impact Area. Numerous ponds dot the marsh. Many of these are shallow mudflat ponds, less than 6 inches deep, that often dry up during summer. Others are more permanent and achieve depths of over 4 feet. These deeper ponds often are fed by freshwater streams and springs.

Two freshwater aquifers underlie most of Fort Richardson. These aquifers flow west from the Chugach Mountains to the Cook Inlet and are recharged by groundwater originating from precipitation in the mountains. The two aquifers lie in different soil strata, and are separated by a 60 to 200-foot layer of impermeable Bootlegger Cove Clay. The upper, unconfined aquifer lies in a 30 to 100-foot layer of well-bedded and well-sorted gravel near the surface. This aquifer usually can be accessed at depths of less than 50 feet (CH2M Hill 1994). Fort Richardson's water is supplied primarily by Ship Creek. The Ship Creek "high dam," with a structural height of 50 feet, forms a reservoir that impounds approximately 5

million gallons of water at maximum capacity. All of the domestic water for Fort Richardson and Elmendorf Air Force Base comes from the reservoir. Anchorage also receives part of its water supply from Ship Creek.

2.2.2.5 Biological Resources

2.1.2.5.1 Flora

Fort Richardson falls within the Cook Inlet Lowlands Section of the Coastal Trough Humid Taiga Province of Bailey's Ecoregions of the United States (McNab et al. 1994). Forests in the Anchorage area closely resemble the Boreal Forest of Interior Alaska, although some understory and tree species occur that are typically found in the Coastal Spruce-Hemlock Forest. Fort Richardson's forests have been described as open, low-growing spruce and closed spruce-hardwood forests by Viereck and Little (1972), and as a lowland spruce-hardwood forest by the Joint Federal-State Land Use Planning Commission (Joint Federal-State Land Use Planning Commission for Alaska 1973). Packee (1994), in examining Alaska's forest vegetation zones, characterizes the region as an area where white spruce *(Picea glauca*) and Sitka spruce (*Picea sitchensis*) naturally hybridize, balsam poplar (*Populus balsamifera*) and black cottonwood *(Populus trichocarpa*) intergrade, and mountain hemlock *(Tsuga mertensiana*) may form the subalpine forest. Vegetation reflects the transitional nature of the climate between maritime and continental. This maritime climatic influence has resulted in a lower incidence of natural fire than is found in the spruce-hardwood forests of interior Alaska (Gabriel and Tande 1983).

Upland sites on Fort Richardson are dominated by paper birch (*Betula paperifera*), white spruce, and, on drier sites, quaking aspen *(Populus tremuloides*). Cottonwood and poplar are common in areas bordering principal streams. Black spruce *(Picea mariana*) is the dominant tree in wetter areas and on some well-drained sites. Most bogs are treeless or support stands of stunted black spruce. Grasses, herbs, willows (*Salix* spp.), and alders (*Alnus* spp.) dominate the vegetation in a narrow band along the Inlet and at elevations above 1,500 feet on the Chugach Mountain slopes. White spruce, mountain hemlock, and, to a lesser extent, balsam poplar, are the dominant treeline species in south-central Alaska (Viereck et al. 1992). At upper elevations, graminoid forb meadows, alder, and dwarf birch (*Betula glandulosa/nana*) thickets give way to low-growing alpine vegetation in the Chugach Mountains.

There are no federally listed endangered or threatened plant species on Fort Richardson (Lichvar et al. 1997). There are 20 vascular plant species-of-concern known to occur on Fort Richardson. These plants are being tracked by the Alaska Natural Heritage Program because they are thought to be uncommon or rare in Alaska and/or uncommon or rare globally (Alaska Natural Heritage Program 2006).

On Fort Richardson, there are freshwater and saltwater marshes, bogs, lakes and lake margins, and riparian areas. The post has estuarine, palustrine, riverine, marine, and lacustrine wetlands. There are 2,165 acres of wetlands within Eagle River Flats Impact Area.

2.1.2.5.2 Fauna

Most species indigenous to south-central Alaska can be found on Fort Richardson. Moose are the largest, most abundant, and most sought-after species among hunters and wildlife viewers (Gossweiler 1984; Bennett 1982). The size of Fort Richardson's moose herd makes it the largest concentration of wintering moose in the Anchorage urban area. Other big game species occur on the post but are not hunted. These include grizzly bear, black bear, and Dall sheep *(Ovis dalli*) (Quirk 1994). Small game and furbearers found on Fort Richardson include coyote, wolf, lynx, red squirrel, snowshoe hare, hoary marmot, marten, beaver, river otter, wolverine, red fox, porcupine, and mink. Beluga whales have been sighted within Eagle River Flats as far as 1¼ miles up the Eagle River. They have been observed chasing salmon up drainages along the river bank and are frequent visitors to both the river and Eagle Bay from May to November (Quirk 1994).

A 1994 U.S. Fish and Wildlife Service raptor inventory (Schempf 1995) identified six different types of raptors occurring on Fort Richardson: bald eagle, golden eagle (*Aquila chrysaetos*), northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), Harlan's hawk (dark phase of red-tailed hawk), and sharp-shinned hawk. Although no goshawks were found during this inventory, they are known to inhabit the dense forested areas of the post. Game species include spruce grouse, ptarmigan (*Lagopus spp.*), and numerous ducks and geese. An intensive owl survey conducted by the U.S. Fish and Wildlife Service in 1997 (Browne and Andres 1998) identified three species: great-horned (*Bubo virginianus)*, saw-whet (*Aegolius acadicus)*, and boreal (*Aegolius funereus)*. Since 1994, an ongoing inventory and monitoring of landbirds has been conducted in conjunction with Range and Training Land Assessment, and the U.S. Fish and Wildlife Service has also been assisting USAG-AK with bird surveys. A total of 40 bird plots have been established in conjunction with Range and Training Land Assessment, and two Measuring Avian Productivity and Survival surveys have recorded 55 species. Inventories conducted by the Environmental Research and Development Center, Cold Regions Research Center have identified 103 avian species, including 25 waterfowl species, have been identified in the salt marsh or the surrounding forested border of Eagle River Flats (Steele and Reitsma 1991-1994; Collins et al. 1995-2003).

Fort Richardson is part of the Anchorage Area Management Unit for fisheries administered by the Alaska Department of Fish and Game. The Alaska Department of Fish and Game periodically stocks rainbow trout, landlocked salmon, and arctic char in the four managed lakes. The Alaska Department of Fish and Game also maintains records of fish harvested from post streams and rivers. Species of game fish occurring in these waterways include silver salmon, king salmon, red salmon (*Oncorhynchus nerka*), chum salmon (*Oncorhynchus keta*), pink salmon (*Oncorhynchus gorbuscha*), and Dolly Varden *(Salvelinus malma*). Fort Richardson's only significant non-game fish are the three-spine stickleback (*Gasterosteus aculeatus*) and the slimy sculpin. One other species recorded on Elmendorf Air Force Base, and probably found on Fort Richardson, is the nine-spine stickleback (*Pungitius pungitius*) (Roth et al. 1983).

No federally listed threatened or endangered animals inhabit Fort Richardson. No reptiles are known to occur on Fort Richardson. One species of amphibian, the wood frog, is found on the post. The frog is common in bogs, freshwater and saltwater marshes, and lake margins. In Eagle River Flats, it is an important prey species for migrating sandhill cranes (CH2M Hill 1994).

2.1.2.6 Restoration Sites

Fort Richardson has five Superfund operational unit sites. In 1994, Fort Richardson was placed on EPA's National Priorities List (under Superfund) and Eagle River Flats was designed as a Superfund site due to un-oxidized white phosphorus from smoke producing ammunition. The Record of Decision stipulated the remedial action objectives (extensive drainage of ponds within Eagle River Flats to allow oxidation of white phosphorus, 50% reduction in waterfowl mortality (from the baseline of 1996) within 5 years, and reduction of mortality to 1% of the total waterfowl population within 20 years) for the site. The reduction in waterfowl mortality has been achieved within the limits of statistical analysis. Eagle River Flats will remain a Superfund site for the foreseeable future. The remaining four Superfund sites have little effect on natural resources.

2.1.2.7 Acreage, Acquisition, and Land Status

Fort Richardson encompasses approximately 61,000 acres. Due to federal government domination of most land in Alaska in the 1940s and the small population of Anchorage at that time (less than 10,000), land acquisition for military purposes was relatively uncomplicated. Most public domain land was acquired for military use by executive orders and public land orders. Several small parcels of private land,

e.g., homesites and homesteads, were purchased outright by the Army and are owned as fee simple. Fort Richardson land acquisition is shown in Figure 2-4.

Figure 2-4. Fort Richardson Land Acquisition.

In 1939, an executive order was issued that withdrew 36,570 acres of land from the public domain placing it under War Department jurisdiction. This land, along with small fee-based (private land) acquisitions, subsequent executive orders and public land orders make up the predominant land base of Fort Richardson today. Between 1939 to 1945, approximately 151,180 acres of land were withdrawn for military use. Fort Richardson originally resided on land that Elmendorf Air Force Base currently occupies. In 1950, Fort Richardson was moved east to its current location, and 9,042 acres were transferred to the Air Force, which later became Elmendorf Air Force Base. From 1945 to 1955, the military returned approximately 85,000 acres to the Department of the Interior. Many executive orders stipulated the return of these lands following the end of World War II. A letter from the Secretary of the Interior, dated Oct. 27, 1952, granted permission for the military to retain jurisdiction over withdrawn lands until they were not needed for military use. From 1955 to 1965, the Department of the Army released approximately 10,000 acres to various entities such as the U.S. Air Force, State of Alaska, and the Bureau of Land Management, and acquired approximately 6,000 for Army use. From 1966 to the present, Fort Richardson's boundaries have remained fairly stable. Leases from the Bureau of Land Management have expanded the boundary to the east and in the south.

2.1.2.8 Installation History

In 1939, increasing world tensions caused the establishment of Elmendorf Field just outside of Anchorage. One year later, the name Fort Richardson was adopted by the U.S. War Department in memory of Brigadier General Wilde P. Richardson, a Texas engineer and 1884 West Point graduate who served three tours of duty in the rugged Alaska Territory between 1897 and 1917. Fort Richardson's first mission was defense of southern Alaska by establishing a permanent air base, supply depot, and garrison. When the Japanese attacked Pearl Harbor in 1941, Fort Richardson was charged with defending Alaska from invasion and coordinating the Alaskan war effort. As the war progressed, Fort Richardson's mission expanded significantly as the logistics base for numerous Army garrisons and the Air Corps.

After World War II, the U.S. Department of Defense reduced military forces in Alaska. Fort Richardson and Fort Wainwright (known at that time as Ladd Army Airfield) were the only two Department of Defense installations in Alaska not placed on housekeeping status. Nevertheless, Fort Richardson relinquished much of its training lands, excessing over 80,000 acres of training and maneuver lands, and over one million acres of bombing ranges. In addition, approximately 13,000 acres were transferred to the Air Force. After the establishment of the Air Force as a separate service in 1947, the Army post was rebuilt on its present location in 1950.

In December 1974 the post became headquarters for the 172nd Infantry Brigade (Alaska) in January 1975. In a subsequent realignment in March 1986, the 172nd gave way to the 6th Infantry Division (Light) and United States Army Garrison, Alaska. The division became aligned more closely with the Defense Department's forces in the Pacific when, in 1989, it began reporting to the U.S. Army Western Command in Hawaii (later re-designated United States Army Pacific). The 6th Infantry Division (Light) was inactivated July 1994, and Fort Richardson became headquarters for United States Army Alaska. In 1998, the 1st Brigade, 6th Infantry Division (Light) was deactivated, and the 172nd Infantry Brigade was reactivated. In May 2004 the 172nd Infantry Brigade was converted to a Stryker Brigade Combat Team

and the 1st-501st Airborne Battalion to an Airborne Task Force. In late 2005, the 1st-501st Airborne Task Force was converted to the 4th-25th Airborne Brigade Combat Team.

2.1.2.9 Historic Natural Resources Program Development

Forest management on Fort Richardson dates to 1955 when mapping of forest types was completed (Quirk 1990). This mapping delineated forest stands for management purposes. Since the 1950s, firewood and Christmas trees have been harvested on a limited annual basis. Fish and wildlife management on Fort Richardson predates statehood, beginning in the mid-1950s when the first steps were taken toward fish management. In 1953, rainbow trout were stocked in a few post lakes. Stocking has since continued annually. Two years later, a land management plan was drafted that included provisions for fish and wildlife management (Gossweiler 1984). In 1956 and 1957, wild rice was sown by helicopter on Eagle River Flats to improve waterfowl habitat. This was successful, and wild rice became established in the marsh (Fort Richardson 1963).

In 1972, the post hired a civilian natural resources specialist as part of a new environmental team, which also was responsible for the other lands under the Alaska Command (Quirk et al. 1978). The first wildlife management plan for Fort Richardson was completed in 1982 (Bennett 1982), followed by the first natural resource management plan in 1984 (Gossweiler 1984). By the early 1990s, waterfowl mortality in Eagle River Flats emerged as the most significant natural resources issue on the post. A series of intensive evaluations and remedial investigations (CH2M Hill 1994; Racine et al. 1993) followed, and in 1994, Environmental Protection Agency placed Fort Richardson on the National Priorities List.

The 1998-2002 Integrated Natural Resources Management Plan (INRMP) was the first INRMP developed and implemented under the new requirements of the 1997 Sikes Act Amendments. The 2002-2006 INRMP was implemented and many of the proposed projects in this plan lead to the enhancement of natural resources on Fort Richardson. This current INRMP is an update of the 2002-2006 Fort Richardson plan. This INRMP continues to carry out many projects for the enhancement of natural resources on Fort Richardson.

2.2 U.S. Army Mission in Alaska

The United States Army must maintain its capability to put overwhelming land combat power on future battlefields and defeat potential enemies. Decisive victories depend on the Army's ability to rapidly deploy, fight, self-sustain, and win quickly with minimum casualties. As the Department of Defense's premiere land force, the Army relies on land to achieve its training and testing objectives and maintain force readiness. Force readiness depends on high quality, realistic training. The Army must train as it will fight. Realistic training areas and ranges are required to fully train Soldiers. A Soldier does not fire his/her weapon alone in battle. The Soldier's entire squad, platoon, company, and even battalion must coordinate their efforts to prevent any friendly fire accidents. This skill must be practiced on large-scale training areas and ranges that realistically portray a combat environment before going to war.

To accomplish this goal, the Army has separated garrison installation management and support functions from the warfighter, allowing the warfighter to focus entirely on the training mission. In Alaska, the Army warfighter component, U.S. Army Alaska, contains the units and Soldiers that train, deploy, fight, self-sustain and win. The Stryker Brigade Combat Team, Airborne Brigade Combat Team and Aviation Task Force comprise a large portion of U.S. Army Alaska. Installation support operations, such as range operations, logistics, public works, and environmental are now known as U.S. Army Garrison Alaska (USAG-AK).

2.2.1 U.S. Army Alaska Mission

The mission of U.S. Army Alaska is to provide trained and equipped forces to rapidly deploy in support of worldwide joint military operations, crisis response and peacetime engagements; maintain quality of life and force projection platform; field the 4th Brigade Combat Team 25th Infantry Division; and serve as the Army component command to Alaskan Command. U.S. Army Alaska faces several challenges in accomplishing its mission. One of these is ensuring that training facilities are capable of supporting all required training events while integrating environmental stewardship into daily operations. As these critical challenges are met, U.S. Army Alaska also must continue to maintain a positive rapport with local communities.

U.S. Army Alaska currently has two major subordinate tactical commands, the 172nd Infantry Stryker Brigade Combat Team and the 4th-25th Airborne Brigade Combat Team. The mission of the Stryker Brigade Combat Team is "on order, deploy worldwide, secure a lodgment, and conduct military operations in support of U.S. national interests." The mission of the Airborne Brigade Combat Team is to "build, transform, train, deploy, and employ an Airborne Brigade Combat Team that is capable of conducting forcible entry and full spectrum operations anywhere in the world."

2.2.2 U.S. Army Garrison Alaska (USAG-AK) Mission

USAG-AK is obligated to provide the best training for our military forces so that they will be ready to defend our nation in times of crisis. USAG-AK mission objectives are to (1) plan and execute deployment support, force protection, and contingency operations, (2) plan and execute transformation of the installation that supports Stryker and other mission units, (3) provide quality installation support and service to our customers, (4) provide proper stewardship of all resources and the environment, (5) sustain strong community relations, (6) and provide for the well being of the Army Family into the 21st Century. For generations, Alaska has looked to USAG-AK as the leader in both training and environmental management. USAG-AK will continue this mission without compromise.

2.1.3 Relationships between Natural Resources and the Military Mission

The conservation of natural resources and the military mission will not be mutually exclusive.[2]

In many respects, U.S. Army Alaska's mission is highly dependent on natural resources, but at the same time it is moderately taxing on some of those resources. The Army's Integrated Training Area Management program mitigates some damage caused by this mission and other programs within this INRMP will prevent or reduce future damage. Pending no further land or resource losses, it is anticipated that USAG-AK will continue to provide a sufficient arena for current and future mission requirements.

2.1.3.1 Army Training in Alaska

Army training includes home station training (in Alaska), national combat training center rotations (outside Alaska), joint training exercises, and operational deployments in support of national directives. Home station training and joint training exercises impact natural resources in Alaska. In general, squad, platoon and some company training events would be conducted at Fort Richardson and Fort Wainwright, and remaining company, battalion and brigade training events would be conducted at Donnelly Training Area. Unit training events are defined by a basic event type (e.g., command post exercise), the size of the unit (e.g., battalion, company), and the type of unit (e.g., infantry, engineer). Basic unit training events

[2] AR 200-3, *Natural Resources-Land, Forest, and Wildlife Management*, para 2-11.

include individual weapons qualification, common military training, crew weapons qualification, crew weapons sustainment, command post exercise, command field exercise, situational training exercise, fire coordination exercise, field training exercise, live-fire exercise, tactical exercise without troops, and map exercise. Each of these training events requires different range or training assets and has a different impact on training lands. Activities associated with these events have been analyzed in the *Final Legislative Environmental Impact Statement for Alaska Army Land Withdrawal Renewal, Vol. 1-2* (U.S. Army Alaska 1999) and the *Final Environmental Impact Statement for Transformation of U.S. Army Alaska, Vol. 1-2* (U.S. Army Alaska 2004).

2.1.3.2 Impacts of Army Training on Natural Resources

2.1.3.2.1 Past Impacts

USAG-AK lands were all withdrawn during or since World War II. Military use has changed the landscape from its original, pristine condition through construction and weapons and maneuver training. While military use has degraded these pristine habitats from the original condition before World War II, the withdrawal of land for military use has had a long-term positive effect on natural resources, as the areas likely would have otherwise been enveloped by the expansion of Anchorage, Fairbanks and North Pole. Most of the land outside of the Main Post cantonment areas remains undeveloped, affected only by training impacts. In 1970, USAG-AK adopted a policy of actively conserving natural resources. Proactive natural resources conservation programs since then have mitigated impacts from military training and have resulted in positive impacts on natural resources.

2.1.3.2.2 Present Impacts

Military training can be separated into two broad categories that can cause impacts to natural resources: maneuver training and (live-fire) weapons training. While these two activities can be conducted at the same time (especially on the new Battle Area Complex and Multi-Purpose Training Ranges), maneuver generally occurs in training areas and weapons training occurs on live-fire ranges and impact areas.

Maneuver training is conducted primarily in training areas, a space for ground and air combat forces to practice movements and tactics. Each training area is managed and scheduled by Range Control. Different unit types may work in support of one another (combined arms), or the unit may operate on its own to practice a specific set of tasks. Included in these training areas are bivouac sites, maneuver areas, roads, trails, base camps, drop zones, landing zones, observation points and other miscellaneous training sites. Primary impacts to soils, vegetation and wetlands occur from driving vehicles on and off-road. Localized impacts can occur in bivouacs, base camps and assembly areas from digging, vegetation damage, spills and trash. These activities also carry the minor risk of the potential for hazardous waste spills or fire starts. These activities can cause erosion, road degradation, creation of new trails and long-term habitat change.

Live-fire weapons training also have land-based requirements. Direct fire weapons training occurs primarily on firing ranges; indirect fire weapons training occurs on mortar or artillery firing points and munitions from firing ranges land in surface danger zones or impact areas. A live-fire operation is defined as a training event that uses service (or real) ammunition as opposed to blank ammunition. A direct fire operation occurs when ammunition is delivered on target by sighting directly on the target using the weapon system's sighting equipment. During a direct live-fire event, Soldiers maintain an unimpeded direct line-of-sight between their location and the targets, while shooting real bullets at those targets. Indirect fire means that weapons are fired up in the air at a trajectory. Soldiers do not maintain an unimpeded direct line-of-sight between their location and targets, but rather track munitions through a forward observer or other technological means. Live-fire ranges are maintained and targets replaced on a regular basis to provide realistic training. While some impacts occur on range berms and targets locations, most impacts on the environment occur in impact areas. Impacts to soils, water, and vegetation from live-

fire weapons training include cratering, target scrap, munitions residues and the potential for unexploded ordnance and fire starts.

The Army recognizes that training to doctrinal standards under realistic combat conditions will affect the environment. Providing premiere and realistic training opportunities requires training lands to be in good environmental condition. It is in overcoming the apparent conflict between force readiness and environmental stewardship that the Integrated Training Area Management program serves the overall needs of the Army. The Integrated Training Area Management program essentially acts as an ongoing mitigation program for Army maneuver training activities. It is the Army's formal strategy for focusing on sustained use of training lands, and it provides the Army with the sound planning and execution mandatory to protect Army land as an essential asset for training. The integration of stewardship principles into training land and conservation management practices ensures that the Army's lands remain viable to support future training and mission requirements.

As part of the Integrated Training Area Management program USAG-AK has developed a hierarchical classification system (termed environmental limitations overlays) for use with existing military installation maps to inform Soldiers and units where, when and how military operations can be conducted. These classifications are applicable to all Alaska Army training lands and are used by military units and Range Control when making scheduling decisions. These overlays serve as the primary guide in regulating and minimizing surface disturbance from maneuver and general military training in the field. USAG-AK is also conducting soil and water quality monitoring in impact areas to identify and detect if any munitions residues are moving out of impact areas. Preliminary data from these studies suggests that munitions residues are not moving out of impact areas through surface water, groundwater, wind-blown soils or wildlife.

There are also positive effects of the military mission on natural resources. The U.S. Army Alaska military mission fosters relatively healthy, stable ecosystems. The most basic and significant reason for this is found in the very nature of the infantry's use of the land. While infantry-related exercises may cause localized damage, they very seldom threaten ecosystems or biodiversity. Also extremely important is USAG-AK's commitment to natural resources management, including minimizing and mitigating military mission damage. This commitment is beneficial for both natural resources in general and people who use them. Instead of conflict with the mission, natural resources management emphasizes the accomplishment of multiple objectives for both natural resources management and military training. Habitat enhancement areas (especially habitat enhanced for species that depend on primary successional vegetation such as moose, bison or grouse) are often used as bivouac areas for training. Conversely, training exercises can be used as a tool to accomplish natural resource management objectives.

2.1.3.2.3 Future Impacts

Impacts of the continuing withdrawal of land for military purposes are addressed in the *Final Legislative Environmental Impact Statement for Alaska Army Land Withdrawal Renewal, Vol. 1-2* (U.S. Army Alaska 1999). Impacts of current and future military activities on Army lands are addressed in the *Final Environmental Impact Statement for Transformation of U.S. Army Alaska, Vols. 1 and 2* (U.S. Army Alaska 2004). Activities at Donnelly Training Area are further analyzed in the *Final Environmental Impact Statement for the Construction and Operation of a Battle Area Complex and a Combined Collective Training Facility within U.S. Army Training Lands in Alaska* (U.S. Army Alaska 2006a). The *Environmental Assessment and Finding of No Significant Impact for Conversion of the Airborne Task Force to an Airborne Brigade Combat Team* covers additional changes (U.S. Army Alaska 2005a). These respective National Environmental Policy Act documents address the regular ongoing impacts of U.S. Army Alaska's new missions, the transformation/conversion of the 172nd Separate Brigade Combat Team and the 1st-501st Airborne Task Force, and the construction and use of the Battle Area Complex and Combined Arms Collective Training Facility ranges at Donnelly Training Area. The impacts of the

maneuver missions will be predicted using the Army's Training and Testing Area Carrying Capacity methodology (U.S. Army Alaska 2004). Future impacts to natural resources as a result of a mission changes that are not covered under current planning documents will be addressed by separate National Environmental Policy Act documentation. Natural resource management is not an option for the USAG-AK. In addition to the Sikes Act requiring natural resource management on all military (including withdrawn) lands, natural resource management is required mitigation for all of these National Environmental Policy Act documents.

2.1.3.3 Impacts of Natural Resources on Army Training

Military training is affected by limitations imposed by natural resources on USAG-AK lands. Most limitations involve wetlands protected by executive order, federal and state laws, and Army policies, but also include limitations resulting from species at risk, Migratory Bird Treaty Act vegetation clearing guidelines, special interest areas, outdoor recreation, wildlife calving, and Superfund clean-up. All these factors are included into the environmental limitations overlay, which communicates these limitations to units and Soldiers.

The elimination of training with white phosphorous munitions on Fort Richardson was imposed in 1991. White phosphorus is commonly used to mark targets for air strikes. Without its use, the Army and Air Force must now rely on lasers to mark targets. Another impact to the military mission is artillery units that normally trained at Eagle River Flats now have to travel to Donnelly Training Area to train with white phosphorous munitions.

CHAPTER 3. MANAGEMENT STRATEGY AND SUSTAINABILITY

3.1 Ecosystem Management

USAG-AK's natural resources program has traditionally been based on multiple use management philosophies. Military training, however, is the primary land use. This philosophy will continue through 2007-2011, with one important addition – maintaining functional ecosystems is now the goal of land and natural resources management programs. "Realistic training lands" are often quoted as essential needs by military trainers. For training to be realistic, the military must train in non-degraded ecosystems with natural vegetation and terrain features. Such ecosystems must also be maintained for the long-term because the acquisition of new training lands is difficult at best. This means that functional ecosystems on Army lands must be sustained indefinitely. Thus the future of USAG-AK and the U.S. Army Alaska military mission, as well as the local communities that depend upon the USAG-AK lands, relies on maintaining functional ecosystems.

3.1.1 Introduction

The Department of Defense has endorsed ecosystem management nationwide. The Department of Defense goal with regard to ecosystem management is: *"To ensure that military lands support present and future training and testing requirements while preserving, improving, and enhancing ecosystem integrity. Over the long term, that approach shall maintain and improve the sustainability and biological diversity of terrestrial and aquatic (including marine) ecosystems while supporting sustainable economies, human use, and the environment required for realistic military training operations.*"[3] Ecosystem management goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance with environmental laws, quality of life, and integration. The specific ecosystem management goals and objectives for USAG-AK are listed below:

- Provide an indicator of ecosystem integrity, status of sensitive species or communities, and other special interests.
- Implement an adaptive management strategy by providing current and predictive natural resources information that will affect land use decision-making.
- Pinpoint areas where management could positively affect ecosystems.
- Protect and conserve all biological communities, including game and nongame species.
- Ensure that USAG-AK's natural resources program is coordinated with other agencies and conservation organizations with similar interests.
- Sustain natural landscapes required for the training and testing necessary to maintain military readiness.
- Provide the greatest return on Department of Defense's investment to preserve and protect the environment.
- Expedite the environmental compliance process and help avoid conflicts.
- Engender public support for the military mission.
- Improve the quality of life for military personnel.

Objectives and guidelines for achieving these goals are listed below:

[3] Department of Defense Instruction Number 4715.3, Environmental Conservation Program, May 3, 1996, specifically Enclosure 6.

- Develop a vision of ecosystem health.
- Develop priorities and reconcile conflicts in land use decisions.
- Maintain and improve the sustainability and native diversity of ecosystems.
- Administer with consideration of ecological units and evolutionary time frames.
- Support sustainable human activities.
- Develop and implement coordinated approaches to work toward ecosystem health.
- Use benchmarks to monitor and evaluate outcomes.
- Implement through installation plans and programs.
- Support the military mission.
- Use joint planning between natural resources managers and military operations personnel.
- Integrate conservation of ecosystem integrity into Integrated Natural Resources Management Plan, Integrated Training Area Management, and other planning protocols.
- Involve internal and external stakeholders up front.
- Emphasize the regional (ecosystem) context.
- Involve scientists and use the best science available.
- Concentrate on results.

3.1.2 Current Management

As stated above, the goal of the ecosystem management program is to maintain ecosystem integrity while continuing to train Soldiers to a high level of military readiness. Ecosystem integrity, sometimes referred to as biodiversity, includes the concept of biological diversity as well as the ecological and evolutionary processes that contribute to the maintenance of functioning ecosystems and the production of biological diversity itself. Ecosystem integrity also encompasses several levels and geographic scales in the hierarchy of life, including ecosystem diversity, community diversity, species diversity, and genetic diversity (Noss and Cooperrider 1994). USAG-AK is using an ecosystem management process to maintain ecosystem integrity by managing for a large number of species simultaneously, managing for a variety of habitats and structural vegetation types, and striving to maintain natural processes on the landscape.

The Department of Defense is developing a policy for the management of ecosystem integrity that will use the Integrated Natural Resources Management Plan (INRMP) process as the implementation tool. A first step in this process was the preparation of *A Department of Defense Biodiversity Management Strategy* (The Keystone Center 1996). In that report, the authors note that the challenge is "*to manage for biodiversity in a way that supports the military mission.*" The Keystone Center strategy identifies the INRMP as the primary vehicle to implement protection of ecosystem integrity on military installations.

Conservation of ecosystem integrity is a large commitment, and ecosystem management is increasingly recognized as an important means to achieve this commitment. Although ecosystem management is not mandated by law, its implementation is a proactive approach that will help in the process of complying with existing environmental laws such as the Endangered Species Act, Sikes Act, Clean Water Act, and National Environmental Policy Act.

3.1.3 Proposed Management

USAG-AK will continue to implement the ecosystem management process as a foundation and integrator for all other management programs. The procedures for implementing ecosystem management are found in Volume III of this document. USAG-AK has developed a number of proposed ecosystem management prescriptions for each ecosystem management unit found in Volume IV, Prescriptions.

3.2 Watershed and Wetlands Management

In previous versions of the Army's natural resource management planning documents, the first component of natural resources plans was referred to as "land management." This section of the plan dealt with programs and policies relating to the management of soils and vegetation. In this version of the INRMP, the first primary component is termed "watershed and wetlands" management to emphasize the interrelationship between soil and vegetation and the water resources that bind them together and help to define them. Therefore, this watershed and wetlands component plan to the INRMP will attempt to integrate soil, vegetation and water resources management, a foundation for the following forestry and wildfire, fish and wildlife, outdoor recreation, and rare, threatened and endangered species component plans.

3.2.1 Introduction

Watershed and wetland management goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. Army Regulation 200-1 and Army Regulation 200-3 establish the following objectives for soil, vegetation, and water resources on Army lands:

- Conserve all soil, vegetation, and water resources.
- No net loss of wetlands.
- Ensure that USAG-AK is in compliance with all applicable federal and state laws and regulations regarding wetlands.
- Provide wetland areas for realistic military training, while maintaining ecosystem integrity and minimizing impacts to wetlands.
- Distribute wetland management prescriptions to all user groups: military, recreationalists, Directorate of Public Works, and Alaska Fire Service.
- Promote early coordination between installation staff and the Environmental Resources Department to prevent adverse impacts to wetlands.
- Control or eliminate sources of pollution to surface water or groundwater through conventional or innovative treatment systems.
- Demonstrate leadership in attaining the national goal of zero discharge of water pollutants.
- Provide drinking water that meets applicable standards.
- Cooperate with federal, state, and local regulatory authorities in forming and implementing water pollution control plans.
- Control or eliminate runoff and erosion through sound vegetative and land management practices.

USAG-AK will continue to implement the watershed and wetlands management program. A much more detailed management component plan is found in Volume II, Annex B. Projects to be completed during 2007-2011 are also found in Volume II, Annex B. The procedures for implementing watershed and wetlands management are found in Volume III, Supplements. Site-specific goals, objectives, and projects are found in Volume IV, Prescriptions.

3.2.2 Soil Resources Management

Soil resources management on USAG-AK lands entails the conservation of soils as the foundation of other natural resources. USAG-AK contributes to soil conservation through surveys, monitoring, rehabilitation, and effective management strategies. These components of soil resources management are described in the sections below. More details on soil resources management can be found in Volume II, Annex B, Section B2.1.

3.2.2.1 Soil Resources Inventory and Monitoring

USAG-AK conducts both planning level soil surveys and soil resource monitoring. The first program, planning level surveys, inventories the soil and topography resources present across the entire installation. The Integrated Training Area Management program conducts annual monitoring of soils and vegetation through the Range and Training Land Assessment program.

3.2.2.1.1 Soils Planning Level Survey

The initial step to be taken in the development of a multiple use natural resources management program requires an inventory and classification of the resources present and their status. The draft Natural Resources Guidance from Army Chief of Staff for Installation Management (2005) indicates that in addition to other surveys, the installation must identify and evaluate the condition of soil resources. USAG-AK will identify and map soils, correlate soils to permafrost areas, and establish relationships among terrain components. Soil surveys are essential for establishing a database to plan effective management of withdrawn public lands. Soils data are required for input into the military training and scheduling process.

3.2.2.1.2 Topographical Planning Level Survey

Conduct ten-year update of a topographical planning level survey. An accurate topographical planning level survey is required by Army Regulation 200-3 and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act).

3.2.2.1.3 Soil Monitoring

Soils monitoring is conducted through the Range and Training Land Assessment program, the monitoring component of the Integrated Training Area Management program. Current and past disturbance resulting from military training and recreational use is delineated and quantified in terms of "land condition." Annual Range and Training Land Assessment reports detail the levels of disturbance and land condition on Forts Richardson and Wainwright.

3.2.2.2 Soil Resources Rehabilitation and Management

Soil resources management consists primarily of prevention activities and actual restoration of disturbed areas. The Integrated Training Area Management Five Year Management Plan contains best management practices, which are in concert with installation storm water prevention techniques. Restoration of disturbed areas is conducted by both installation management erosion control and streambank stabilization programs, as well as the mission-related Land Rehabilitation and Maintenance program.

3.2.2.2.1 Erosion Control and Streambank Stabilization

Installation sources of dust, runoff, silt, and erosion debris are controlled to prevent damage to land, water and air resources, equipment, and facilities, including those on adjacent properties. A protective vegetative cover is maintained over all compatible areas. USAG-AK uses bio-engineered erosion control practices when possible, including live plantings, root wads, coir logs, and spruce tree revetments, to provide erosion protection and habitat for fish and wildlife. Other materials that are used for erosion control include gravel, fabrics, mulch, riprap, and other materials that are environmentally safe and compatible with the site and approved by the Alaska Department of Natural Resources, Office of Habitat Management and Permitting. When bare ground is required to accomplish mission objectives, other soil conservation measures are used to control dust, erosion, and sedimentation.

3.2.2.2.2 Land Rehabilitation and Maintenance

Land rehabilitation and maintenance consists of strategies and resource allocations for resting and repairing the soils on training lands on a rotational basis as well as repairing other problem erosion areas as the need arises. Land rehabilitation and maintenance includes programming, planning, designing, and executing land rehabilitation and maintenance projects based on requirements and priorities identified by the Training Requirements Integration and Range and Training Land Assessment components of the Integrated Training Area Management program.

3.2.2.2.3 Agriculture/Grazing Outlease

Leasing of land for uses that are compatible with mission requirements can reduce installation maintenance efforts, provide opportunities for accomplishing land maintenance by the lessee at no cost to the installation, provide funds which the Army can use to support leasing efforts and other natural resources requirements, and support community relations and the local economy. While there currently are no outleases on USAG-AK lands, USAG-AK will continue to search for opportunities that could contribute to soil resources management.

3.2.3 Water Resources Management

Water resource management goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and program integration. Surface water management consists of protecting creek sides, streambanks, lake shores, and immediately adjacent areas that are easily damaged. Groundwater management consists of restoration projects to resolve individual sources of pollution. These projects are not classified as natural resources management and are not included within this INRMP. More details on water resources management can be found in Volume II, Annex B, Section B2.2.

3.2.3.1 Water Resources Inventory and Monitoring

USAG-AK water resources inventory is accomplished by conducting planning level surface water surveys as well as annual surface water and groundwater monitoring. The first program, planning level surveys, delineates the extent of surface water across all of USAG-AK's lands. Surface water monitoring focuses on monitoring water surrounding impact areas. The responsibility for groundwater monitoring does not fall within the natural resources program within the Department of Defense system of environmental management. However, a brief summary of groundwater monitoring is provided to show its importance as an environmental compliance activity.

3.2.3.1.1 Surface Water Planning Level Survey

USAG-AK conducts surface water planning level surveys to delineate the extent of surface water across all 1.6 million acres of USAG-AK lands. Shifting waterlines caused from glacially fed riverine systems results in constantly changing surface water boundaries. Maintain and update a "fence line to fence line" surface water planning-level survey. This survey is required to be updated at least once every ten years.

3.2.3.1.2 Surface Water Monitoring

Monitoring water quality is important for measuring ecosystem health. Surface water monitoring will be conducted to evaluate the presence of munitions residues from impact areas. USAG-AK is developing monitoring protocols to evaluate soil and water quality to monitor soils and water for potential heavy metals and munitions residues. Surface water sampling locations will be concentrated where rivers and creeks enter and leave the installation. Soil sampling will occur in rivers and creeks at the edge of the impact areas. Soil and water quality monitoring evaluates water quality coming onto and leaving USAG-AK lands and identifies any potential residues leaving the impact area. Water quality monitoring is required to comply with the Clean Water Act and other environmental laws and regulations, as well as to

formulate options for managing those species particularly dependent upon high water quality, as required by the Sikes Act and Army Regulation 200-3.

3.2.3.1.3 Groundwater Monitoring

Groundwater monitoring will continue as part of programs implemented by the Environmental Resources Department. What little contamination that has been detected is at very low levels and is of no threat to human health. Groundwater levels in the wells are monitored each month, and extensive chemical testing is conducted on a quarterly basis. Monitoring groundwater was emphasized after Fort Wainwright and Fort Richardson was placed on the National Priorities List in 1994. The resulting Federal Facilities Agreement has commitments from U.S. Army Alaska to monitor this critical resource. As a result, USAG-AK has installed about 100 monitoring wells over the years. This program is important to natural resources management, but is not considered a natural resources function. Rather, it is a responsibility of the compliance and/or restoration program, and therefore, details of this program are not included within this INRMP.

3.2.3.2 Water Resources Management

Managing water quality on lands consists of developing best management practices designed to reduce chemical release from expended munitions in the impact areas. Activities such as moving targets away from open water and wetlands reduce the likelihood that potential releases may occur. Water quality management is required to comply with the Clean Water Act and the Sikes Act, which requires “no net loss” in the capability to support the military mission of Forts Richardson and Wainwright. Water resources management actions in USAG-AK are centered around storm water planning and management, erosion control, best management practices, and impact area management.

3.2.3.2.1 Storm Water Pollution Prevention Plan

USAG-AK has a storm water plan for both Fort Wainwright and for Fort Richardson. The storm water plan sets the framework for which all construction projects must follow in terms of storm water management (USAG-AK 2003).

3.2.3.2.2 Erosion Control Best Management Practices

USAG-AK employs a set of best management practices. These best management practices help to ensure sediment and other runoff does not end up in wetlands or other waters of the U.S. These best management practices are all listed in the Integrated Training Area Management Five Year Management Plan (U.S. Army Alaska 2005).

3.2.3.2.3 Impact Area Management

Managing water quality consists of developing best management practices designed to reduce potential release from expended munitions in the impact areas. Activities such as moving targets away from open water and wetlands reduce the likelihood that potential releases may occur. Water quality management is required to comply with the Clean Water Act and the Sikes Act, which requires “no net loss” in the capability to support U.S. Army Alaska’s military mission.

USAG-AK recognizes that the release of contaminants into the environment and response actions to clean up those contaminants may result in adverse impacts to natural resources addressed in this INRMP. The Installation Restoration Program is responsible for identifying such releases, considering risks and assessing impacts to the environment (including impacts to endangered species, migratory birds and biotic communities), and developing and selecting response actions when unacceptable risk to ecological receptors from the release is likely. The installation's natural resources management staff, in coordination with the U.S. Fish and Wildlife Service and Alaska Department of Environmental Conservation, will

identify when required, the potential impacts to natural resources caused by the release of contaminants and communicate those impacts to the Installation Restoration Program.

3.2.4 Vegetation Management

Vegetation management on USAG-AK lands entails the conservation of vegetation for military cover and concealment, wildlife habitat, timber, and erosion control. USAG-AK contributes to vegetation conservation through surveys, monitoring, rehabilitation, and effective management strategies. More information on vegetation management can be found in Volume II, Annex B, Section B2.3.

3.2.4.1 Vegetation Inventory and Monitoring

Vegetation inventory efforts are accomplished by conducting comprehensive "fence line-to-fence line" flora and vegetation community planning level surveys. Vegetation monitoring is accomplished through the Range and Training Land Assessment program.

3.2.4.1.1 Flora Planning Level Survey

USAG-AK conducts a baseline floristic survey to identify all vegetative species that occur on all USAG-AK lands. This survey is updated at least once every ten years to determine trends in floristic biodiversity and to improve the quality of the floristic database. Floristic inventory activities set the foundation on which many decisions regarding land management are based.

3.2.4.1.2 Vegetation Communities Planning Level Surveys

USAG-AK also conducts a vegetation communities survey for all of its lands. This survey is also updated at least once every ten years. Vegetation surveys are conducted as part of an ecological land classification that synthesizes results from integrated resources studies to map ecologically sensitive portions of the landscape to facilitate land management and minimize impacts to ecosystems. The project is designed to emphasize three aspects of ecosystem management: the sensitivity and recovery of ecosystems to disturbance, permafrost distribution and relative stability, and the value of wildlife habitats. The identification of ecologically sensitive areas and threats to these areas are critical to management of the entire installation.

3.2.4.1.3 Vegetation Monitoring

Vegetation monitoring is conducted through the Range and Training Land Assessment program, the monitoring component of the Integrated Training Area Management program. Current and past disturbance to vegetation resulting from military training and recreational use is delineated and quantified in terms of "land condition." The Annual Range and Training Land Assessment reports detail the levels of disturbance and land condition on USAG-AK lands.

3.2.4.3 Vegetation Management

All five of the Integrated Training Area Management components support vegetation management. Range and Training Land Assessment monitors vegetation condition, Land Rehabilitation and Maintenance repairs and revegetates disturbed areas, Training Requirements Integration schedules training on areas that can support that training, and Sustainable Range Awareness minimizes vegetation damage through soldier education. Geographical Information System displays and maintains data of vegetation. The Integrated Training Area Management program is described in more detail below in Section 3.2.8.5.

Vegetation is also managed through the USAG-AK forestry and fish and wildlife programs. Hand thinning, mechanical methods, and prescribed fire are all used to improve wildlife habitat, reduce hazard fuels, conduct timber stand improvement, improve accessibility and maneuverability, and maintain

overhead cover. Other programs also affect vegetation. Both range maintenance and roads and grounds maintenance control vegetation to maintain roads, maintain ranges, increase accessibility to facilities, and improve sight lines to range targets.

3.2.5 Wetlands Management

Wetlands are of critical importance to the protection and maintenance of living resources, including a significant number of endangered and threatened species, as they provide essential breeding, spawning, nesting, and wintering habitats for a major portion of the nation's fish and wildlife species. Wetlands also protect the quality of surface waters through impeding the erosive forces of moving water and trapping waterborne sediment and associated pollutants, protecting regional water supplies by assisting the purification of surface and groundwater resources, maintaining base flow to surface waters through the gradual release of stored flood waters and groundwater, and providing a natural means of flood control and storm damage protection through the absorption and storage of water during high runoff periods.

Wetlands management on USAG-AK lands is implemented on the primacy of completing the military mission and the belief that effective training can be accomplished with minimal long-term environmental damage while complying with applicable laws and regulations. Effective training/testing and environmental stewardship are compatible and necessary for the maintenance of a quality military training/testing environment and protection of sensitive wetland areas. Proposed actions described in this plan will reduce and mitigate any resulting wetland damage. More information on wetlands management can be found in Volume II, Annex B, Section B2.4.

3.2.5.1 Wetlands Inventory and Monitoring

Inventory and monitoring of wetland resources provide an indicator of ecosystem integrity, status of sensitive plant species and communities, and provide data required to comply with wetland-related laws, executive orders, directives, and regulations. In addition, inventory and monitoring help to determine areas where improvements or rehabilitation are needed to maintain ecosystem integrity and to support military training activities.

3.2.5.1.1 Wetlands Inventory

Wetlands inventories on USAG-AK lands are accomplished by conducting wetland planning level surveys. The wetland planning level survey includes a wetland classification system based on hydro-geomorphic characteristics of vegetative communities. The project includes a description of values and functions of wetlands along with management recommendations. The National Wetland Inventory was not conducted at a scale appropriate for detecting many of the smaller wetlands, which rendered it inadequate for installation natural resources management programs. Wetland surveys are required for management of withdrawn public lands.

3.2.5.1.2 Wetlands Monitoring

Wetlands monitoring concentrates on wetlands areas that have been used for maneuver training. This use includes general field training exercises such as military maneuvers, bivouac (camping) activities, and live-fire operations from permanent firing ranges. Almost all military training tasks involve a maneuver component, and can take place both on and off-road. The goal of wetlands monitoring is to quantify the extent and severity of disturbance to wetlands from both military and civilian land use. The Range and Training Land Assessment component of the Integrated Training Area Management program is utilized to monitor military and non-military use of wetlands. In addition to quantitative monitoring through the Range and Training Land Assessment, USAG-AK staff continues to conduct qualitative assessments of wetlands use during large military training field exercises.

3.2.5.2 Wetlands Management

Wetlands management maintains proper wetlands functions while allowing military training and ensuring that plant, wildlife and soil resources are not degraded. Implementation of wetlands management will improve the quality of military training in USAG-AK by providing realistic training options in wetlands, resulting in an overall increase in training opportunities. In addition, conducting wetlands management activities will reduce the amount of planning time previously needed for wetlands permit applications to train in wetlands. Wetlands management also establishes a basis for conservation and protection of wetlands. Various courses of action in support of the wetlands management are described in Volume IV, Prescriptions. These actions assist USAG-AK in accomplishing wetland management goals, while maintaining compliance with applicable wetland requirements. These actions set specific procedures for management of military training, recreational use, facilities management, and fire prevention and suppression activities in wetlands.

3.2.5.2.1 Wetlands Protection and Damage Prevention

Preventing environmental damage is easier and far less costly than trying to restore degraded ecosystems. However, the most effective prevention measure – prohibition of any destructive use of the land – is generally not an option on military installations. Thus, a compromise between total protection and unrestricted military training must be reached.

In 2000, USAG-AK received a five-year Clean Water Act, Section 404 permit that allowed limited maneuver or other military activities to occur in low function wetlands while protecting high function wetlands. Restoration of all damage was mandatory, and other permit conditions applied. The permit expired in March 2005 and was not renewed due to changes in the mission (transformation to a Stryker Brigade Combat Team). An entirely new application for Fort Wainwright and Donnelly Training Area will be submitted some time in 2007. To protect certain wetland areas and to prevent un-permitted damage, USAG-AK developed environmental pre-approval overlays to be used with the five-year wetland permit. To reduce damage to wetlands within training lands from maneuver or other training activities, USAG-AK has implemented an environmental awareness program called Sustainable Range Awareness.

Other uses also impact wetlands. Outdoor recreation can impact wetlands and wetland related species (Racine et al. 1998). These issues are addressed in Volume II, Annex E, Outdoor Recreation Management. Future land use requirements such as construction of buildings, parking areas, recreation facilities and future mission needs may require a permit if fill in wetland areas is required to accommodate increased demands on existing land use areas. During fire suppression activities, the Alaska Fire Service evaluates each fire and helps determine suppression procedures. With fires on USAG-AK managed properties, the Alaska Fire Service relies and follows USAG-AK's priorities and policies for management of wetlands during a fire.

3.2.5.2.2 Wetland Regulations and Compliance

Permits for fill of wetlands are required under Section 404 of the Clean Water Act and Army Regulation 200-3. The permitting process allows USAG-AK to mitigate unavoidable damage to wetlands during military, recreational, maintenance, and fire suppression activities. U.S. Army Corps of Engineers is the authority for ensuring compliance with the requirements of Section 404 of the Clean Water Act, which regulates use of wetland areas. As such, U.S. Army Corps of Engineers will conduct random follow-up inspections on a representative sample of disturbed wetlands to ensure compliance with issued permits.

3.2.5.2.3 Wetlands Reclamation

Wetland reclamation is conducted by USAG-AK to repair and restore wetlands affected by military and non-military activities. Wetland reclamation projects will be coordinated through the Land Rehabilitation and Maintenance program, a component of the Integrated Training Area Management program. Techniques for repairing damage include installing waterbars, re-contouring areas to match surrounding area, rolling back the vegetative mat, and revegetation. Specific procedures for the rehabilitation of military training activity areas are outlined in the Supplements in Volume III. Impacts resulting from recreational use are similar to those resulting from military activities. Thus, similar rehabilitation measures can also be applied to these areas. Current reclamation management of recreational sites involves the maintenance of newly developed sites and the upgrade of locations to be developed for future recreational use. Road drainage maintenance is important for controlling sedimentation. Road maintenance on training lands is generally a responsibility of Directorate of Public Works. However, the Engineer Units provide some road maintenance. In addition, the U.S. Air Force maintains roads in Yukon Training Area due to its need for access to and use of the Army's Stuart Creek Impact Area. Land rehabilitation activities will commence immediately upon initiation of wildfire suppression activities. Minimum impact fire suppression tactics to meet suppression objectives will be utilized to reduce adverse impacts to forest resources and extent of rehabilitation requirements. Environmental Resources Department staff will monitor and document quality of rehabilitation efforts.

3.2.6 Pest Management

Pest management goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. Pest management goals and objectives are:

- Meet requirements defined by the Army pest management program measures of merit.
- Use alternative strategies (sanitation, trapping, biological control, mechanical control, etc.).
- Select the least toxic pesticides.
- Select precision application techniques that target specific pests and habitats.
- Emphasize education, communication, monitoring, inspection, and record keeping.

Additional information on pest management can be found in the Fort Richardson and Fort Wainwright Installation Pest Management Plans (USAG-AK 2003) and in Volume II, Annex B, Section B2.5.

3.2.6.1 Installation Pest Management Plan

Environmental Resources Department is responsible for maintaining and updating the Installation Pest Management Plan. The goal of the Installation Pest Management Plan is to minimize the adverse environmental impacts of using pesticides while achieving an acceptable level of control and cost-effectiveness. Completion and updates of the plan are required to meet Installation Management Office - Pacific Area Regional Office pest management measures of merit. This plan discusses specific actions necessary to accomplish pest management. Pest management planning is a requirement of Army Regulation 200-5. The Installation Pest Management Plan must be reviewed annually and updated at least once every five years.

3.2.6.2 Pest Management Monitoring

Pest inventory and monitoring is accomplished through surveys by pest control personnel. Other natural resource monitoring efforts also contribute to pest inventory and monitoring. Range and Training Land

Assessment, in particular, monitors vegetation annually and identifies any invasive and exotic plant species in the training areas.

3.2.6.2 Pest Management

Pest management is accomplished through the maintenance and update of an Installation Pest Management Plan as well as through direct measures designed to control pests. In 1994, the Department of Defense developed a Measures of Merit Program for all military installations, which requires a pest management plan to be prepared, signed, and implemented. Other requirements include the reduction of pesticide use on all installations by 50% over a seven-year period (1994–2000) and certified training of all pest control personnel.

In USAG-AK, vegetation control is required on the airfield, shoulders of main roads, storage areas, and in pavement cracks. Weeds such as dandelions, knotweed, crabgrass, etc. are treated when requested on a service or work order. Chemical control is a last resort option. Any plant control activities associated with withdrawn lands will consider the Bureau of Land Management strategic noxious weed control plan.

Pest management is the responsibility of Directorate of Public Works, specifically a certified pest controller. Other organizations involved include Provost Marshal's Office Conservation Officers and Directorate of Public Works Environmental Resources. The Pest Management Coordinator is not involved in routine pest management operations, but serves as a technical advisor to the program.

3.2.7 Invasive Species

Executive Order 13112 requires all federal agencies to prevent the introduction of invasive species, to provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species may cause. Invasive species can be a threat to natural resources, impact local economies, and adversely affect the military mission. Invasive species are defined as an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Alien species are further defined as any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem. Additional information on invasive species management can be found in Volume II, Annex B, Section B2.6.

The purpose of the USAG-AK invasive species program is to detect and manage invasive species in order to inhibit negative impacts to the environment and military training operations. Objectives of the program are to:

- Conduct annual surveys for invasive species including vegetation, fish, birds and mammals.
- Determine the location and extent of invasive species on USAG-AK lands.
- Determine an index of noxious weed abundance relative to native vegetation.
- Map all invasive locations and maintain a current Geographic Information System database for proactive management.
- Develop and implement protocol to inhibit movement of invasive species among posts from military convoys and exercises.

Invasive species monitoring has occurred informally through the Range and Training Land Assessment program and natural resources program. The Range and Training Land Assessment program has quantitatively documented invasive vegetation on training lands at plot locations, and pest control manages invasive plant species in cantonment areas. New methodologies are needed for surveying invasive species that specifically focus on these species. USAG-AK lands have few faunal invasive species and the primary invasive species, numerically speaking, are vascular plants.

3.2.7.1 Invasive Species Survey and Monitoring

Various natural resources studies are continually occurring within the installation. These projects span fisheries management, small mammal inventories, flora and fauna planning level surveys and a multitude of avian surveys. These surveys document invasive species present. If certain species are discovered (e.g., northern pike in Otter Lake on Fort Richardson), the ecosystem management team discusses management options and appropriate actions are taken to minimize potential damage to the environment and military training opportunities. This has been done opportunistically to date.

The Range and Training Land Assessment program conducts annual natural resources monitoring on training lands and documents vegetation and invasive species during surveys. Range and Training Land Assessment conducts three types of invasive plant surveys: Range and Training Land Assessment plots, incidental, and target areas. Formal comprehensive inventories have not been conducted. Invasive species that occur, their locations, infestations and distributions need to be identified and a formal monitoring program implemented.

3.2.7.2 Invasive Species Management

Invasive weed species are often spread through purchase, transportation and utilization of contaminated seed, forages, topsoil, gravel and plant materials. Vehicles (including railroads) and water are the most common agents for spreading invasive plant species. Control methods for invasive species are determined based on the species, and degree and extent of infestation. For invasive plant species, no one control method or solution usually exists for management. Several methods are used including biological control (using organisms to reduce populations), manually pulling, mowing, and herbicides. The main options available to land managers for control of invasive species are prevention, no action, mechanical, biological and chemical.

Invasive species know no boundaries. Management should include collaborative efforts with area agencies and entities. Much work on invasive species is being conducted by the Alaska Department of Fish and Game, National Park Service, University of Alaska Fairbanks, Bureau of Land Management, and the Alaska Committee for Noxious and Invasive Plants Management in Alaska. It would be beneficial to include the recommendations from these efforts and agencies into the development of the USAG-AK invasive species program.

3.2.8 Agricultural Outlease Management

Military land will be routinely examined to determine what areas, if any, can be made available for outlease in accordance with Army Regulation 405-80. In accordance with the concept of multiple land use, areas that are required to support the military mission may also be outleased for agricultural purposes. Frequently, areas that are held for future development support the military mission as buffer, security, or safety zones; and areas used for training, ranges, storage, airfields, etc., can be leased for the growing of agricultural crops or livestock grazing and still fulfill the required military use. Leasing of land for uses that are compatible with mission requirements can reduce installation maintenance efforts, provide opportunities for accomplishing land maintenance by the lessee at no cost to the installation, provide funds which the Army can use to support leasing efforts and other natural resources requirements, and support community relations and the local economy.

Currently, there are no areas in USAG-AK that are used for agricultural leases. If any USAG-AK lands are evaluated in the future for this type of outlease, agriculture outleasing shall be conducted in such a manner to support mission operations, support conservation compliance, and execute natural resources

stewardship, maintain healthy ecosystems, sustain biodiversity. Additional information on agricultural outleases can be found in Volume II, Annex B, Section B2.7.

3.2.7 Minerals Management

Mineral resources on public lands withdrawn for military purposes in Alaska are managed by Bureau of Land Management under federal regulations found in 45 CFR 3000. Sale and/or free use of mineral materials require National Environmental Policy Act review and USAG-AK concurrence. Unauthorized use of mineral materials is considered trespass and will be resolved jointly by the military and the Bureau of Land Management.

Minerals management goals and objectives are listed below:

- Manage the mineral resources on USAG-AK lands in the best interest of the public within the framework of the military mission.
- Provide the military with a source of saleable construction materials for military construction purposes.

The Bureau of Land Management identifies three categories of mineral resources on federal lands:

Locatable minerals include most metals, metallic ores, and some non-metallic minerals. If the land is open to mineral location under the federal mining laws, private citizens may stake or "locate" a claim, perform assessment work, and develop the resources. Valid mining claims can result in private ownership of the mineral resources. The withdrawn areas have been closed to mineral location since the 1950s. There are no valid or existing claims within the withdrawals.

Leaseable minerals include oil, gas, coal, geothermal resources, oil, shale, gilsonite, phosphate, potassium, and sodium. These mineral resources are leased from the federal government for a period of time and do not become the developer's property. The withdrawn areas have been closed to mineral leasing since the 1950s. There are no valid leases on withdrawn lands.

Saleable minerals consist basically of construction materials such as sand, gravel, riprap, cinders, pumice, clay, limestone, and dolomite. They are purchased outright from the federal government. Saleable materials on the withdrawals have been used locally by the Army and other authorized agencies, but have not been extracted commercially since the lands were first withdrawn in the 1950s.

3.2.8 Integrated Training Area Management

Army training is designed to challenge Soldiers, leaders, and units. As the Department of Defense's premiere land force, the Army relies on land to achieve its training and testing objectives and to maintain force readiness. Force readiness depends on high quality realistic training. The use of these lands for training and testing purposes causes damage that can potentially reduce the quality of training on these lands. Integrated Training Area Management serves the overall needs of the Army by overcoming the apparent conflict between force readiness and stewardship.

There are five components of the Integrated Training Area Management program. These five components work in unison to accomplish the Integrated Training Area Management mission:

- Range and Training Land Analysis (formerly Land Condition Trend Analysis)
- Training Requirements Integration
- Land Rehabilitation and Maintenance

- Sustainable Range Awareness (formerly Environmental Awareness)
- Geographical Information System (see Section 4.8.1 for details).

The Integrated Training Area Management program is the Army's formal strategy for focusing on sustained use of training and testing lands. The intent of the Integrated Training Area Management program is to systematically provide a uniform training land management capability across the total Army. The Army will manage its lands in a manner to ensure no net loss of training capabilities and to support current and future training and mission requirements. The integration of environmental stewardship principles into training land and conservation management practices ensures that the Army's lands remain viable to support future training and mission requirements. Additional information on the Integrated Training Area Management program can be found in the USARAK Integrated Training Area Management Five-Year Plan (U.S. Army Alaska 2005b) and Volume II, Annex B, Section 2.9.

3.2.8.1 Range and Training Land Assessment

Range and Training Land Assessment is the component of the Integrated Training Area Management program that provides for the collecting, inventorying, monitoring, managing, and analyzing of tabular and spatial data concerning land conditions on an installation. Range and Training Land Assessment provides data needed to evaluate the capability of training lands to meet multiple use demands on a sustainable basis. It incorporates a relational database and Geographic Information System to support land-use planning decision processes. Range and Training Land Assessment collects physical and biological resources data to relate land conditions to training and testing activities. These data are intended to provide information to effectively manage land use and natural resources.

3.2.8.2 Training Requirements Integration

Training Requirements Integration is a decision support procedure that integrates all requirements for land use with natural and cultural resources management processes. Training Requirements Integration integrates the installation training and testing requirements for land use derived from the Range and Training Land program, the range operations and training land management processes, and the installation training readiness requirements with the installation's natural resources conditions. The integration of all requirements occurs through continuous consultation among the Directorate of Plans, Training, Mobilization, and Security, natural and cultural resources managers, and other environmental staff members. Training Requirements Integration supports the Army's requirements for environmentally sustainable training lands. Training Requirements Integration improves coordination and facilitates cooperation, decision-making, and allocation by providing uniform information regarding land conditions, trends, and any necessary modification of requirements. The Training Requirements Integration goals are achieved when training and environmental requirements are balanced in the decision-making process.

3.2.8.3 Land Rehabilitation and Maintenance

Land Rehabilitation and Maintenance is a preventative and corrective land rehabilitation and maintenance procedure that reduces the long-term impacts of training and testing on an installation. It mitigates training and testing effects by combining preventive and corrective land rehabilitation, repair, and/or maintenance practices. It includes training area redesign and/or reconfiguration to meet training requirements. Land Rehabilitation and Maintenance uses technologies such as revegetation and erosion control techniques to maintain soils and vegetation required to support the military mission. These specifically designed efforts help maintain quality military training lands and minimize long-term costs associated with land rehabilitation or additional land purchases.

3.2.8.4 Sustainable Range Awareness

Sustainable Range Awareness is the component of the Integrated Training Area Management program that seeks to foster a conservation ethic in military personnel. The educational materials produced by the Sustainable Range Awareness program describe the principles of land stewardship and the practices of reducing training and/or testing impacts. Sustainable Range Awareness provides a means to educate "other land users" on their environmental stewardship responsibilities as well. Sustainable Range Awareness materials also include information geared towards environmental professionals concerning the operational requirements for Army training. The Sikes Act requires "no net loss" in the capability of military lands to support the military mission. Sustainable Range Awareness supports this compliance goal by reducing maneuver damage, reducing long-term maintenance costs for repair of training lands, and improving operational security skills. When land users practice environmental stewardship in the field, they are also achieving Army mission objectives. The Sustainable Range Awareness program provides the land users with an understanding of how mission, training, testing, and other activities impact the land's capacity for sustaining a realistic training environment. Sustainable Range Awareness also educates land users on how their land use affects the resident wildlife and vegetation.

3.3 Forestry and Wildland Fire Management

Forest and wildland fire management is an extremely important tool to protect, maintain, and enhance military training environments. Interior Alaska ecosystems require fire for continued functionality. However, wildfires are also a concern in Alaska due to their impact on human activities and structures, and military operations. Without forest and wildland fire management, vegetation communities become much less diverse, and animal species normally associated with certain successional stages find the environment unsuitable. Forest and wildland fire management rejuvenates these ecosystems and supports the military mission.

The Forestry and Wildland Fire Management Plan is a component of the U.S. Army Garrison Alaska (USAG-AK) Integrated Natural Resources Management Plan Volume II, Annex C. This plan covers the management, maintenance, protection, and improvement of forest vegetation on USAG-AK managed lands in Alaska. This plan meets the Public Law 106-65 requirement for a forest management plan on military withdrawn lands in Alaska as outlined in the Bureau of Land Management Fort Wainwright and Fort Greely Resource Management Plans (Bureau of Land Management and U.S. Army 1994b/a). This plan meets the Army requirement for an Integrated Wildland Fire Management Plan and supports the Alaska Interagency Fire Management Plan.

Forestry and wildland fire management goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. Forestry and wildland fire management goals and objectives are:

Stewardship

- Manage vegetation and timber in support of ecosystem management objectives.
    - Maintain and enhance the health, productivity and biological diversity of forest and woodland ecosystems.
    - Maintain a current inventory of forest and vegetative resources.
    - Maintain a current forest stand map.
    - Improve wildlife habitat through timber stand improvement, prescribed burning, mechanized vegetation removal and hand thinning.
    - Maintain ecosystem functionality.

    - Sustain production of forest products.

- Maintain forest health.
    - Conduct forest health monitoring.
    - Control forest pests.
    - Conduct timber salvage operations.

Mission Support

- Maintain a diverse forest to enhance a varied military training environment.
- Manage vegetation and timber in support of military range upgrade projects.
    - Conduct timber sales to remove timber from project sites.
    - Implement forest management practices through timber stand improvement, timber management, timber sales, and timber salvage cuts.
    - Support training area redesign maneuver corridors.

- Protect military facilities.
    - Reduce forest hazard fuels around military facilities.
    - Maintain forest fuel inventory.

- Reduce wildfire starts through wildfire prevention.
    - Fire danger rating system based on Fire Weather Index.
    - Maintain and enforce USAG-AK regulations.

- Control wildfires through suppression activities.
    - Report wildfires.
    - Conduct initial response.
    - Coordinate with Alaska Fire Service during fire fighting operations.

Quality of Life

- Manage vegetation and timber to enhance recreational opportunities.
    - Provide quality recreational opportunities.
    - Provide firewood for local military and civilian population.
    - Provide Christmas trees.
- Conduct Public Outreach.
    - Educate surrounding public with FireWise Program.
    - Apply annually for Tree City USA.
    - Conduct annual Arbor Day celebration.

Compliance

- Employ standard forestry practices to meet and comply with Migratory Bird Treaty Act, Eagle Protection Act, Clean Water Act, National Environmental Policy Act, and National Historic Preservation Act.
    - Update annually USAG-AK timber policy.
- Meet annual forestry reporting requirements.
    - Submit annual master Report of Availability.
    - Submit Report of Availability for each timber sale.
    - Submit annual Forestry Annual Work Plan.

Integration

- Involve resources agencies in planning for forest management and the public in review of the plan.
    - Update forest management plan annually and revise every five years.
    - Ensure forestry projects meet multiple objectives.

- Conduct wildland fire planning.
    - Update Integrated Wildland Fire Management Plan annually and revise every five years.
    - Participate in Alaska Interagency Fire Management Plan.
    - Create burn plans for each prescribed burn that meet multiple stewardship, mission objectives, and safety objectives.

- Minimize restrictions to training from forest management policies and issues.

3.3.1 Forest Management

The USAG-AK forest management program is required to support and enhance the immediate and long-term military mission and meet natural resource stewardship requirements set forth in federal laws. Forest ecosystems perform important, sometimes unique, natural resource functions which are inherently valued and which are of benefit to all living things. The objectives and benefits of forest ecosystem management include: biodiversity of species and habitat; natural beauty; outdoor recreation opportunities; wildlife habitat, including habitat for threatened and endangered species of plants and animals; soil conservation and watershed protection, including erosion control; improvement of air and water quality; sustained production of commercially valuable forest products; noise abatement; and the sustainment of viable and diversified training lands to meet the military mission.

3.3.1.1 Forest Management Planning and Integration

A forest management plan is a required component of the Integrated Natural Resources Management Plan (INRMP) for USAG-AK lands in Alaska. The Fort Wainwright (Bureau of Land Management and U.S. Army 1994b) and Fort Greely (Bureau of Land Management and U.S. Army 1994a) Resource Management Plans also require the development of forest management plans compatible with achieving the military mission. This component plan meets both of these requirements. The forest management plan must consider military mission, preservation of habitat, and recreation for all of these forested acres. Harvests of timber products from USAG-AK lands are permitted, but not mandatory. Management of the forest ecosystem is one of the most critical aspects of land management on the installation due to the high percentage of forested land and its importance to wildlife. The management of forest and woodland resources on USAG-AK is consistent with ecosystem management principles. It must also consider ecosystem management principles of preservation and manipulation of habitat, conservation of wildlife, outdoor recreation, and public safety. This forest management plan addresses allowable harvest levels, reforestation methods, and appropriate silvicultural methods by measuring the impact of each on military needs, recreational opportunities, and economic considerations.

3.3.1.2 Forest Inventory and Monitoring

Inventory and monitoring of USAG-AK's forest resources provide an indicator of ecosystem integrity, biodiversity of species and habitats, and sustained production of commercially valuable forest products. In addition, inventory and monitoring help to determine areas where improvements or rehabilitation are needed to maintain ecosystem integrity and to support military training activities. Inventories are conducted by forestry crews from the USAG-AK Natural Resource Forestry Office with equipment purchased for the purpose of conducting these inventories.

3.3.1.3 Forest Protection

Forest resources are protected on USAG-AK lands through this INRMP as well as through local and Army wide regulations. The three primary activities on Army lands that can affect forest resources are military activities, timber sales and construction activities. U.S. Army Alaska Regulation 350-2, *Range Regulation*, regulates military activities. U.S. Army Alaska Regulation 350-2 allows minor use of vegetation during training exercises but prohibits clearing of trees larger than 4 inches in diameter. Spruce boughs are only to be collected from trees sized less than four inches diameter-breast-height. U.S. Army Alaska Regulation 350-2 also prohibits open fires in the training areas. This INRMP establishes best management practices (see Volume III, Supplements) during the conduct of timber sales, clearing or construction activities to protect surrounding forest resources, wetlands, surface water and wildlife. Construction activities that affect commercial forest resources are regulated by Army Regulation 200-3, *Natural Resources - Land, Forest, and Wildlife Management* (28 February 1995) Chapter 5 Forest Management, Section 5-2 Timber Management, b. Harvesting actions, (2) Disposal action, (d) which states,

> "Commercial forest products will not be given away, abandoned, carelessly destroyed, used to offset costs of contracts, or traded for products, supplies, or services. All forest products are to be accounted for and commercial harvests completed prior to the start of any construction that may impact forest resources. When forest products are removed from Army lands by any means other than a commercial timber sale, a dollar amount equal to the fair market value is to be deposited to Budget Clearing Account 21F3875.3960 20-C S99999 for products removed."

If construction activities cannot avoid clearing of forest resources, construction activities must follow the USAG-AK forest timber policy to minimize impacts and effectively utilize forest products. The timber policy is found in Volume II, Annex C, Section 2.1.3 as well as Volume III, Section SC3.1.

3.3.1.4 Forest Health

Maintaining good forest health is a primary objective of the USAG-AK forestry program. The USAG-AK forestry program must be integrated with the USAG-AK Installation Pest Management program and the U.S. Department of Agriculture Forest Service. Section S of the Cooperative Forestry Assistance Act of 1978 (16 U.S.C. 2101) authorizes the Secretary of Agriculture to protect trees and forests, wood products, stored wood and wood in use from insects and diseases. The Forest Service has the delegated responsibility for carrying out the provisions of the Cooperative Forestry Assistance Act on USAG-AK lands. It is intended that the Forest Service will provide technical assistance and appropriate funds to meet specific pest management project objectives to provide foliage protection, reduce specific insect and disease populations, reduce the risk of artificial spread to uninfested areas, and prevent tree mortality. Additional information on the forest health program is found in Volume II, Annex C, Section C2.1.4.

3.3.1.5 Forest Land Improvement

Forest land improvement on USAG-AK lands involves reforestation, timber stand improvement and habitat improvement using scientific silvicultural principles. USAG-AK uses hand thinning, mechanized thinning and clearing, timber sales and prescribed burning to accomplish these silvicultural treatments. The major objective of the USAG-AK's forestry program is to promote a healthy ecosystem capable of supporting mission and conservation requirements. Silvicultural treatments will be designed to restore, maintain, and improve the ecological functions and values of the particular forest unit being managed. Silvicultural treatments used on Army lands will be designed to improve military mission areas and, when possible, attain multiple use and sustained yield timber management while enhancing watersheds, wildlife habitats, and natural beauty values along scenic corridors.

USAG-AK strives to design management activities to maintain a mix of native forest types (including aspen, birch, mixed hardwood-spruce, and white spruce types) and stand ages. Harvests activities are located and designed to provide key benefits of natural disturbances, particularly fire. These benefits include warmer soils, increased sunlight, a mosaic of vegetation patterns, fuel reduction, and some wood left on harvested sites, such as snags, logs, and diseased trees. Specific cuttings will be designed to achieve site-by-site objectives.

The objective of the USARAK silvicultural program is to promote a healthy ecosystem capable of supporting the military mission and conservation requirements. Silvicultural treatments are designed to restore, maintain, and improve the ecological functions and values of the particular forest unit being managed. Silvicultural treatments used will improve military mission areas and, when possible, attain multiple use and sustained yield timber management while enhancing watersheds, wildlife habitats, and natural beauty values along scenic corridors. When silvicultural treatments provide opportunity for commercial sale of forest products, each commercial forest activity will be performed in accordance with 10 USC 2665, and operating expenses will be commensurate with anticipated financial returns on lands on which the Army holds vegetation rights.

3.3.1.5.1 Reforestation

The objective of the forest regeneration program is to quickly reestablish trees on cleared and harvested sites. Regeneration of forests, either natural or planned, is an essential part of forest ecosystem development. Regeneration of forests can be made through planting seedlings, planting sprigs, coppice cuts or seeding. Regeneration of forests, either naturally or artificially, is an essential part of forest ecosystem development.

3.3.1.5.2 Timber Stand Improvement

Timber stand improvement activities are designed to improve the quality of forest stands, support military training activities, and improve wildlife habitat. Timber stand improvement is often categorized as noncommercial activities used to improve the quality of commercial timber, but it may also be used to improve forest conditions for other uses. Timber stand improvement may include thinning, spacing, chemical injection, chipping, prescribed burning, etc., all of which are designed to improve species composition, quality, and/or growth rate of existing stands by removing competing vegetation to allow preferred trees to grow faster. Timber stand improvement is also an effective treatment for wildland fire hazard fuel reductions and insect and disease control. Usable material from timber stand improvement projects will be disposed of through timber sales or the personal use firewood program.

3.3.1.5.3 Forest Timber Sales

Timber sale activities are designed to improve the quality of forest stands, support military training activities, and improve wildlife habitat. Timber sales are categorized as commercial activities. Timber sales on portions of USAG-AK lands could be used to improve conditions for conduct of the military mission as well as and enhance the local economy. Bureau of Land Management and Army timber management practices and contract stipulations govern timber sales on USAG-AK lands. Timber sales on withdrawals where the Army holds vegetation rights will be governed by Army practices and contract stipulations.

3.3.1.5.4 Firewood/Personal Use Program

The Firewood/Personal Use program consists of Christmas tree cutting, house log harvesting, and firewood cutting. Christmas tree permits are free and available starting December 1 each year. Designated cutting areas vary year by year. The topping of larger trees is not allowed, nor is cutting trees over 15 feet tall. On USAG-AK lands where USAG-AK controls vegetation rights, firewood permits are sold for five

dollars a cord with a three-cord minimum and five dollars for each additional cord. In other areas, permits are free. Long term designated firewood cutting areas are established in several training areas.

3.3.1.6 Urban Forestry

The integrated urban forest ecosystem encompasses many environments, disciplines, and concepts. This includes open lands, water, and vegetated areas in and adjacent to improved and semi-improved grounds as well as woodland borders. The urban forest includes individual trees as well as groupings and small tracts scattered among more dominant land uses. Multiple use of this resource must occur within and among this complex system of interspersed land uses. Urban forests are valued primarily for their non-consumptive contributions to our everyday lives and the environment in which we live.

3.3.1.6.1 Landscape Plantings

All planting, pruning, cultivation, and other maintenance will conform to criteria in TM 5-630, ANSIZ60 standards, and the approved Installation Design Guide. Landscaping will be functional in nature, simple and informal in design, and meet professional standards for species selection and installation design. The landscaping will be compatible with adjacent surroundings, and complementary to the architectural features and the overall natural setting of the area.

3.3.1.6.2 Tree City USA

The National Arbor Day Foundation, in cooperation with the United States Department of Agriculture, Forest Service and the National Association of State Foresters, recognizes towns and cities across America that achieve the standards of the Tree City USA program. The Tree City USA program is designed to recognize those communities that effectively mange their public tree resources, and to encourage the implementation of community tree management based on four Tree City USA standards. USAG-AK will apply annually at both Fort Wainwright and Fort Richardson for the Tree City USA designation when resources allow and either post has met the requirements to apply.

3.3.1.6.3 Installation Aesthetics and the Army Communities of Excellence Program

The Army Communities of Excellence and self-help program initiatives provide a means to enhance the aesthetics of the installation, provide an opportunity for all personnel to improve their living and working areas, reduce maintenance costs, and increase the overall value of the Army's physical establishment. Special days (Arbor Day, Earth Day, and so forth.) should be designated to promote annual self-help awareness and participation. Both day-to-day type operations and maintenance and project type work will be performed in a way to enhance installation aesthetics.

3.3.1.6.4 Nurseries

Expenditure of appropriated funds is not authorized for the operation of commercial plant nurseries. Trees and shrubs will be obtained from commercial nurseries and federal and state agencies when available. If economical, and in compliance with the INRMP and the Installation Master Plan, trees and shrubs from planted areas as well as natural areas may be used, providing they can be transplanted with sufficient roots and soil to meet American Association of Nurseryman Standards and that the site and associated biological resources will not be adversely impacted.

3.3.1.7 Forestry Outreach

Public involvement is a key component to USAG-AK's commitment to community outreach. Implementation of this plan requires keeping the public informed of firewood and Christmas tree cutting areas, providing permits, and other items of interest. Arbor Day activities are centered around the public tree planting ceremony. Additional activities include educational presentations on Arbor Day, tree care,

and forestry practices. The Environmental Resource Offices schedule media and tree seedling give-away events at Fort Wainwright and Fort Richardson for Arbor Day.

3.3.1.8 Forestry Funding

Installation forest management and silvicultural expenses may be charged to various Army accounts, including Base Operations - Environmental Conservation, Maintenance and Repair - Grounds, Fire and Emergency Response Services. Forest management and silvicultural activities may be supplemented by the Conservation Reimbursable Forestry Account. The Conservation Reimbursable Forestry Account is a supplemental fund that fluctuates, in terms of total Army-wide proceeds, from year to year based on mission needs, threatcon, forest product market conditions, etc. Allocation of installation specific Conservation Reimbursable Forestry Account funds will be determined through the process outlined in the Protocol for Determining Recommended Installation Specific Forestry Automatic Reimbursable Authority - Initial Budget Build and Continuing Adjustments. Projects must support the mission. Projects must not encumber land that is needed for conducting mission operations. Projects must comply with applicable laws and have an INRMP developed in accordance with the National Environmental Policy Act that addresses the impact, if any, on the composition, structure, and function of natural communities and biological diversity. Projects must be a fiscally sound investment and capable of ecosystem sustainability.

The Department of Defense Forestry Reserve Account was established under 10 USC 2665, to collect surplus funds from the sale of forest products. These funds are the monies remaining after program expenses are reimbursed and the state entitlements are paid. Installations of all the Services may apply for Department of Defense Forestry Reserve Account funds to fund natural resources management projects, even if that installation has not received Conservation Reimbursable Forestry Account dollars. The state of Alaska is entitled at the end of each year to 40% of the net revenue of forest product disposal from USAG-AK lands. Net revenue is defined as the gross proceeds received less the amount of reimbursement of appropriations to the Department of the Army on an installation pro-rata basis.

3.3.2 Integrated Wildland Fire Management

Fire is critical for maintaining the viability of boreal ecosystems, yet fire can also be a threat to human life, property, and valued resources. The realization that fire plays an essential ecological role, but also has a destructive potential in relation to human life and values can render the decision-making process very difficult. This component plan describes the programs, policies and procedures for integrated wildland fire management on USAG-AK lands.

This component of the INRMP serves as the USAG-AK Integrated Wildland Fire Management Plan (for the entire Integrated Wildland Fire Management Plan, see Volume II, Annex C, Section 2.2). This Integrated Wildland Fire Management Plan reduces wildfire potential, effectively protects and enhances valuable natural and cultural resources, integrates applicable state and local permit and reporting requirements and implements ecosystem management goals and objectives on USAG-AK lands. The Integrated Wildland Fire Management Plan directly supports U.S. Army Alaska missions and is consistent with USAG-AK emergency operations plans, while being integrated into the INRMP, the USAG-AK's fire and emergency services plan, and the Integrated Cultural Resources Management Plan.

The goal of the USAG-AK Integrated Wildland Fire Management Plan is to establish fire management procedures and protocols to provide USAG-AK the capability to complete its mission to maintain combat readiness and fulfill resource management intent. Implementation of this Integrated Wildland Fire Management Plan maintains and enhances the health, productivity, and biological diversity of USAG-AK lands.

Wildland fire management in Alaska requires multi-agency cooperation. Fire management is a joint effort by USAG-AK and the Bureau of Land Management, Alaska Fire Service. The agencies have developed two Inter-Service Support Agreements, which establishes the Alaska Fire Service's responsibility for all fire detection and suppression on installation lands (Alaska Fire Service and U. S. Army Alaska 1995; U. S. Army Alaska and Alaska Fire Service 1995). In exchange, the Army provides the Alaska Fire Service with use of certain buildings, utilities, land, training services, air support, and other support services.

The values to be protected on Army training lands from wildfires include personnel safety, built-up improvements (structures, electronic weaponry, and targets) and cultural resources. Unauthorized structures will be allowed to burn during wildfires. Alaska Fire Service has been notified of the locations of all known illegal structures. Since fire is a natural component of the ecosystem in Alaska, there are natural resources that require protection.

3.3.2.1 Pre-Suppression Actions

In fire-prone areas, climate, human activity, and types of vegetation (or fuels) determine the level of wildland fire risk. Pre-suppression activities are those activities that reduce wildland fire risk. These pre-suppression actions are planning, prevention, fuels management, and prescribed burning.

3.3.2.1.1 Pre-Suppression Planning

Pre-suppression planning stresses safety, effective fire response planning, and pre-suppression priority. Public and firefighter safety is the first and highest priority. Safety is the responsibility of everyone assigned to a wildfire incident. Safety is an attitude that must be promoted at all operational levels. Once personnel are committed to an incident, those resources become the highest value to be protected. Fire response planning is a continuing process. Most fire planning is based on five years of records including both fire weather and fire occurrence. Pre-suppression priorities for USAG-AK lands are established by this Integrated Wildland Fire Management Plan component of the INRMP. Pre-suppression priorities are shown for each training area in Volume IV, Prescriptions. The Alaska Wildland Fire Management Plan established four fire management options to be used by land owners to determine pre-suppression priorities: Critical, Full, Modified, and Limited. Land managers may select among these options for different parcels of land, based on evaluation of legal mandates, policies, regulations, resource management objectives, and local conditions (Alaska Wildland Fire Coordinating Group 1998).

3.3.2.1.2 Prevention

Fire prevention activities include fire prevention education, enforcement, engineering, Fire Danger Rating system, automated weather stations, and ignition control policy. In coordination with Range Control and resource protection managers, fire prevention orientation and training programs will be designed and implemented to explain wildfire ignition potentials, probability of escape, impact on natural resources, and the threat to high value areas within and outside of each installation. The FireWise Program was established nationwide to convey information to private homeowners on how to protect their property from wildfires. Enforcement is a very important component of an effective fire prevention program. Engineering involves the alteration of a range design/alignment or physically disrupting the fuels to reduce the likelihood of a fire starting or to reduce its effects if one does start. The Fire Danger Rating System is outlined in U.S. Army Alaska Range Regulation 350-2. The system follows the Canadian Forest Fire Danger Rating System and utilizes the Fire Weather Index. Currently there are six fire weather stations located across USAG-AK training areas: Fort Richardson Small Arms Complex, Fort Wainwright Small Arms Complex, Manchu Range and Stewart Creek in the Yukon Training Area, Bolio Lake in Donnelly Training Area, and Donnelly Drop Zone in Donnelly Training Area. There are also fire weather stations located on the cantonment areas at Fort Richardson, Fort Wainwright, Fort Greely, and Eielson Air Force Base. Ignition control is accomplished primarily through the enforcement of the Fire Danger

Rating system by controlling the use of classes of ammunition and pyrotechnics that have higher fire hazards associated with their use. The Fire Danger Rating is provided to Range Control, which restricts the use of munitions and pyrotechnics as fire danger increase.

3.3.2.1.3 Fuels Management

Wildfire danger can be reduced through the management of fuels. USAG-AK conducts fuel management by conducting fuel hazard assessments and by constructing and maintaining a combination of fuel breaks and firebreaks through the mechanical removal of fuels and through prescribed burning. Fuel assessments evaluate vegetation flammability at a landscape scale, weather, historical fire patterns, fire behavior and proximity to values at risk. Fuels modification is defined as removing and/or modifying an area or wide strip of flammable vegetation. Fuel modification can provide a reduction in radiant and convective heat, thereby providing fire suppression forces a safer area in which to fight the fire. Fire hazard is managed by changing the vegetation type. The goal is to maintain a fuel condition that makes fires easier to control. Maintenance treatments are necessary because the flammable biomass will grow back over time thus making fires more difficult to suppress. USAG-AK maintains a fuel break/firebreak system on locations with the highest wildfire risk to minimize the spread of fires. If a wildfire escapes the initial attack, fuel breaks and other fuel modification areas provide the most logical location for fire containment lines. Well-maintained fuel breaks and fuel modifications provide defensible space that aids in wildfire containment.

3.3.2.1.4 Use of Prescribed Fire

Prescribed burning is defined as the controlled application of fire under specified environmental conditions that allow the fire to be confined to a predetermined area while at the same time producing fire behavior required to attain resource management objectives. Prescribed burns mimic the important ecosystem functions of wildfire while reducing risk to human environments and other resources. USAG-AK, in cooperation with the Alaska Fire Service, conducts prescribed burns on its installations to improve wildlife habitat, to decrease the potential for ignitions and fire escape from live firing, and to increase the size of military training areas. Because of the potential for unintended circumstances, extensive planning, coordination, and risk management must be completed prior to ignition of any prescribed burn.

3.3.2.2 Fire Suppression Actions

The objective of fire suppression is to attack and suppress wildfires at minimum cost while protecting values at risk and minimizing the impacts from suppression activities. In some cases, a wildfire on Army training lands can be controlled with a single attack response vehicle; in others, large numbers of firefighters, fire apparatus, and equipment may be required. Because of this range of resource needs, fire suppression can be relatively simple and straightforward or extremely complex.

3.3.2.2.1 Wildfire Incident Coordination

Wildfire suppression follows the incident command system (Fireline Handbook 2004). The incident commander is responsible for suppression and management of a wildfire. The military zone of Alaska Fire Service is dedicated to the management of wildfires on USAG-AK lands. The USAG-AK Fire Chief is responsible for all fires and must be informed of the status of new and ongoing wildfires (Support Agreement Alaska Fire Service/U.S. Army Alaska 1995).

3.3.2.2.2 Fire Suppression Actions

Wildfire suppression is conducted by the Bureau of Land Management, Alaska Fire Service and/or the military fire department. The State of Alaska, Division of Forestry may be called upon for assistance as well as local fire departments. Alaska Fire Service is responsible for wildfires on USAG-AK lands in exchange for use of the facilities at Fort Wainwright (Support Agreement Alaska Fire Service/ U.S. Army

Alaska, 1995). The Wildland Fire Situation Analysis is a systematic and documented decision process employed to determine the most appropriate suppression strategy for a particular situation.

3.3.2.2.3 Special Considerations for Suppression

Protection of the local environment will be considered in fire management strategies, particularly in the location of fuel breaks and control lines. Bulldozers are a useful tool in fire suppression efforts but can have a severe impact on natural and cultural resources. Fire managers must be familiar with the long-term effects of physical ground/vegetation disturbance, potential of alien vegetation introduction, through the use of dirty equipment or the creation of invasion routes, creation of erosion problems, protection of cultural sites, limitations on use of fire suppression chemicals (foam and retardant), the aerial use of chemical retardant, fire foam and saltwater will be weighed against the potential for fire damage to sensitive plants.

Use of aerial fire retardant near lakes, wetlands, streams, rivers, sources of human water consumption, and areas adjacent to water sources should be avoided to protect fish habitat and water quality. If feasible in these areas, the use of water rather than retardant is preferred. When the use of retardant is necessary, avoid aerial or ground application of retardant or foam within 300 feet of a waterway; application beyond 500 feet is preferred. Examples of when the use of retardant is authorized are for the protection of:

- Human life.
- Permanent year-round residences.
- National Historic Landmarks.
- Structures on or eligible for the National Register of Historic Places.
- Government facilities.
- High value resources on BLM managed land and those of adjacent land owners.
- Threatened, endangered, and sensitive species habitats as identified by resource specialist.

3.3.2.2.4 Fire Detection and Reporting

All wildfires are to be immediately reported to Range Control. Range Control will then notify the Bureau of Land Management, Alaska Fire Service and/or the military fire department. Monitoring is defined as the systematic process of collecting, recording and mapping of fuels, topography, weather, fire behavior, and fire effects data to provide a basis for evaluating and adjusting wildland fire management programs.

3.3.2.2.5 Public Information

Wildfire progress monitoring is conducted by the Bureau of Land Management, Alaska Fire Service. Updates can be obtained on their web site http://fire.ak.blm.gov/. Updates for fires where suppression action is required can also be obtained by contacting the public information officer at Alaska Fire Service. The USAG-AK installation forester acts as a liaison with the wildfire incident command staff on an as-needed basis conveying land management concerns and providing institutional knowledge of the land. The USAG-AK installation forester also relays information from the wildfire command staff to the various installation directorates.

3.3.2.3 Post Fire Actions

3.3.2.3.1 After-Action Review

At the end of each fire season an interagency review of the fire plan implementation and fire suppression operations will be held with fire suppression personnel and land managers. Land managers and fire suppression personnel will be given the opportunity to identify plan implementation problems and operational concerns.

3.3.2.3.2 Rehabilitation

Firelines and camp areas will be rehabilitated to stabilize the burn area and to mitigate the effects of suppression activities. The agency administrator will ensure that the Incident Commander consults with natural resource managers, as needed, regarding any specific rehabilitation needs. When possible, burned areas will be allowed to regenerate naturally. Firelines will be monitored to ensure rehabilitation plans are followed and successful. Invasive species colonization and erosion control are some of the main items monitored after fires.

3.3.2.3.3 Fire Research and Monitoring

Wildfires are monitored for several years after a burn to determine vegetation response, identify erosion issues, and determine if fire suppression actions have been adequately rehabilitated. Monitoring is conducted using a combination of aircraft flyovers, photo points, vegetation plots, and permanent fuel loading sample plots following procedures outlined by Brown (1976). Prescribed fires are monitored to determine if burn objectives are met, determine fuel loading, and identify rotational periods between burns.

3.4 Fish and Wildlife Management

The fish and wildlife management program provides for the regulation and conservation of game and non-game populations and their habitats. These management practices are consistent with accepted scientific principles, and in compliance with the Endangered Species Act and all other applicable laws and regulations. Further, these goals are in harmony with the total natural resources program. Emphasis is placed on the maintenance and restoration of habitat favorable to the production of indigenous fish and wildlife. Lands and waters suitable for conservation of fish and wildlife resources are managed to conserve fish and wildlife resources. Non-game as well as game species are considered when planning activities. USAG-AK's natural resources program has traditionally been based on multiple-use management philosophies. However, military training has always been and will continue to be the primary land use. Maintaining functional ecosystems is now the primary goal of the natural resources management program. "Realistic training lands" are often quoted as essential needs by military trainers. This translates into functional ecosystems that can be sustained indefinitely.

3.4.1 Fish and Wildlife Cooperative Plan

In accordance with the Sikes Act (16 USC 670a), the Fish and Wildlife Cooperative Plan is the component of the INRMP that describes how the fish and wildlife resources at an installation will be managed. It is a tripartite agreement between the Sikes Act's required partners: USAG-AK, the U.S. Fish and Wildlife Service and Alaska Department of Fish and Game. The cooperative plan provides a program of planning for, and the development, maintenance, and coordination of wildlife, fish, and game conservation. The Fish and Wildlife Cooperative Plan provides for fish and wildlife habitat improvements or modifications, wildlife considerations in all range rehabilitation, control of off-road vehicle traffic, use and protection of fish and wildlife resources, to include both consumptive and non-consumptive use, and natural resources law enforcement requirements, and designated responsibilities for the control and disposal of feral animals.

3.4.2 Fish and Wildlife Inventory and Monitoring

Fish and wildlife inventory includes comprehensive planning level surveys designed to identify all fauna species on USAG-AK lands. Monitoring involves annual surveys of selected species to track population trends.

3.4.2.1 Fish and Wildlife Inventory

Fauna inventories include planning level surveys for fish and wildlife. These surveys identify avian neotropical, upland gamebird, waterfowl, and raptor species; moose, bison, caribou, bear, furbearers, small mammals, amphibians, Dall sheep, fish species, and beluga whales.

3.4.2.2 Fish and Wildlife Monitoring

Fish and wildlife monitoring involves the continuation of existing programs and the creation of new long-term monitoring programs for fish, and wildlife. Monitoring focuses on neotropical migratory birds, waterfowl, raptors, upland game birds, salmon, trout, and other fish species, frogs, small mammals, furbearers, and large mammal species (including beluga whale [*Delphinapterus leucas*]). These monitoring programs are a major component of the Ecosystem Management Program.

3.4.3 Fish and Wildlife Management

Fish and wildlife actions fall into two categories: population management and habitat management. Fish and wildlife population management is accomplished through actions directly affecting wildlife species. Setting population goals and managing harvests are the primary actions used in population management. Habitat management, on the other hand, affects wildlife populations indirectly by manipulating their habitat.

3.4.3.1 Fish and Wildlife Population Management

Population management includes working with the Alaska Department of Fish and Game, which establishes hunting, trapping and fishing regulations and harvest objectives, stocks fish in post lakes, controls nuisance animals, conducts habitat enhancement, and coordinates other projects to conserve and enhance game and non-game populations. Wildlife populations will be managed in accordance with the objectives set forth in this INRMP (detailed under items of specific cooperation between USAG-AK, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game).

3.4.3.1.1 Fish Stocking

The Alaska Department of Fish and Game, Fairbanks office, stocks Fort Wainwright through the Statewide Stocking for Recreational Fisheries Plan (Alaska Department of Fish and Game 2006). The Alaska Department of Fish and Game has utilized lakes on Donnelly Training Area that are suitable for fish stocking for many years. Donnelly Training Area has numerous lakes that provide opportunities for recreational fishing. Fort Richardson is part of the Alaska Department of Fish and Game Anchorage Management Area for fisheries. A fish hatchery and rearing facility, located on the post on Ship Creek, is operated through the joint efforts of the Alaska Department of Fish and Game and the post. In return for this Real Property lease, Alaska Department of Fish and Game stocks Fort Richardson's lakes at no cost to USAG-AK.

3.4.3.1.2 Fish and Wildlife Transplanting

There are no plans for transplanting wildlife onto or from USAG-AK lands at this time. All proposed introduction or reintroduction of wildlife species will be thoroughly assessed in accordance with the National Environmental Policy Act and associated U.S. Fish and Wildlife Service requirements to determine the impact on existing flora and fauna and the installation mission.

3.4.3.1.3 Nuisance Fish and Wildlife Control

Under the Migratory Bird Treaty Act, it is unlawful "by any means or manner, to purse, hunt, take, capture or kill" any migratory bird except as permitted by regulation (16 U.S.C. 703-704). Regulation (50

CFR 21.11) prohibits the take, possession, import, export, transport, sale, purchase, barter, or offering of these activities, except under a valid permit or as permitted in the implementing regulations. Where the purpose of an installation action is to intentionally and directly take any migratory bird species (e.g., eradicate nuisance birds; clear nesting, adding eggs), the installation must apply for and obtain a depredation, special purpose, or scientific collection and education permit or other regulatory authorization form the U.S. Fish and Wildlife Service prior to taking action(s) and record any birds purposefully and intentionally taken under the permit and provide an annual report to the U.S. Fish and Wildlife Service.

Removal of fish and wildlife on USAG-AK lands is the responsibility of the USAG-AK Pest Control section, in coordination with Military Police Conservation Officers and Environmental Department personnel. Removal of larger game animals is the responsibility of the Alaska Department of Fish and Game in coordination with Military Police Conservation Officers and Environmental Department personnel. The trapping of furbearers is prohibited on Fort Richardson, with the exception of nuisance beavers that may be removed by USAG-AK Pest Control personnel with special State of Alaska depredation permits.

3.4.3.1.4 Invasive Species Management

Executive Order 13112 requires all federal agencies to prevent the introduction of invasive species, to provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species may cause. Invasive species can be a threat to natural resources, impact local economies, and adversely affect the military mission. Invasive species are defined as an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Alien species are further defined as any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem.

3.4.3.1.5 Harvest

Fish and wildlife harvest is the most commonly used form of population management. Hunting, trapping, and fishing are forms of outdoor recreation that help the Alaska Department of Fish and Game maintain population goals. Hunting, fishing, and trapping are conducted under regulations promulgated by the Alaska Department of Fish and Game to ensure that population numbers can be supported by the available habitat as well as being able to sustain meeting the recreational demand. USAG-AK manages hunting, trapping, and fishing in terms of areas available, dates within Alaska Department of Fish and Game seasons, safety requirements, permit and reporting requirements, and other parameters to avoid conflicts with the military mission and to provide safe, high quality recreational experiences.

3.4.3.1.6 Wildlife Protection and Conflict Avoidance

It is USAG-AK's intention to avoid conflicts between military training and wildlife. Wildlife is protected under a number of statutes, such as the Endangered Species Act, Migratory Bird Treaty Act, State of Alaska fish and game laws, Eagle Protection Act, etc. As a result, U.S. Army Alaska Regulation 350-2 prohibits Soldiers from intentionally targeting wildlife when conducting firing activities, and from harassing wildlife during their maneuver activities. The U.S. Air Force is required to shut down exercises in portions of the Oklahoma/Delta Creek Impact Area if large numbers of the Delta caribou herd are calving there. Historically, neither of these animal-military conflicts has posed much of a problem to accomplishing the military mission.

USAG-AK will minimize activities or operations directly and negatively impacting fish and wildlife during sensitive time periods or seasons. USAG-AK will notify the Alaska Department of Fish and Game when USAG-AK concludes that the presence of fish and wildlife during these time periods is too low for there to be significant effects from activities or operations. USAG-AK will not intentionally fire into the open waters of Eagle River at any time. USAG-AK will not fire into Eagle River or a 100-meter buffer

zone around Eagle River when belugas are present in Eagle River. USAG-AK will minimize disturbance to bison calving areas on Donnelly Training Area during 15 April –31 May if bison are present. USAG-AK will minimize disturbance to bison pre-migration areas 1 July –31 August if bison are present. USAG-AK will not conduct indirect fire operations within 2,000 meters of bison in the impact area during any time of the year. USAG-AK will not conduct activities or operations within 500 meters of any bison during any time of year to minimize the impacts on bison. USAG-AK will minimize activities or operations in Oklahoma Impact Area or Delta Creek Impact Area from 1-31 May for caribou pre-calving, calving, and post-calving if caribou are present in significant numbers. USAG-AK will not conduct indirect fire or bombing operations within 8,000 meters of caribou from 1–31 May. USAG-AK will also limit activities or operations in or near unique or sensitive habitats (high function wetlands, Eagle River Flats) during time periods or seasons (spring migration, nesting) that are likely to have a significant adverse effect on fish and wildlife. For instance, USAG-AK will limit military operations and outdoor recreational activities in high function wetlands from 1 May – 15 July for migratory bird protection during nesting seasons and will limit indirect fire activities and operations into Eagle River Flats during spring and fall migratory periods.

Vegetation clearing, site preparation, or other construction activities not conducted during military readiness activities that may result in the destruction of active bird nests or nestlings would violate the Migratory Bird Treaty Act. In both south-central and Interior Alaska, U.S. Fish and Wildlife Service recommended these activities not be conducted during 1 May – 15 July each year. The timing guidelines are not regulations, but are intended as recommendations to help comply with the Migratory Bird Treaty Act. Some species and their nests have additional protections under other federal laws, including those listed under the Endangered Species Act and bald and golden eagles (protected under the Bald and Golden Eagle Protection Act).

Table 3-1. Recommended Time Periods for Avoiding Vegetation Clearing in Alaska in order to Protect Migratory Birds (from U.S. Fish and Wildlife Service 2005).

HABITAT TYPE → REGION ↓	Forest or woodland[1] *(i.e., trees present)*	Shrub or Open *(i.e., shrub cover or marsh, pond, tundra, gravel, or other treeless/ shrubless ground habitat)*	Seabird colonies *(including cliff and burrow colonies)*	Raptor and raven cliffs
South-central *(Includes Fort Richardson)*	May 1 – July 15 **Error! Bookmark not defined.**		April 15 – September 7 **Error! Bookmark not defined.**	April 10 – Aug 10
Interior *(Includes Fort Wainwright Main Post, Yukon Training Area, Tanana Flats Training Area, Donnelly Training Area, Gerstle River Training Area, and Black Rapids Training Area)*	May 1 – July 15 **Error! Bookmark not defined.**		May 1 – July 20 [1]	April 15 – August 1

[1] Owl species may begin to nest two or more months earlier than other forest birds, and are common breeders in most forested areas of Alaska. You may wish to survey for nesting owls prior to tree-cutting. It is your responsibility to protect active owl nests from destruction.
[1] Canada geese and swan habitat: begin April 20
[1] Storm petrel burrow habitat: April 1 – October 15
[1] Black scoter habitat: through August 10
[1] Seabird colonies in Interior refer to terns and gulls

The Migratory Bird Treaty Act prohibits "take" of migratory birds. However, the Department of Defense has been granted an exemption for military operational readiness activities that allows "unintentional

take". This rule authorizes the Department of Defense to take migratory birds associated with military readiness activities, subject to certain limitations and subject to withdrawal of the authorization to ensure consistency with the provisions of the migratory bird treaties. The 2003 National Defense Authorization Act (Pub. L. 107-314, 116 Stat. 2458, Dec. 2, 2002, 16 U.S.C. 703 note) required the Secretary of Defense, in consultation with the Secretary of the Interior, to identify ways to minimize, mitigate, and monitor take of migratory birds during military readiness activities and required the Secretary to prescribe, with the concurrence of the Secretary of Defense, a regulation that exempts such activities from the Migratory Bird Treaty Act's prohibitions against take of migratory birds. This INRMP further clarifies military readiness activities to include (1) air and ground maneuver training, (2) live-fire demolition, direct and indirect fire activities, (3) range construction, range upgrade and range maintenance activities which are required for military operational readiness, and (4) those vegetation management activities which directly support readiness activities and Soldier safety such as prescribed burning and mechanical or hand thinning to reduce fire danger in range training areas.

3.4.3.1.7 Regional Population Management Cooperative Efforts

USAG-AK participates in a number of regional cooperative efforts to manage wildlife. USAG-AK is part of a regional cooperative effort to manage wildlife in the Anchorage Bowl. Offering a broad vision for wildlife management in Anchorage, the plan is a pioneering attempt to coordinate and integrate decisions by local, state and federal government. USAG-AK works cooperatively with the Alaska Department of Fish and Game to monitor and manage caribou and bison populations on USAG-AK lands. USAG-AK supports Alaska Department of Fish and Game efforts to attract birds to Creamers Field in Fairbanks and away from the military airfield on Fort Wainwright. This effort supports USAG-AK Bird Air Strike Hazard initiatives by farming additional acreage at Creamer's Refuge to attract problem geese away from the Fort Wainwright Airfield. USAG-AK along with the Alaska Department of Fish and Game and Elmendorf Air Force Base jointly manage bear populations on multi-jurisdictional lands, within the Anchorage Bowl. The ultimate goal is to further public safety and education while maintaining black and brown bear populations and their natural habitats within this area. USAG-AK works cooperatively with the Alaska Department of Fish and Game to monitor and manage moose populations on USAG-AK lands. USAG-AK works cooperatively with the National Marine Fisheries Service on beluga whale monitoring, habitat protection, and population management.

3.4.3.2 Fish and Wildlife Habitat Management

Habitat management efforts will be accomplished in a manner to conserve and enhance existing flora and fauna consistent with the Army goal to conserve, protect, and sustain biological diversity while supporting the accomplishment of the military mission. Activities will be directed towards management to maintain healthy ecosystems and to restore degraded ecosystems to their historic functions and values. Primary management consideration will be given to the management of indigenous listed, proposed, and candidate species habitats. When habitat enhancement projects affect salmon habitat, USAG-AK will conduct a project-specific Essential Fish Habitat Assessment and obtain a permit from the Alaska Department of Natural Resources, Office of Habitat and Permitting.

3.4.3.2.1 Habitat Enhancement

Habitat enhancement primarily includes the development and improvement of habitat for bison, moose, ruffed grouse, and other landbird species, furbearers, and small mammals. Some habitat improvement may also be undertaken for fish and waterfowl. USAG-AK utilizes two primary methods of manipulating habitat, prescribed burning and mechanical removal of vegetation. USAG-AK also utilizes herbaceous and woody vegetation plantings in the cantonment area to improve habitat.

3.4.3.2.2 Habitat Protection

Migratory bird habitat is protected during nesting season by the Migratory Bird Treaty Act. Since it is so difficult to be able to identify birds and bird nests in forests, the U.S. Fish and Wildlife Service has promulgated guidance that restricts vegetation clearing in south-central and Interior Alaska from 1 May to 15 July annually. USAG-AK has created a number of special interest areas that protect habitat. Many of the special interest areas contain high function palustrine or wetland areas that provide habitat for multiple species. Special management controls exist for these areas which exceed the protective measures that apply everywhere else on USAG-AK lands. In the past, USAG-AK received a five-year Clean Water Act, Section 404 permit that allowed certain types of military maneuver training in low function wetlands while protecting high function wetlands.

3.4.3.3 Outreach

Public involvement is key to USAG-AK's commitment to community outreach. Implementation of this public outreach requires keeping the public informed of recreation regulations, providing harvest forms, military maps and other items of interest. Documents pertaining to wildlife and habitat work will be made available on USAG-AK's conservation web site (www.usarak.army.mil/conservation). These include:

- Outdoor Recreation Regulation Supplement
- Harvest documents and forms
- USARTRAK and Recreation Access Permit information
- Environmental documents pertaining to wildlife management, monitoring and habitat creation.
- Recreation opportunities available on post
- Maps (including off-limits and restricted areas)
- Contact phone numbers

3.5 Outdoor Recreation Management

USAG-AK strives to maintain an interactive relationship with local communities by providing as many opportunities for public access as allowed by current military training, military security, safety and environmental conditions. In 2005, for instance, users of USAG-AK lands logged over 6,300 user days of outdoor recreation on Army lands with an additional estimated 3,500 days of use that is thought to have gone unrecorded. Listed in this section are specific programs to provide recreation opportunities on USAG-AK lands, consistent with the military mission. These programs are directly related to natural resources management and include access, off-road recreational vehicles, hunting, trapping and fishing. Additional information on outdoor recreational management can be found in Volume II, Annex E.

Outdoor recreation goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. Outdoor recreation goals and objectives are listed below:

Military Readiness

- Manage outdoor recreation consistent with needs of the U.S. Army Alaska military mission.

Stewardship /Range Sustainment

- Monitor and manage soils, water, vegetation, and wildlife with a consideration for all biological communities and human values associated with these resources.

- Provide human-valued products of renewable natural resources when such products can be produced in a sustainable fashion without significant negative impacts on the military training mission.
- Involve the surrounding community in USAG-AK's natural resources program.
- Manage outdoor recreation while maintaining ecosystem integrity and function.
- Control the use of off-road recreational vehicles in terms of damage to ecosystem functionality.

Quality of Life

- Provide high quality opportunities to the USAG-AK community and the general public for hunting, trapping, and fishing within biological and recreational carrying capacities of the resources.
- Provide high quality natural resources-based opportunities for other outdoor recreation, such as hiking, skiing, snowmachining, rafting, birding, etc.

Compliance

- Manage natural resources within the spirit and letter of environmental laws, particularly the Sikes Act.
- Implement this plan within the framework of Army policies and regulations.

3.5.1 Public Access

While the Army has been training Soldiers around the world for more than a century, it also has provided access to quality recreational opportunities for Soldiers, their families, employees, and the general public. If recreational or management activities conflict with military activities, the military mission comes first. USAG-AK, however, has shown that these two goals can be met even in the most rigorous and demanding of training environments.

Traditionally, there have been ample opportunities for the public to participate in recreational activities on USAG-AK lands. In maintaining a liberal policy of public access, USAG-AK relies on a responsible public to adhere to installation policies designed to promote physical security, minimize safety hazards, and protect natural and cultural resources. Access to USAG-AK lands for recreation is authorized at specific entrances only, and all recreation activities must be conducted in accordance with applicable rules and regulations.

3.5.1.1 Public Access Policy

Civilians and military personnel requesting recreational access to USAG-AK's lands and waters must obtain a Recreation Access Permit. This permit provides conditional authorization to enter Army training lands and is good for two calendar years. Permits can be obtained at each installation's Visitor Center; Morale, Welfare and Recreation Office at Fort Wainwright; or Environmental Office. On Donnelly Training Area, permits can also be obtained by calling the Natural Resources Office, 873-1614. After the Recreation Access Permit is obtained and prior to entering USAG-AK lands, all recreational users must log in, using the permit number located on the Recreation Access Permit, to the U.S. Army Recreational Tracking System (USARTRAK) to ascertain which training areas are available for recreational use. Individuals are prohibited from entering areas other than those indicated as open on the USARTRAK system. Individuals are also prohibited from entering any of the areas indicated as closed by placard, blockade, verbal warning, red flag or other means of communication. Authorization for access is subject to change based on the current Force Protection Condition levels and mission training requirements.

3.5.1.2 USARTRAK

U.S. Army Garrison Alaska has established the U.S. Army Recreation Tracking (USARTRAK) system to facilitate recreational access onto military lands. All persons (civilian and military) desiring to recreate on Army lands in Alaska must obtain a Recreational Access Permit and must use the USARTRAK system (per USAG-AK Access Policy effective 15 November 2004). USARTRAK is an automated access system that allows registered users (Recreational Access Permit holders) to telephonically access range opening data and to check in to areas open to recreation.

3.5.1.3 Public Access and Military Land Use

The amount of limitations and restrictions on public use of military lands depends on the type of military use of each area. Military use can be broken down into four general categories that affect access. Public access into training areas is allowed subject to safety restrictions and military security, when access does not impair the military mission, as determined by the Installation Commander. Public access into firing ranges, surface danger zones, and non-dudded impact areas is normally not allowed due to conflicts with the military mission. However, there are times during the year when public use does not conflict with military training and public access is allowed into these areas. Public access into dudded impact areas is prohibited because of the hazard of unexploded ordnance. Public access into urban areas is allowed subject to safety restrictions and military security, when access does not impair the military mission, as determined by the Installation Commander.

3.5.1.4 Encroachment Policy

Encroachment may be defined as legal activities and land use on or next to a military installation that are incompatible with long-term military mission sustainability and success. Building residences and subdivisions up to the installation boundary can result in conflicts with the public due to noise and dust. USAG-AK is committed to working with surrounding landowners to minimize these types of potential conflicts.

Over the last ten years, USAG-AK has been inundated with numerous requests and proposals from state, federal, and municipal government agencies, businesses, utilities, clubs, organizations, and individuals for authorization or permission to use Army lands on a long-term basis for nonmilitary purposes. Requests often have included commercial or long-term real estate interests involving rights-of-way, easements, land use permits, leases, outgrants, land transfers, exclusive use areas, and special concessions. It is the position of USAG-AK to generally deny requests for nonmilitary uses of USAG-AK properties if those requests include or involve a requirement for long-term real estate commitments, such as leases, easements, or land transfers, or if they create a potential adverse impact on the military mission or the environment.

3.5.1.4 Trespass

Illegal entry onto USAG-AK lands is the most common form of trespass. Most illegal activities either directly or indirectly affect natural resources. Since trespass is often the precursor to most illegal range activity, reducing trespass could also reduce illegal range activity. Crossing the installation boundary or the internal boundary of an off-limits area without approval constitutes trespass. Little of the installation's boundary is fenced or posted with installation boundary signs, which adds to the problem. However, trespass is often premeditated. Posting the boundary would reduce accidental trespass, but the effect on premeditated trespass would be minimal. Boundary marking can only be effective in concert with enforcement efforts associated with premeditated trespass.

3.5.2 Hunting and Trapping Programs

Both hunting and trapping are important natural resources-based forms of outdoor recreation on USAG-AK lands. In 2005, for instance, hunting and trapping accounted for 72% of the recorded (in USARTRAK) total outdoor recreational usage on USAG-AK lands (big game hunting = 54%, small game hunting = 15% and trapping = 3%). Additional information on hunting and trapping programs are in Volume II, Annex E, Section E2.2.

3.5.2.1 Hunting and Trapping Management

Hunting and trapping on USAG-AK are conducted under regulations promulgated by the Alaska Department of Fish and Game to ensure a sustainable harvest of game and furbearer species. USAG-AK manages hunting and trapping in terms of areas available, dates within Alaska Department of Fish and Game seasons, safety requirements, permit and reporting requirements, and other parameters to avoid conflicts with the military mission and provide safe, high quality recreational experiences. USAG-AK also may institute hunting and trapping regulations (including season closures or bag limit decreases) that are more restrictive than those promulgated by the Alaska Department of Fish and Game. For this reason, hunters and trappers must consult Army rules and regulations prior to attempting to harvest game on USAG-AK lands.

3.5.2.2 Authority to Hunt, Fish, and Trap

Hunting, fishing, and trapping may be permitted within the current sustainable population levels and carrying capacity of specific wildlife habitats. The number of users of fish and wildlife resources may be limited on a daily or seasonal basis. Membership in an organization, including rod and gun clubs, will not be a prerequisite to obtain permits or authorization to hunt, fish, or trap on USAG-AK lands. All hunting, fishing, or trapping on a military installation under the control of the Department of the Army will be in accordance with applicable federal, state, laws and regulations.

There will be no hunting, fishing, or other recreational activities in officially designated and marked impact areas and associated buffer zones. Impact areas that have been permanently or temporarily closed may be opened to hunting and fishing only after approval from the Installation Range and Safety Officers and the USAG-AK Commander. The Range, Safety, and Natural Resources offices will determine recreational use boundaries (pursuant to the Integrated Natural Resource Management Plan) that are adjacent to impact areas.

3.5.2.3 Permits

3.5.2.3.1 USAG-AK Recreation Access Permits

As stated above, all civilians and military personnel who desire to hunt, fish, trap or otherwise recreate on USAG-AK lands are required to obtain a Recreation Access Permit. All hunters and trappers on USAG-AK lands must also have all required state and federal hunting licenses and stamps and state issued hunter safety cards (regardless of age) in possession while hunting or trapping on USAG-AK lands.

3.5.2.3.2 Fort Richardson Moose Hunt Permit

Individuals desiring to obtain a Fort Richardson moose hunt permit must (1) complete a State of Alaska approved bowhunter or muzzleloader education course, (2) purchase all appropriate state licenses and tags (i.e., non-resident moose tags), (3) successfully draw a State of Alaska moose hunting permit (permits are mailed to the Army), (4) complete a State of Alaska approved basic hunter education course (may be from any state but must meet Alaskan standards), (5) pass a proficiency test administered by USAG-AK, (6)

attend a hunt orientation presented by USAG-AK, (7) obtain a Recreational Access Permit from USAG-AK, and (8) remit $125 conservation fee to USAG-AK.

3.5.2.3.3 Hunting and Fishing Permit Fees

Almost all military installations issue permits for hunting, fishing, and trapping and most are charging a fee for those permits. Army funding policies are making it almost impossible to fund hunting and fishing programs unless a fee system is installed. Pursuant to16 USC 670a-f and Army Regulation 200-3, the USAG-AK Garrison Commander is authorized to collect, spend and administer fees for hunting, fishing, or trapping on USAG-AK lands. The only fees currently collected on USAG-AK are those collected on Fort Richardson for its annual moose hunt. Such fees are administered in accordance with Army Regulation 200-3 and are used on the installation from which they are collected for the protection, conservation, and management of fish and wildlife, including habitat restoration and improvement, biologist staff and support costs, and related activities, as stipulated in the Fish and Wildlife Cooperative Plan, but for no other purpose.

3.5.2.4 Regulations

Hunting, fishing and trapping on USAG-AK lands are regulated by both the State of Alaska, through its hunting and trapping regulations, and the federal government through Army-wide and installation specific regulations. The Alaska Department of Fish and Game issues various regulations (trapping, migratory bird hunting, and hunting) for hunters and trappers in Alaska. Army Regulation 200-3*, Natural Resources - Land Forest and Wildlife Management*, and U.S. Army Alaska 190-13, *Enforcement of Hunting, Trapping and Fishing on Army Lands in Alaska*[4], are the primary means of establishing controls on hunting and trapping as well as other natural resources-related activities on USAG-AK. U.S. Army Alaska 190-13 pertains to hunting, trapping, fishing and off-road recreational vehicle use on USAG-AK lands. The Fort Wainwright, Donnelly Training Area, and Fort Richardson recreation supplements (updated at least every two years) condense these regulations into a user-friendly format and are distributed to the public

3.5.3 Fishing Program

Fishing on USAG-AK is conducted under regulations promulgated by the Alaska Department of Fish and Game to ensure a sustainable harvest of fish species. USAG-AK manages fishing in terms of areas available, dates within Alaska Department of Fish and Game seasons, safety requirements, permit and reporting requirements, and other parameters to avoid conflicts with the military mission and to provide safe, high quality recreational experiences. USAG-AK also may institute fishing regulations (including season closures or creel limit decreases) that are more restrictive than those promulgated by the Alaska Department of Fish and Game. For this reason, anglers must consult Army rules and regulations prior to fishing on USAG-AK lands. Additional information of the fisheries program on USAG-AK lands can be found in Volume II, Annex E, Section E2.3.

3.5.4 Subsistence

Subsistence has been legally defined to include the customary and traditional uses of fish and game in all of Alaska's rural areas. Food is one of the most important subsistence uses of wild resources. However, there are other important uses of subsistence products, such as clothing, fuel, transportation, construction,

[4] USAG-AK is currently in the process of drafting a conservation enforcement regulation that will supercede U.S. Army Alaska Regulation 190-13, *Enforcement of Hunting, Trapping and Fishing on Army Lands in Alaska.* This new regulation, USAG-AK 200-x (number format not yet approved) is expected to take effect by October of 2006. Anyone requesting access to USAG-AK lands for recreational purposes should check at the main gate of each installation for the status of Army regulations pertaining to outdoor recreation.

home goods, sharing, customary trade, ceremony and arts and crafts. All of these uses of wild resources are recognized and protected in law. Subsistence is a rich pattern of living, of which food is but one important part (Wolfe 1989).

Since 1989, laws of the United States and the State of Alaska governing subsistence in Alaska have been in disagreement. Because of this unresolved discrepancy, the State of Alaska and United States governments each maintain separate programs for providing for subsistence on their separate lands and waters within the state. This Integrated Natural Resources Management Plan does not attempt to solve these discrepancies or differences. Rather, the following section and Volume II, Annex E, Section E2.4 (in greater detail) attempt to explain the differences in the federal subsistence program, the state subsistence program, and traditional subsistence and then discuss how those programs apply to USAG-AK lands.

All Army lands in Alaska are federal lands. USAG-AK consists of mostly public domain land withdrawn for military purposes. Federal regulations do not provide for subsistence priority on lands withdrawn for military use. Federal subsistence regulations specifically state that Fort Richardson is closed to subsistence hunting of wildlife. 50 CFR 100.3(d), published 27 December 2005, in the Federal Register states: (d) The regulations contained in this part apply on all other public lands, other than to the military, U.S. Coast Guard, and Federal Aviation Administration lands that are closed to access by the general public, including all non-navigable waters located on these lands.

While there are no subsistence priorities on military lands for those who qualify under federal or state rules, subsistence users do utilize subsistence resources on military lands. USAG-AK is responsible for managing these subsistence resources for all users and the impacts must be assessed. USAG-AK lands were also traditionally used for subsistence activities by Alaska Natives and the Army has a trust responsibility to conserve the resources.

3.5.5 Off-Road Recreational Vehicles and Watercraft

Off-road recreational vehicles are used in association with many activities in the Alaskan Interior. These vehicles are used to access hunting, fishing, and trapping areas, for recreational riding and for other activities. USAG-AK will maintain opportunities for off-road recreational vehicle use provided it does not conflict with the military mission or adversely affect the environment. The Army is a trustee of public lands and has a responsibility to protect and enhance environmental quality, conserve natural resources, and provide opportunities for outdoor recreation. Nevertheless, the land under Army control was acquired solely for national defense purposes. Other uses are therefore secondary to mission needs.

3.5.5.1 Suitability

To determine the suitability of areas and trails for off-road recreational vehicles, each type of motorized off-road recreational vehicles will be considered separately, taking into account potential environmental impacts, the season of use, and opportunities to balance seasonal use with other recreational uses. If the Garrison Commander, or designee, determines that off-road recreational vehicle use is causing or will cause considerable adverse effects to the soil, vegetation, wildlife, wildlife habitat, or cultural or historic resources, the use of the type of off-road recreational vehicle causing such effects will be immediately prohibited. If necessary, designated sites will be closed. Restrictions on off-road recreational vehicle use or closure of designated sites will remain in effect until such adverse effects have been eliminated, including site restoration if necessary, and appropriate measures implemented to prevent any such recurrence.

The environmental and related impacts of off-road recreational vehicle use will be assessed according to Army Regulation 200-1 and 32 CFR 651. Coordination with adjacent private and public landowners and managers will be included in the assessment process. Coordination must be made to ensure all local, state, and federal requirements are met. Although many off-road recreational vehicle riders use established trails and roads, off-road recreational vehicles have the potential for damage to natural resources. Army policy on off-road recreational vehicles is very restrictive (Army Regulation 200-3).

Army lands may be designated for one or more types of off-road recreational vehicle use in response to a demonstrated need, provided that sufficient suitable areas are available. Lands that may not be designated for one or more types of off-road recreational vehicle use are as follows:

- Areas restricted for security or safety purposes, such as explosive ordnance impact areas.
- Areas containing geological and soil conditions, flora or fauna, or other natural characteristics of fragile or unique nature, which would be subject to excessive or irreversible damage by use of off-road recreational vehicles.
- Areas where the use by a type or types of off-road recreational vehicles would cause unequivocal and irreversible damage or destruction as a result of such use, provided, however, that types of off-road recreational vehicles not causing such damage or destruction may be permitted to use such areas.
- Areas that are key fish and wildlife habitats, as identified under environmental consideration.
- Areas that contain archeological sites, historic sites, petroglyphs, pictographs, or areas set aside for their scenic value, and areas in which noise would adversely affect other uses or wildlife resources.
- Areas in or adjacent to outdoor recreation areas where noise or vehicle emissions would be an irritant to users of the outdoor recreation area.
- Noise sensitive areas such as housing, schools, churches, or areas where noise or vehicular emissions would be an irritant to inhabitants.
- Areas or trails set aside for horses and their recreational use.
- Areas where off-road recreational vehicle use would disturb nesting or breeding of wildlife, especially those protected under Endangered Species Act or Migratory Bird Treaty Act.

3.5.5.2 Off-Road Recreational Vehicle and Motorized Watercraft Use on USAG-AK Lands

Off-road recreational vehicles have great potential for damage to natural resources. Army policy on off-road recreational vehicles is very restrictive. U.S. Army Alaska Regulation 190-13 addresses areas open and closed to off-road use on USAG-AK lands. Use of privately-owned off-road recreational vehicles on USAG-AK lands is allowed on a limited basis. Vehicles that are used commonly as off-road recreational vehicles on USAG-AK lands must remain on designated trails and roads or stay within a designated recreational use area. Opening and closing dates of Fort Richardson's off-road recreational vehicle seasons will be set in conjunction with Chugach State Park.

3.5.5.2.1 Land Based Off-Road Recreational Vehicles

Off-road recreational vehicles include snowmachines, dirt bikes, four-wheelers, swamp buggies, civilian use small unit support vehicles and four-wheel-drive vehicles. The use of three-wheeled off-road recreational vehicles is not allowed anywhere on USAG-AK lands.

3.5.5.2.2 Motorized Watercraft

Motorized watercraft include all boats with some type of motor attached, which includes jetboats, riverboats, and airboats

3.5.5.2.3 Off-Road Recreational Vehicle and Motorized Watercraft Areas

All land and water areas will be closed to off-road recreational use by motorized off-road recreational vehicles except those areas and trails that are determined suitable and specifically designated for such under the procedures established in this Integrated Natural Resources Management Plan. In determining suitability of areas and trails for off-road recreational vehicle and motorized watercraft use, each type of motorized vehicle will be considered separately, taking into account its potential environmental impact, the seasonal nature of its use and opportunities for counter-seasonal use with other recreational uses.

USAG-AK is managed for a number of different types of public recreational use. All areas that are determined open for recreational use may be closed temporarily during periods of military use. All users must daily check in through USARTRAK to determine if areas are open to recreational use. USAG-AK uses the following classification system to describe recreation areas on the installation.

> ***Open Use Area*:** Open to all types of off-road recreational vehicles. Open to all other recreational activities year-round.
>
> > *Frozen* (6+ inches of snow cover)**:** No restrictions for any off-road recreational vehicles when soil is frozen.
> >
> > *Unfrozen summer conditions:* During unfrozen conditions, off-road recreational vehicles over 1,500 lbs (road vehicles, dune buggies, Argos, small unit support vehicles etc.) must stay on existing roads and trails. No restrictions for off-road recreational vehicles under 1,500 lbs (all-terrain vehicles, snowmachines, dirt bikes etc.). Motorized watercraft must stay within existing open water channels.
>
> ***Modified Use Area***: Open to all types of off-road recreational vehicles. No restrictions for any off-road recreational vehicles when soil is frozen. All off-road recreational vehicles must stay on existing roads and trails during the summer. Motorized watercraft must stay within existing open water channels. Open to all other recreational activities year-round.
>
> ***Limited Use Area***: Open to all non-motorized recreation (hunting, fishing, trapping, hiking, skiing, and berry picking) year-round but are not open to any type of off-road recreational vehicle at any time. Motorized watercraft must stay within existing open water channels.
>
> ***Special Use Management Area***: An area managed for recreational use under specific rules that apply only to that area (i.e., Tanana Flats Training Area Airboat Special Use Management Area).
>
> ***Closed Area***: Closed to all recreational activities year-round. Closed areas include, but are not limited to, airfields, tank farm, landfill, small arms ranges, impact areas, ammunition storage points, etc.

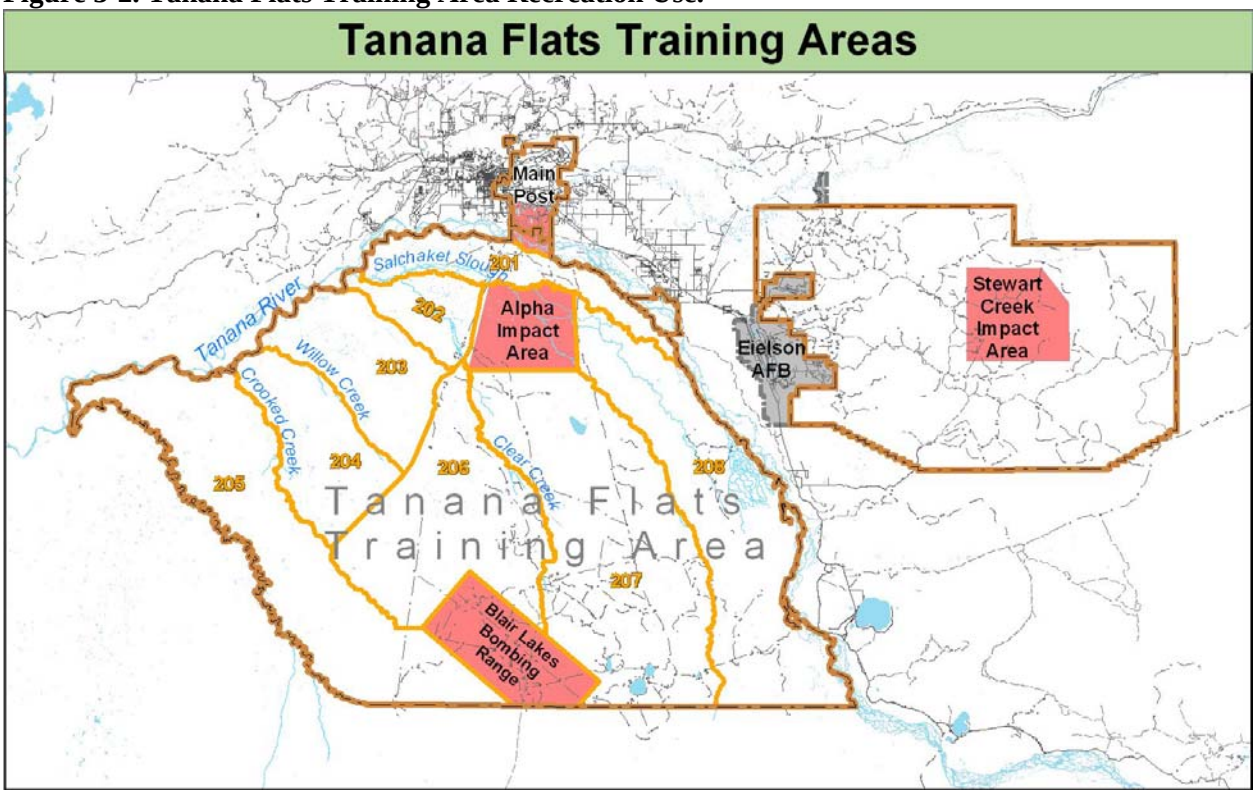
U.S. Army Alaska Regulation 190-13 (Appendix D), and the Fort Wainwright, Donnelly Training Area and Fort Richardson Supplements, address areas open and closed to off-road recreational vehicle use on USAG-AK lands. Maps showing open, modified, limited, closed, and special use management areas are shown in Volume IV of this INRMP. Use of privately owned off-road recreational vehicles on post is allowed on a limited basis. The Fort Greely Resource Management Plan (Bureau of Land Management and U.S. Army 1994a) restricts off-road recreational vehicle use along the Trans-Alaska Pipeline System right-of-way without permission from Alyeska Pipeline Service Company.

3.5.5.3 Tanana Flats Recreation Use Policy

Recreational use on Tanana Flats Training Area has been a contentious issue over the years. During 2001-2005, USAG-AK conducted a recreational vehicle impact study in Tanana Flats Training Area to identify the impacts of airboats and other recreational vehicles on the sensitive fen ecosystem. Based on the study, this 2007-2011 Integrated Natural Resources Management Plan (INRMP) proposes a new recreation use policy for Tanana Flats Training Area as discussed in Volume IV, Section PB3, with the following management controls.

The INRMP proposes to manage Tanana Flats Training Area as an "open use area" except for the impact areas, which are always "closed use areas" (see Figure 3-2). In addition, the INRMP proposes to apply specifically tailored rules to newly created Tanana Flats training areas 202 and 203 (bordered by Salchaket Slough, Willow Creek, Tanana River and Bonnifield Trail). These training areas would be open to airboats and other motorized watercraft with no restrictions between 15 August and 1 April each year. Between 1 April and 15 July, training areas 202, 203 and 204 would be off-limits to all off-road recreational vehicles, including airboats and other motorized watercraft. Between 15 July and 15 August, access into the lower fen (Training Area 202) and upper fen (Training Area 203) would be managed separately based on water levels. Access into Training Area 204 would remain closed to all motorized vehicles from 1 April – 30 October. Access into all other training areas during this time would remain open. This proposed policy does not affect rules and regulations for hunting, trapping or fishing. This proposed policy would apply to all recreational users, but does not apply to military training or other official use.

Figure 3-2. Tanana Flats Training Area Recreation Use.



3.5.6 Other Recreational Activities

USAG-AK strives to maintain an interactive relationship with local communities by providing many recreational opportunities to the public. Other recreational activities include picnicking, camping, hiking, cross-country skiing, snowshoeing, dog mushing, boating, rafting, and berry picking.

3.5.6.1 Watchable Wildlife

The Watchable Wildlife program provides wildlife viewing opportunities for Soldiers, civilians, Alaska residents, and visitors, as well as benefiting public relations for U.S. Army Alaska. Watchable wildlife programs include wildlife viewing platforms, nature trails, interpretive signs, brochures, facilities, audio visual productions, public presentations, and cooperative publications with local, state, and federal agencies. This program provides recreation and enhances environmental awareness among participants. Two wildlife viewing platforms and interpretative panels have been installed in locations overlooking the Chena River. Bike paths have also been added.

3.5.6.2 Boating and Rafting

All personal use boats and rafts will adhere to Alaska state law for safety and registration requirements on USAG-AK properties. In addition, USAG-AK requires that all individuals, while operating the boat or raft, wear Coast Guard approved personal floatation devices, regardless of age.

3.5.7 Recreational Use Monitoring

USAG-AK monitors recreational use on its lands to determine ecosystem impacts Monitoring includes field surveys, aerial surveys, and user surveys to determine location, type, duration and frequency of use. Monitoring of training areas also locates trespass structures. Recreational use of military land in Alaska creates impacts on military training lands, primarily a result of legal recreational use and illegal trespass of recreational vehicles. A basic tenet of ecosystem management is the importance of human values and use. USAG-AK's outdoor recreation program affects ecosystems in terms of both renewable resources (fish and game species, firewood, etc.) and disturbance associated with recreationalists. USAG-AK is well aware of the need to ensure these activities do not significantly impact ecosystem integrity. There are a number of elements of the outdoor recreation inventory and monitoring program. Recreational facility inventory, recreational user monitoring, recreational impact monitoring, and trespass structure monitoring and inventory all are components of the outdoor recreation monitoring and inventory program.

3.5.8 Public Outreach

The public outreach program develops informational materials, conducts briefings, attends public meetings and events, and conducts surveys of public desires for natural and cultural resources management on USAG-AK lands that will improve public awareness about the diverse and unique natural and cultural resources found on Army lands in Alaska. The goal of the public outreach program is to provide an awareness of recreational opportunities and responsibilities to hunters, trappers, anglers and others who participate in recreational activities on USAG-AK lands. More information is available in Volume II, Annex E, Section E2.8.

3.5.9 Conservation Enforcement

Many aspects of natural resources management require effective enforcement if they are to be successful. Such features as harvest controls, protection of sensitive areas, pollution prevention, hunting and fishing recreation, non-game protection, and others are dependent upon effective law enforcement. Enforcement of laws primarily aimed at protecting natural resources and outdoor recreation activities are an integral part of the installation's natural resources management program. Game laws must be implemented in accordance with applicable state and federal laws and as approved by the commander in the INRMP. Whenever hunting, fishing, or trapping is allowed on Army installations, enforcement of natural resources laws and regulations will be in accordance with the installation Fish and Wildlife Cooperative Plan and will be performed by natural resources law enforcement professionals and/or Provost Marshal if practicable, or as required under the Status of Forces Agreement, outside the continental United States.

The Director of Emergency Services is the senior USAG-AK law enforcement official. The director is responsible for coordination and supervision of fish and wildlife law enforcement on all Army lands in Alaska. The Provost Marshal at Fort Richardson appoints Military Police personnel to serve as conservation enforcement officers. This system of fish and wildlife enforcement has been in place since establishment of the installation. The Chief USAG-AK Conservation Enforcement Officer supervises the Conservation Enforcement program. They also coordinate and receive technical direction from the Chief of Natural Resources in accordance with Army Regulation 200-3.

USAG-AK lands have concurrent jurisdiction. Conservation enforcement can be performed by officers with federal or state commissions. Enforcement is a joint responsibility of USAG-AK, U.S. Fish and Wildlife Service, and the Alaska Department of Public Safety (State Troopers). Alaska Department of Fish and Game employees are also deputized to enforce fish and game regulations. Citations written by USAG-AK personnel are adjudicated by the Federal Magistrate, whereas citations issued by Alaska State Troopers go through the state system for adjudication. The Directorate of Public Works; Directorate of Community Activities, Directorate of Emergency Services, Bureau of Land Management, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game all have responsibilities here.

There are five components of the USAG-AK conservation enforcement program which include enforcing conservation laws, reducing theft and vandalism, interacting with the public, enforcing trespass, and conservation officer training.

Enforcement of laws primarily aimed at protecting wildlife and other natural resources is an integral part of the installation's natural resources management program. Conservation enforcement on Fort Richardson includes enforcement of all natural resource related and environmental laws, enforcement of trespass, interaction with the public, and conservation enforcement officer training. Effective law enforcement is critical to natural resources conservation and the continuance of hunting, trapping, and fishing programs on a sustained basis. Trespass is often the first step to most illegal range activity and reducing illegal trespass could also reduce illegal range activity. Conducting conservation enforcement is required by Public Law 86-797 (Sikes Act) to implement the INRMP.

Fish and wildlife enforcement on Fort Richardson was the responsibility of the Fort Richardson Military Police until 1999. During 1999, a change in the Military Police unit structure removed all Fort Richardson Military Police game wardens from fish and wildlife enforcement duties. In 2000, Environmental Resources Department, through authority of the Sikes Act, implemented a contract to provide civilian conservation enforcement. During the middle of 2005, the contract was discontinued and the Director of Emergency Services reinstated Military Police conservation enforcement officers, under the supervision of the Chief USAG-AK Conservation Officer.

During the fall hunting season, USAG-AK personnel use flights to monitor any trespass within the impact areas, Eagle River Flats, Davis Range, and other restricted areas on post.

Crossing the installation boundary or the internal boundary of an off-limits area without approval constitutes trespass. Trespass is the most frequent infraction occurring on military installations, which is often the precursor to other illegal activities. Simply crossing the boundary without approval constitutes this action.

Theft of military ordnance (both unexploded and debris) and other items is an important issue with the Federal Bureau of Investigation and other enforcement agencies. These agencies work with military installations where this is a serious problem. People who enter USAG-AK lands and other installations to steal military ordnance and other items are called "scrappers." This issue is not thought to be as serious at USAG-AK as it is at some other installations in the nation.

Cultural artifacts have value both for personal enjoyment and commercial sale. Protection of cultural resources is directly related to the control of trespassers. Vandalism in the buildings on Site Summit has been a problem since 1979 when security patrols were abandoned. Over the years, individuals have torn off plywood covering doors and windows to gain entry. Gates on the fences around the missile launching pads should be kept closed and locked.

In many cases, conservation officers are the primary contact between USAG-AK natural resource management and the public. This is a very important role for the conservation officers to play, because they represent not only the conservation program but also all of USAG-AK. These contacts are an excellent opportunity for USAG-AK to accomplish public outreach, awareness, and education.

Army Regulation 200-3 and the Sikes Act require effective natural resources law enforcement on military installations. There are requirements that this enforcement be closely coordinated with the natural resources organization and that enforcement be accomplished by professionally trained conservation enforcement personnel. A generally recognized requirement exists for a 40-hour-minimum annual refresher training for enforcement officers.

3.6 Rare, Threatened and Endangered Species Management

There are no known federally endangered or threatened species on USAG-AK lands and therefore management focuses on rare, uncommon, and priority species as well as species of concern. Rare, threatened and endangered species monitoring contributes to our natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. The USAG-AK Ecosystem Management Plan (USAG-AK 2005b) identifies management of these species in detail including management guidelines and implications for department and military training.

USAG-AK has taken proactive approaches, developed rigorous strategies and created adaptive management based programs to minimize potential for our species to become threatened or endangered. The USAG-AK Ecosystem Management Program identifies rare, uncommon, and priority species and species of concern. The Fish and Wildlife Management program, Invasive Species Management program and Special Interest Areas Management program help to ensure continued effective management on USAG-AK lands in Alaska for years to come. Effective conservation in Alaska will require long-term planning and cooperation among wildlife managers, land management agencies, and resource users (Schoen 2003). The programs mentioned above and their associated plans, as well as the information in this plan, encompass these principles and provide a solid framework for rare, threatened and endangered species management on USAG-AK lands.

3.6.1 Threatened and Endangered Species

The Cook Inlet Beluga whale sub-population, an example of a species at risk, was federally listed as endangered on 22 December 2008.. Beluga whales often gather in Eagle Bay between the months of May and November (Huntington 2000) and have been observed in Eagle River from June to November as far inland as 1.25 miles upstream of Eagle Bay. Eagle River flows through the Eagle River Flats Impact Area. There is no evidence to suggest that beluga whales are negatively affected by military activities, but this species at risk could impact military training.. The Eagle River drainage is thought to be relatively unproductive but does support small runs of chinook, coho (*Oncorhynchus kisutch* [Walbaum]), sockeye, pink and chum salmon, as well as resident grayling, Dolly Varden and rainbow trout (Miller and Bosch 2004). Fish surveys in Eagle Bay have identified the presence of adult and juvenile salmonids, 3 and 9 spine stickleback and saffron cod (Pentec Environmental 2005). Predator-prey relationships in Eagle River and Eagle Bay are poorly understood. A series of three studies conducted on the Eagle River Flats found no significant evidence of bioaccumulation in either fish (sticklebacks) or macro-invertebrates collected in areas with known white phosphorus contamination (U.S. Army Environmental and Health Agency 1995; Sparling 1994) and concluded that white phosphorus was not affecting Eagle River Flats macro-invertebrate diversity, species richness or numbers per unit area (U.S. Army Environmental and Health Agency 1995). Given these results, in conjunction with the success of the remediation effort, the non-detection of white phosphorus (or other munitions constituents) in the water of Eagle River and Eagle Bay and the current winter-only firing restrictions on Eagle River Flats, it seems unlikely that military activity on Eagle River Flats is having an adverse affect on the Cook Inlet beluga whale stock.

3.6.2 Rare, Sensitive, Candidate and Species of Concern

3.6.2.1 Candidate Species and Species at Risk

Species that are candidates for federal listing as threatened or endangered are not protected under the Endangered Species Act. USAG-AK will consider decisions that may affect candidate species, as they may be listed in the future. USAG-AK will avoid taking actions that result in the need to list candidate species as threatened or endangered. Installations are encouraged to develop Endangered Species Management Component Plans for candidate species and to participate in conservation agreements with the U.S. Fish and Wildlife Service. Affirmative action to conserve candidate species can preclude the need to list such species. At a minimum, installations will document the distribution of candidate species on the installation and monitor their listing status.

The Army's policy is to proactively manage species at risk in order to prevent Endangered Species Act listings that could severely degrade military readiness. Army species at risk are official candidates for Endangered Species Act listing, classified by NatureServe as critically imperiled or imperiled on a global scale, and/or a concern for ESA listing in the foreseeable future. There are four species at risk on USAG-AK lands. They are the Alaska starwort (*Stellaria alaskana*), G3; *Oxytropis tananensis*, G2G3; Rusty blackbird (*Euphagus carolinus)*, G4; and the beluga whale (*Delphinapterus leucas*) G4T1. Managing species at risk is a critical requirement. USAG-AK must prioritize species at risk management requirements within allocated resources to ensure that species at risk requirements are adequately addressed. The objective of the Army species at risk initiative is to focus conservation efforts on species at installations that have an Army-wide strategic and enduring mission capability and where there are indications that the listing of a species at risk may be imminent due to population declines, instability, threats, etc.

3.6.2.2 State Listed Species

Army installations must be sensitive to those species listed as endangered or threatened under state law. Whenever feasible, installations should cooperate with state authorities in efforts to conserve these species. The State of Alaska Species of Special Concern list is developed by the Alaska Department of Fish and Game.

- Aleutian Canada goose[1, 2] *(Branta canadensis leucopareia)*
- American peregrine falcon[2] **(Falco peregrinus anatum)*
- Arctic peregrine falcon[2] *(Falco peregrinus tundrius)*
- Northern goshawk *(Accipiter gentilis laingi)* (Southeast Alaska population)
- Spectacled eider[1] *(Somateria fischeri)*
- Steller's eider[1] *(Polysticta stelleri)*
- Olive-sided flycatcher[4] *(Contopus cooperi)*
- Gray-cheeked thrush *(Catharus minimus)*
- Townsend's warbler *(Dendroica townsendi)*
- Blackpoll warbler *(Dendroica striata)*
- Brown bear *(Ursus arctos horribilis)* (Kenai Peninsula population)
- Steller sea lion[1, 3] *(Eumetopias jubatus)*
- Harbor seal *(Phoca vitulina)*
- Beluga whale[3] * *(Delphinapterus leucas)* (Cook Inlet population)
- Bowhead whale[3] *(Balaena mysticetus)*
- Sea otters *(Enhydra lutris)*
- Chinook salmon[1] *(Oncorhynchus tshawytscha)* (Fall Stock from Snake River)

[1] Federally listed as threatened
[2] Downlisted from Alaska Endangered Species List
[3] Federally listed as endangered
[4] Category 2 Candidate Species under federal ESA
* Documented occurrence on USAG-AK lands

3.6.2.3 Special Status Fauna

The U.S. Fish and Wildlife Service, Office of Migratory Bird Management maintains a list of *Migratory Nongame Birds of Management Concern in the United States*. Species listed for Alaska that have been documented on Fort Wainwright are trumpeter swan, common loon (*Gavia immer*), northern harrier, northern goshawk, olive-sided flycatcher, alder flycatcher (*Empidonax alnorum*), gray-cheeked thrush, and blackpoll warbler. Eighteen species confirmed on Fort Wainwright are included on the Boreal Partners in Flight Working Group as target or priority species for monitoring because of declines in populations noted across the Americas. There are no legal requirements to manage these species although all migratory bird species are afforded some protection under the Migratory Bird Treaty Act (Ruth Gronquist, Bureau of Land Management, personal communication).

The American peregrine falcon is known to migrate through Fort Richardson. The falcon was de-listed in 1999. Though not found during the recent raptor inventory (Schempf 1995), it was recorded during field studies at Eagle River Flats in May and August 1991–1992 (CH2M Hill 1994). Another de-listed species, the arctic peregrine falcon, has not been observed but could also potentially occur on Fort Richardson. The bald eagle is common locally and is afforded special protection by USAG-AK in accordance with the Bald Eagle Protection Act (Quirk et al. 1978). In the raptor inventory (Schempf 1995), bald eagles were the most frequently seen species. Two other avian species, the trumpeter swan and the golden eagle, are of special concern for wildlife management on Fort Richardson. As the world's largest waterfowl species, the trumpeter swan is a migrant on Fort Richardson, stopping in Eagle River Flats during both spring and fall migrations. The golden eagle is a resident of the alpine habitats of the post (Quirk et al. 1978). Beluga

whales have been sighted within Eagle River Flats as far as 1¼ miles up the Eagle River. They have been observed chasing salmon up drainages along the river bank (Quirk 1994). These, as well as all whales in United States waters, are protected under the Marine Mammal Protection Act. In addition, as of 22 December 2008, the Cook Inlet population of beluga whales has been listed as endangered under the Endangered Species Act.

The American peregrine falcon found on Donnelly Training Area, was de-listed in 1999. Raptor surveys conducted in 1998 determined there is limited peregrine falcon nesting habitat on Donnelly Training Area (Anderson et al. 2000). However, a nest was documented on Donnelly Training Area in 2004 on a bluff above the Delta River, and peregrine falcons have occasionally been seen during migration. The U.S. Forest Service lists the trumpeter swan and osprey (*Pandion haliaetus carolinensis*) as sensitive species. Trumpeter swans nest on Donnelly Training Area and surveys have documented increases in nesting populations across Alaska including on USAG-AK lands (Ajmi and Payne 2006). Ospreys have been documented on Donnelly Training Area during migration. Four passerines listed as species of special concern by the state of Alaska have been confirmed on the withdrawn lands. They are the olive-sided flycatcher, gray-cheeked thrush, Townsend's warbler, and blackpoll warbler. All of these species have been documented breeding on Donnelly Training Area. An annual Breeding Bird Survey route and periodic updates to other bird surveys are used to monitor these species on Donnelly Training Area. Eighteen species confirmed on Fort Greely and Donnelly Training Area are included on the Boreal Partners in Flight Working Group as target or priority species for monitoring because of declines in populations noted across the Americas. There are no legal requirements to manage these species although all migratory bird species are afforded some protection under the Migratory Bird Treaty Act (Ruth Gronquist, Bureau of Land Management, personal communication).

3.6.2.4 Special Status Flora

A comprehensive survey of rare plants was included as part of the floristic inventory for Fort Wainwright conducted in 1995. There are 16 vascular plant species of concern that are known to occur on Fort Wainwright. These plants are being tracked by the Alaska Natural Heritage Program because they are thought to be uncommon or rare in Alaska and/or uncommon or rare globally (Alaska Natural Heritage Program 2006). Eighteen species collected during a floristic inventory of Donnelly Training Area (Racine et al. 2001) were vascular plants being tracked by the Alaska Natural Heritage Program's Biological Conservation Database for interior Alaska. Rare plant surveys have been conducted on Donnelly Training Area since the floristic inventory to update knowledge of species distribution, habitat association and population status (Mason 2006). All additional surveys have been on Donnelly Training Area East and focused on species occurring in habitats on or near the road system. The Donnelly Training Area Range and Training Land Assessment program also maintains records of rare plants located during impact assessment and vegetation monitoring. A detailed Geographic Information System database of rare plant locations has been created. Species status on Donnelly Training Area has been assessed and is used in the ecosystem management program to help guide land use planning and rare species conservation. Rare and sensitive plants found on Fort Wainwright and Donnelly Training Area can be found in Volume II, Annex F, Section F2.2.1.4.

A comprehensive survey of rare plants was included as part of the floristic inventory for Fort Richardson conducted in 1994. There is one former category 2 candidate species, *Taraxacum carneocoloratum*, found in alpine areas of the Chugach Mountains. This plant has been discovered at an increasing number of sites in Alaska, and its candidate status may be reevaluated. There are also 20 vascular plant species of concern that are known to occur on Fort Richardson. These plants are being tracked by the Alaska Natural Heritage Program because they are thought to be uncommon or rare in Alaska and/or uncommon or rare globally (Alaska Natural Heritage Program 2006). Sensitive plants found on Fort Richardson can be found in Volume II, Annex F, Section F2.2.1.4.

3.6.2.5 USAG-AK Species of Concern, Priority Species and Rare Species

Comprehensive management of species of concern, priority species and rare species on USAG-AK lands began in 2000 with the inception of the USAG-AK Ecosystem Management program (Schick 2003). Planning for the program was initiated in 1999 and implementation started in 2002, coinciding with the implementation of the Integrated Natural Resources Management Plan (U.S. Army Alaska 2001). The Ecosystem Management Plan is broadly-based and relies heavily on the principles of both conservation biology (Soule 1986) and landscape ecology (Forman 1995). The program follows guidance for effective ecosystem management described in Grumbine (1994), Noss and Cooperrider (1994), Kohm et al. (1996), Yaffee et al. (1996), Leslie et al. (1996), and Boyce and Haney (1997). The concept of managing complete ecosystems is a relatively new approach to land management and is largely a response to the recognition that single-species management and local scale conservation efforts often do not serve to support the processes that keep larger ecosystems functioning. With a broader, ecosystem approach to management, both the spatial and ecological scale of management efforts are greatly expanded so that management is conducted for many species over much larger geographic regions, including species of concern. Ecosystem management also recognizes that humans have been and will continue to be part of the landscape, and it endeavors to integrate human and non-human uses of the land. Importantly, ecosystem management seeks to place management actions within a larger landscape context, specifically recognizing that the effects of actions at a local scale, for example, can have larger ramifications at a landscape scale (Schick 2003).

Management of specific fish and wildlife species is covered in the Ecosystem Management Plan as well as this Integrated Natural Resources Management Plan, Volume II, Annex D. The management of special interest areas is covered under Volume II, Annex F, Section F2.3.

3.6.3 Rare, Threatened and Endangered Species Monitoring

Rare, threatened and endangered species monitoring on USAG-AK lands entails monitoring avian, mammal, and plant species and protecting sensitive habitat. Because there are no known federally endangered or threatened species on USAG-AK lands monitoring involves conducting surveys and protecting, conserving, and enhancing habitat for rare, uncommon, or priority species.

The Alaska Natural Heritage Program's Plant Tracking Database is used to guide efforts to conserve uncommon plant taxa, and the National and Boreal Partners in Flight Program's listings of conservation priority species are used for uncommon or declining bird species. The Alaska Department of Fish and Game has developed a list of mammals and other species considered to be endangered or species of concern by the state of Alaska. The University of Alaska Fairbanks Museum is also developing a list of mammal species of concern for Alaska (Jarrel, personal communication).

Monitoring is accomplished through the Ecosystem Management Plan, flora and fauna planning level surveys, Alaska Range and Training Land Assessment surveys, aerial monitoring and other monitoring programs. Rare, uncommon, or priority species and their habitats found on USAG-AK lands are identified and delineated through these planning level surveys and monitoring efforts.

3.6.4 Priorities for Rare, Threatened and Endangered Species Management

The determination of which species to manage on USAG-AK lands was not done in any systematic way until the Ecosystem Management Plan was implemented in 2002. Prior to the Ecosystem Management Plan, species were selected primarily based on input from federal and state management agencies (e.g., U.S. Fish and Wildlife Service and Alaska Department of Fish and Game), or in the case of moose and

caribou, because of their status as large and economically important game species. Under the Ecosystem Management Plan, a protocol was established to determine whether or not a species should be managed based on considerations generated from an ecosystem approach to management, and in addition, a priority ranking system was created to determine which species, of those selected, are most important for management. Rare and uncommon species and species of concern fall under these priority species (Schick 2003).

3.6.5 Special Interest Areas

Designation of special protection status for important or fragile natural areas is an effective management tool. In accordance with Army Regulation 200-3, areas that contain natural resources that warrant special conservation efforts will be identified during the inventory and classification process. After appropriate study and coordination, such areas may be managed as "special interest areas" for their unique features. Per Army Regulation 200-3, this Integrated Natural Resources Management Plan "will address the special management necessary for these areas, and all current and future land-uses will consider the uniqueness of these areas and plan accordingly to ensure conservation of their resources."

Designation of special protection status for sensitive or fragile areas is an important management tool. It is easier and more cost effective to place restrictions on the use of some areas, to minimize damage or disturbance, than to repair damage or disturbance after it has occurred. Special interest area management includes protecting special interest areas through regulations, map overlays showing restrictions, and actual barriers. U.S. Army Alaska Regulation 350-2, *Range Regulation*, has many general provisions to protect environmental resources, including special interest areas.

Military mission-related restrictions within special interest areas are included in the environmental limitations overlay map and environmental awareness materials prepared for distribution to military units who use training areas. Most military mission-related restrictions involving special interest areas have been in place for some time with no significant adverse impacts on accomplishment of the mission. Physical barriers can be used to protect special interest areas. However, this is only used in extreme cases because barriers tend to draw attention to an area.

3.6.5.1 Fort Wainwright

Fort Wainwright has several areas with special natural features. They harbor sensitive or unique wildlife species or represent unique plant communities. The following are special interest area categories with accompanying restrictions.

3.6.5.1.1 Wood River and Clear Creek Buttes

Buttes near Blair Lakes and along the Wood River have cultural and ecological significance. Many of these buttes have cleared helicopter pads for military training, especially since they are on high, relatively dry ground. These buttes will be placed off-limits to ground and vegetation-disturbing activities with exception of existing helicopter pads. This restriction should not impact military training since most missions on buttes require vegetative cover for concealment.

3.6.5.1.2 Tanana Flats Migratory Bird Special Interest Area

The area between Crooked Creek and Willow Creek in the Tanana Flats Training Area harbors undisturbed fen wetlands and significant migratory bird nesting areas. No recreational activities are permitted in this area during 1 May through 15 July annually. This area presently has no trails and no new trails may be developed in this area.

3.6.5.2 Donnelly Training Area

Donnelly Training Area has several areas with special natural features. They harbor sensitive or unique wildlife species or represent unique plant communities. The following are special interest area categories with accompanying restrictions.

3.6.5.2.1 Delta Bison Area

A 1980 cooperative agreement (Bonito 1980) designated areas on Donnelly Training Area as important bison calving and summer range. The 1980 agreement also identified the East Training Area as important late summer and early winter range. An agreement in 1986 with the Alaska Department of Fish and Game (U.S. Army 1986) also identified bison calving and summer range. USAG-AK has imposed restrictions to limit disturbance to bison habitat areas from mid February to early September when bison are present.

3.6.5.2.2 Sandhill Crane Roosting Area

The 1986 agreement with the Alaska Department of Fish and Game (U.S. Army 1986) identified several areas along the Delta River on Donnelly Training Area as important for migrating sandhill cranes. Consultation with Alaska Department of Fish and Game for the Military Lands Withdrawal Renewal Environmental Impact Statement identified additional areas along Delta Creek near the Delta Creek Assault Landing Strip as important for migrating sandhill cranes (Center for Ecological Management of Military Lands 1998). The agreement limited disturbance in designated sandhill crane areas each year from 25 April through 15 May, and 1 September through 30 September when sandhill cranes are present. The Army can conduct military activities in these areas if it first consults with the Alaska Department of Fish and Game.

3.6.5.2.3 Delta Caribou Calving and Post-Calving Areas

The cooperative agreement between the Army and Alaska Department of Fish and Game (U.S. Army 1986) identified 12 parcels on Donnelly Training Area as important calving and post-calving areas for caribou. In the 1986 agreement, the Army agreed to suspend activities or operations that would adversely affect these areas during 15 May through 31 May without consultation with the Alaska Department of Fish and Game. Restrictions in these areas are in effect only when caribou are present. In addition, all development and military actions in the caribou calving grounds will be conducted under winter conditions when there is sufficient snow cover and the ground is adequately frozen to minimize the damage to vegetation and soils.

3.6.5.3 Fort Richardson

3.6.5.3.1 Ship Creek Riparian Area

Ship Creek and its riparian habitat are important and sensitive areas on Fort Richardson, requiring protection to insure maintenance of its health and natural function. Water quality on Ship Creek is of utmost importance because any deterioration on Army lands will affect downstream locations on Elmendorf Air Force Base and in the city of Anchorage. USAG-AK's goal is to maintain Ship Creek in a condition as pristine as possible and to repair portions that may become damaged. Troops and other authorized users will continue to have "pass through" access.

3.6.5.3.2 Eagle River Flats

Eagle River Flats and its associated tidal wetlands are important for both natural resources conservation and for military training. The Eagle River Flats is a 2,140 acre estuarine salt marsh located at the mouth of Eagle River on Fort Richardson Army Post. Glacially-fed Eagle River flows through the flats before discharging into Eagle Bay of Knik Arm in Upper Cook Inlet. The Eagle River Flats has been used since the 1940s as an impact area. Because the flats are off-limits, no development has occurred, preserving

much of the ecosystem. Firing is restricted to upland, dryer areas. Live-fire activities may not target wildlife, including beluga whales when they are present in the Eagle River.

CHAPTER 4. IMPLEMENTATION

The Sikes Act Improvement Act requires not just preparation and update of an Integrated Natural Resources Management Plan (INRMP), but "implementation" of the plan. The following section discusses the definition and funding implications of implementation.

Implementation anticipates the execution of all "must fund" projects and activities in accordance with specific time frames identified in the INRMP.

An INRMP is considered to be "implemented" if an installation:

- Actively requests, receives, and uses funds for "must fund" projects and activities.
- Ensures that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the INRMP.
- Coordinates annually with all internal and external cooperating offices.
- Documents specific INRMP action accomplishments undertaken each year.

Natural resource requirements defined by the Office of the Secretary of Defense as environmental "must fund" are those projects and activities required to meet recurring natural resources conservation management requirements or current natural resources compliance needs. The Army equivalent to Office of the Secretary of Defense's "must fund" projects are projects as described in classes 0, 1 and 2 High (2H) in current Army policy and guidance for identifying environmental program requirements.

All projects listed in an INRMP are not necessarily environmental class 0, 1 or 2 High. Implementation of INRMPs is a shared responsibility among those activities that use the land (e.g., trainers, facility managers, provost marshal) as well as those who ensure compliance and provide overall program oversight. Accordingly, projects necessary to implement INRMPs are not limited to environmental funds. However, INRMPs should include all projects.

Projects are contained in Appendix AA2 of this INRMP and will be reviewed and updated annually upon completion of Army review and validation processes.

4.1 Natural Resources Implementation Goals and Objectives

Natural resources program management includes all the tasks required to plan, organize, and implement, and operate the natural resources program for USAG-AK. Goals for natural resources program management are found below:

- Prepare, update, and submit Conservation "must fund" projects on time annually.
- Develop, update, and execute Conservation work plan annually.
- Obtain and execute 100% of natural resource funding annually.
- Contribute to Installation Status Report and Army Environmental Database - Environmental Quality report on time annually.
- Execute conservation implementation plan.
- Maintain designated natural resources professionals with appropriate training.
- Recruit and train adequate staff to conduct natural resources.
- Prepare, update, and execute cooperative agreements, Memoranda of Understanding, and Memoranda of Agreement to accomplish natural resources management.

4.2 Achieving No Net Loss to Military Mission

The natural resources program through this INRMP (as well as the Integrated Training Area Management program) is mitigation for the military mission. Therefore full implementation of this plan is required to achieve no net loss to the military mission.

4.3 Supporting Sustainability of Military Mission

This INRMP is written with the intention of supporting military mission sustainability. Full implementation of this plan is required to achieve mission sustainability

4.4 Planning

4.4.1 Integrated Natural Resource Management Plan

Natural resource planning includes preparing, updating, implementing, and reviewing the INRMP annually. Natural resources management is also part of the conservation program. The conservation program in USAG-AK is guided by the USAG-AK conservation implementation plan. Detailed planning guidelines can be found in Volume II, Annex A.

4.4.2 Conservation Program Implementation Plan

The purpose for the U.S. Army Alaska conservation implementation plan (1998) was to gain approval and provide programmatic guidance to USAG-AK conservation program managers on the future structure of the conservation program. The Sikes Act, as amended in 1998, stipulates that planning level surveys, integrated natural resources management plans and implementation of these plans are required for all Department of Defense lands. Implementation of these plans required a higher level of effort than had occurred prior to 1998 and was not possible because of low priority for funding. This plan outlined the steps and identifies the resources necessary to comply with the Sikes Act by supplementing the USAG-AK conservation program.

4.4.3 Conservation and Integrated Training Area Management Work Plans

The USAG-AK Conservation annual work plan was created to track funding, obligations, and execution for natural resource projects and tasks. Each project contains the following information: project name, priority, project number and name, description, funding required, funding allocated, funding obligated, year funded, agency (in-house or contractor), National Environmental Policy Act requirements, Section 106 requirements, other permit requirements, primary USAG-AK point of contact, project status, and comments.

The Integrated Training Area Management work plan is created by the Integrated Training Area Management Coordinator, submitted by the Directorate of Plans, Training, Mobilization, and Security through the U.S. Army Alaska G3, validated by U.S. Army Pacific, and turned in to the Department of the Army Mobilization & Operations Army Training Division as the basis for Integrated Training Area Management funding.

4.5 Reporting

USAG-AK is responsible for submitting reports for funding requirements, funding work plans, and environmental quality status. USAG-AK must annually submit the Army Environmental Database – Environmental Quality, the Installation Status Report Part II Environmental, and Reimbursable Project Tracking System. The Environmental Program Requirements report, the basis for reporting environmental funding requirements, was discontinued in 2005.

4.6 Cooperative Agreements

A priority for partnering and accomplishing work to implement this plan is through cooperative agreements. Army Regulation 200-3 directs that, where applicable, an installation should enter into cooperative plans, in accordance with 16 USC 670a, with state and federal conservation agencies for the conservation and development of fish and wildlife, soil, outdoor recreation, and other resources.

4.6.1 Fish and Wildlife Cooperative Plan

In accordance with 16 USC 670a, the Fish and Wildlife Cooperative Plan is that component of the INRMP that describes how the fish and wildlife resources at an installation will be managed. It is a tripartite agreement between the USAG-AK, U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game. The cooperative plan provides a program of planning for, and the development, maintenance, and coordination of wildlife, fish, and game conservation. Signature by the three agencies on the INRMP enacts the fish and wildlife cooperative plan. A summary of items agreed to by the three agencies is consolidated in Appendix AA.1

4.6.2 Department of Defense Agreements

Memoranda of Understanding between the Department of Defense and other resources agencies provide the authority for installations to develop their own cooperative agreements in attainment of mutual conservation objectives with these agencies.

Memoranda of Understanding have been established between the Department of Defense and the Departments of Agriculture (March 27, 1963) and Interior (April 7, 1978). The memoranda authorize execution of cooperative agreements in attainment of mutual conservation objectives. Installations may develop cooperative agreements with the following:

- Department of Agriculture functioning through the Agriculture Research Service, the Soil Conservation Service, and the Forest Service.
- The Department of the Interior functioning through the U.S. Fish and Wildlife Service for the conservation of fish and wildlife resources and through the National Park Service for the development and management of outdoor recreation activities.
- The Department of Agriculture functioning through the Animal and Plant Health Inspection Service and Animal Damage Control for animal damage control on military installations.

A cooperative agreement between the Department of Defense and The Nature Conservancy (December 13, 1988) declared a policy of cooperation and establishes procedures for planning and conducting cooperative efforts between The Nature Conservancy and Department of Defense on Department of Defense lands. Under this agreement, installation commanders can obtain technical assistance from The Nature Conservancy and State Heritage Programs, as well as allowing The Nature Conservancy to study significant ecosystems under the Army's control.

In June 1999, the heads of participating federal agencies signed a Memorandum of Understanding establishing the Cooperative Ecosystem Studies Unit Network. Department of Defense joined the network in September 2000 and now serves as a council member and technical advisor on one of the Cooperative Ecosystem Studies Units. Cooperative Ecosystem Studies Units (CESU) provide research, technical assistance, and education to federal land management, environmental, and research agencies, and their partners. The CESU Network has several benefits: a broadened scope of scientific services for federal agencies, increased technical assistance to resource managers, additional scientific resources and opportunities for universities, and increased diversity of research scientists and institutions.

4.6.3 Other USAG-AK Agreements

USAG-AK has developed the following cooperative agreements to implement this plan and the conservation program.

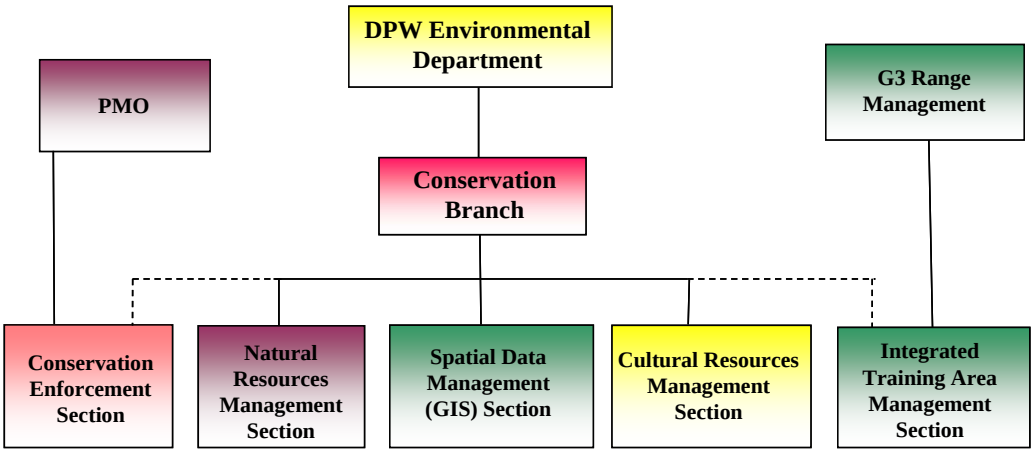
- *Memorandum of Understanding between the Bureau of Land Management and the United States Army Alaska concerning the management of certain public lands withdrawn for military use.* This Memorandum of Understanding, developed and entered into by the Bureau of Land Management's Alaska State Office and the United States Army Alaska established cooperative efforts for the management of public lands withdrawn for military use in accordance with the Military Lands Withdrawal Act of 1986 (public Law 99-606). It implements the Fort Greely Resource Management Plan and the Fort Wainwright Yukon Maneuver Area Resource Management Plan.
- *Cooperative Agreement between Alaska District Corps of Engineers and Bureau of Land Management, Alaska.* This agreement between the Department of the Army, Alaska District, Corps of Engineers and the Department of the Interior, Bureau of Land Management, Alaska State Office (Bureau of Land Management) defines the responsibilities for authorizing use (rights-of-way, leases, licenses, permits) by others of public lands in Alaska withdrawn for the Department of the Army and the Department of the Air Force.
- *Memorandum of Agreement for Fire Suppression on Army Lands in Alaska.* The Army has an agreement with Bureau of Land Management, Alaska Fire Service whereby the Alaska Fire Service is provided facilities on Fort Wainwright in exchange for fire protection on all Army lands in Alaska.
- *Cooperative Agreement for Natural and Cultural Resource Support.* This agreement between USAG-AK and the University of Alaska provides natural and cultural resource support.
- *Cooperative Agreement for Natural, Cultural, and Environmental Support*. This agreement with the Center for Environmental Management of Military Lands at Colorado State University provides support for natural and cultural resources, as well as environmental management.
- *Cooperative Agreement for Erosion Control and Habitat Management.* USAG-AK has entered into cooperative agreements with both the Salcha-Delta Soil and Water Conservation District (DSWCD) and the Palmer Soil and Water Conservation District (PSWCD) for enhancing, rehabilitating, and maintaining USAG-AK training lands to ensure their continued long-term use and effectiveness. The districts partner with USAG-AK to conduct land rehabilitation and maintenance, erosion control, and habitat management projects.

4.7 Organizational Enhancement, Roles, and Responsibilities

4.7.1 Organization

The Conservation Branch is a sub-component of the USAG-AK's Environmental Resources Department. Other branches within Environmental Resources Department include Planning Branch, Compliance Branch, and Clean-up Branch. The Natural Resources Section is a part of Conservation Branch. The Conservation Enforcement Section reports directly to the Provost Marshal's Office, while the Integrated Training Area Management Section reports directly to the Director of Plans, Training, Mobilization, and Security Installation Range Office. Both of these sections are integrated in terms of personnel and implementation of projects with Conservation Branch.

Figure 4-1. Conservation Branch Organizational Chart.



4.7.2 Staffing

The management and conservation of natural resources under Army stewardship is an inherently governmental function. Therefore, the provisions of Army Regulation 5-20 (commercial activities program) do not apply to the planning, implementation, enforcement, or management of Army natural resources management programs. This includes all positions (for example, professional, technical, equipment operators, natural resources law enforcement professionals, laborers, and so on) that have been validated as a requirement to perform natural resources management. However, support to the natural resources program, where it is severable from management, planning, implementation or enforcement actions of natural resources, may be subject to the provisions of Army Regulation 5-20. Personnel positions associated with activities that support (on an as-needed basis), the natural resources program (for example, equipment operators or laborers from a pool or another shop) may be subject to the provisions of Army Regulation 5-20.

The ideal situation would be for all positions to be full-time, permanent federal positions. Considering current Army personnel policies, the addition of permanent full-time federal positions is not likely in the foreseeable future. A blended workforce appears to be a necessity. USAG-AK is also directed by Army Regulation 200-3 to seek technical assistance from appropriate natural resources agencies (federal, state, and local). USAG-AK will pursue options to fill staff positions in a manner that will accomplish the most efficient blended workforce as possible.

Since the natural resources disciplines encompassed within this INRMP are the natural sciences, USAG-AK is mandated by Army Regulation 200-3 to establish the optimum staffing of natural resources management professionals, appropriate to the resources, to ensure necessary technical guidance in the planning and execution of the natural resources program. USAG-AK will establish positions as needed

and fill validated positions in accordance with current Department of Defense/Department of Army policy. Positions required to meet Sikes Act requirements for implementation of this INRMP are shown below in Table 4-1.

Table 4-1. USAG-AK Positions Required to Implement the Integrated Natural Resources Management Plan.

Location	POSITION TITLE	Area of Responsibility	Organization	CLASSIFICATION
FRA	Conservation Branch Chief / U.S. Army Alaska Integrated Training Area Management Coordinator	USAG-AK	DPW Environmental	Federal GS-12
FRA	Conservation Enforcement Chief	USAG-AK	DPW Environmental	Federal GS-11
FRA	4 Conservation Enforcement Officers	FRA	Provost Marshal's Office	Military Police Game Wardens
FWA	6 Conservation Enforcement Officers	FWA / DTA	Provost Marshal's Office	Military Police Game Wardens
FRA	Geographic Information System Coordinator	USAG-AK	DPW Environmental	IPA
FRA	Geographic Information System Technician	USAG-AK	G3 Integrated Training Area Management	University Support
FWA	Geographic Information System Technician	FWA / DTA	DPW Environmental	University Support
FWA	Natural Resources Coordinator	FWA / DTA	DPW Environmental	Federal GS-11
FWA	Fish and Wildlife Biologist	FWA / DTA	DPW Environmental	University Support
FWA	Natural Resources Recreation Specialist	FWA / DTA	DPW Environmental	University Support
DTA	Fish and Wildlife Biologist	FWA / DTA	DPW Environmental	University Support
FRA	Natural Resources Coordinator	FRA	DPW Environmental	IPA / Federal GS-11
FRA	Fish and Wildlife Biologist	FRA	DPW Environmental	Federal GS-11
FRA	Natural Resources Recreation Specialist	FRA	DPW Environmental	University Support
FRA	Natural Resources Specialist	FRA	DPW Environmental	University Support
FWA	Forester	USAG-AK	DPW Environmental	IPA
FWA	Forest Technician	USAG-AK	DPW Environmental	University Support
DTA	DTA Integrated Training Area Management Coordinator	DTA	G3 Integrated Training Area Management	IPA
DTA	DTA Range and Training Land Assessment Coordinator	DTA	G3 Integrated Training Area Management	University Support
FWA	FWA Integrated Training Area Management Coordinator	FWA	G3 Integrated Training Area Management	IPA
FWA	FWA Range and Training Land Assessment Coordinator	FWA	G3 Integrated Training Area Management	University Support
FRA	FRA Integrated Training Area Management Coordinator	FRA	G3 Integrated Training Area Management	IPA

FRA	FRA Range and Training Land Assessment Coordinator	FRA	G3 Integrated Training Area Management	University Support

FWA – Fort Wainwright Alaska
DTA – Donnelly Training Area
FRA – Fort Richardson Alaska
DPW – Directorate of Public Works
G3 Integrated Training Area Management – Assistant Chief of Staff for Training and Operations - Integrated Training Area Management
IPA – Intergovernmental Personnel Act

Full implementation of this INRMP requires full-time federal natural resource positions, as well as assistance from USAG-AK's partners and cooperators, both signatory and otherwise. Specific needs from organizations external to USAG-AK are indicated throughout this document. It is impossible for USAG-AK to hire the specialized expertise needed for some projects within this plan. USAG-AK will require considerable expertise from universities, agencies, and contractors to accomplish some tasks. USAG-AK will reimburse parties for much of this assistance.

Federal In-house Capabilities: USAG-AK has limited in-house federal positions as a result of manpower restrictions. To meet the intent of the Sikes Act, an additional eight federal positions are required for the planning, management, and enforcement of natural resources. Six of those positions could be filled by military game wardens.

Federal Agency Support: USAG-AK could utilize personnel support from other federal agencies; however, this option has not been used previously and is not anticipated to be used during 2007-2011. These types of personnel meet Sikes Act requirements for "Government in Nature" positions for planning, management, and enforcement of natural resources.

State Agency Support: The Intergovernmental Personnel Act of 1972 (IPA) is a means to obtain personnel support. The IPA is a system where a federal or state agency "borrows" other federal or state agency personnel for a limited time to do a specific job. Any state or federal agency is authorized to participate. The installation pays the borrowed employee's salary and administrative overhead. Major advantages are that personnel are not considered contractors, can represent and obligate the federal government, and manpower authorizations are not required. IPA employees are considered part of the USAG-AK staff and can be directly supervised by federal employees. IPA employees are bound by ethics rules of both their home state agency as well as federal ethics regulations. These types of personnel meet Sikes Act requirements for "government in nature" positions for planning, management, and enforcement of natural resources.

Another "borrowed personnel" option for securing manpower assistance is through the Oak Ridge Institute for Science and Education. Oak Ridge Associated Universities manages and operates the Oak Ridge Institute for Science and Education research participation program for the U.S. Department of Energy. Oak Ridge Institute for Science and Education is a consortium of 88 doctoral-granting colleges and universities, providing students and post graduates opportunities to gain experience in their respective fields by working on Army installations. Oak Ridge Institute for Science and Education program coordinators at the Army Environmental Center are points of contact for the program. Oak Ridge Institute for Science and Education personnel are appointed research participants who will gain hands-on experience by completing multiple tasks for the duration of their employment. Stipends are equivalent to salaries for employees hired with similar educational backgrounds, with a 30% overhead added. Oak Ridge Institute for Science and Education personnel can be appointed for a maximum three-year term. Installations may assist in the selection of Oak Ridge Institute for Science and Education personnel. These personnel support positions are not considered "government in nature."

University Assistance. Support to the natural resources program, where it is severable from management, planning, implementation or enforcement actions of natural resources, may be provided by on-site contract personnel. Due to the Sikes Act preference for other federal and state agencies with natural resource expertise, state universities receive first preference for providing on-site natural resources contract personnel support. USAG-AK has used several universities in recent years to help with specialized needs. University of Alaska has provided research support to USAG-AK. The primary source of on-site university personnel assistance has been Colorado State University to help implement the USAG-AK Conservation and Integrated Training Area Management programs. These on-site support positions are not considered "government in nature."

Contractor Support. As a final option for manpower assistance, USAG-AK may turn to outside contractors for tasks that are severable from management, planning, implementation or enforcement actions of natural resources. Contractors give USAG-AK access to a wide variety of expertise. Contractors may be used for projects such as plan preparation, National Environmental Policy Act documentation, aerial census and photography, Land Rehabilitation and Maintenance implementation, and similar activities.

4.7.3 Coordination and Training

Staff coordination and communication can be challenging as the conservation staff is spread out over three locations hundreds of miles apart. A significant strength of the conservation program is the integration with other Army directorates, namely the Provost Marshal's Office and the Directorate of Plans, Training, Mobilization and Security. However, this split chain of command also makes communication and coordination very difficult. On-the-job training is often difficult because some supervisors work in different locations from their staff. A blended workforce consisting of federal employees, Intergovernmental Personnel Agreement staff, university personnel, and contract personnel also contributes to chain of command challenges. Therefore, USAG-AK has instituted a framework of natural resource teams, in-progress reviews, and periodic training to meet these challenges.

4.7.3.1 In-Progress Review

The USAG-AK Conservation/Integrated Training Area Management In-Progress Review process is the forum by which conservation personnel report annual accomplishments and brief future plans and requirements to the USAG-AK Environmental Chief, U.S. Army Alaska Range Manager and Range Officers from each post. The In-Progress Review provides an opportunity for discussion between the conservation personnel from each post and the USAG-AK range and environmental staff. Installation Management Command Pacific Area Regional Office Conservation and U.S. Army Pacific Command Integrated Training Area Management personnel are invited to participate.

4.7.3.2 Conservation Team

The USAG-AK conservation team exists to promote integration and enhance project execution. All natural and cultural resources employees of USAG-AK are members of the conservation team. The conservation team was created to allow free exchange of ideas and information among the members on all three posts. The conservation team also exists to tackle technical scientific issues necessary to carry out projects. There are three permanent components of the USAG-AK conservation team: the conservation team north of the range (Fort Wainwright and Donnelly Training Area), the conservation team south of the range (Fort Richardson), and the conservation steering committee. Ad hoc committees are created and convene as necessary. Ad hoc committees include the ecosystem management team and the Range and Training Land Assessment team. Conservation personnel often serve on a number of these permanent and ad hoc teams.

4.7.3.3 Training

Interdisciplinary training is essential for Department of Defense natural resource managers. It addresses practical job disciplines, statutory compliance requirements, applicable Department of Defense/Department of Army regulations, pertinent state and local laws, and current scientific and professional standards as related to the conservation of our nation's natural resources. The natural resource training objective is to identify technical requirements as well as the resources (cooperative agreements, Legacy, Integrated Training Area Management, Memoranda of Understanding, and so forth) available to implement and execute a successful and proactive program, the goal being to maintain and enhance the military mission, biodiversity, conservation stewardship, and the management of the total ecosystem from the practical standpoint of day-to-day operations as well as long-term planning.

4.8 Decision Support

Decision support system goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. Decision support system goals and objectives are:

- Provide a decision support capability to natural resources, range, and engineer planners and managers.
- Develop and maintain USAG-AK Geographic Information System spatial database and data layers.
- Maintain Geographic Information System data in accordance with Federal Geographic Data Committee standards and Tri-Services Spatial Data Standards, including metadata standards.
- Coordinate and synchronize the three decision support systems.

There are three management components of the decision support systems used in USAG-AK. These three components are Geographic Information System, Range Facility Management Support System, and Integrated Facility System. More information on decision support programs can be found in Volume II, Annex A.

4.8.1 Geographic Information Systems

The USAG-AK Geographic Information System is a foundational capability of natural resource management. The Geographic Information System is a computer-based tool capable of assembling, storing, manipulating, and displaying geographically referenced information, (i.e., data identified according to their locations). The system can be used to analyze and model (manipulate, overlay, measure, compute, and retrieve) the digital spatial data and display the new map products and tabular resources information showing the results of the spatial analysis. Geographic information System technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps. These abilities distinguish Geographic Information System from other information systems.

4.8.2 Range Facilities Management Support System

The Range Facilities Management Support System is a multi-user, personal computer, web-based software package that automates the real property inventory, scheduling, firing (operations) desk, and management functions at an installation Range Control Center. The Range Facilities Management Support System was developed to optimize the scheduling, use, and operations and maintenance functions

for an installation's live-fire ranges, maneuver training areas, and other related training facilities and assets under Army Regulation 210-21.

4.8.3 Integrated Facility System

The Integrated Facility System is a facility engineer automated information evaluation system that encompasses life cycle management of real property resources, and is the Army Chief of Staff for Installation Management's official source of real property information. The current version is the Integrated Facility System – Micro or Mini. In addition to real property information, the system performs a wide variety of other functions, such as work estimating and work-order tracking. The system has two levels: one for the installation level and one for the headquarters level (now called Executive Information System). The U.S. Army Corps of Engineers, Center for Public Works manages the Integrated Facility System.

4.9 Outreach

Outreach is another extremely foundational component of natural resources implementation. Each natural resource program area conducts outreach activities, and the natural resources program management function integrates those efforts through the conservation web page, conservation newsletter, and participates in other outreach events.

4.10 Financial Management

Another significant component of USAG-AK natural resource program management is financial management. Financial management consists of funding, budgeting, and contracting. These three components all are extremely important to USAG-AK's ability to implement this plan.

4.10.1 Funding

The intent of the funding section of this INRMP is to link resources with the goals established. The funding section of this plan will therefore be used to develop and support environmental funding requirements.

4.10.1.1 Environmental Program Funding

Environmental funds are a special category of the Army's budget. Until 2005, the Environmental Program Requirements process governed environmental funding. They were special in that they were fenced by Department of Defense, but they are still subject to restrictions of operation and maintenance funds. "Must fund" classifications included mitigation identified within Findings of No Significant Impact, items required within Federal Facilities Compliance Agreements, and planning level surveys. This INRMP is a Federal Facilities Requirement Agreement that contains projects and programs to mitigate various military activities. Currently, the Environmental Program Requirements system has been replaced by the Environmental Cost Standardization model to implement the Army Strategy for the Environment. The Environmental Cost Standardization uses a cost model to develop installation environmental requirements that are predictable. A great deal of confusion exists concerning environmental funding of new or unpredictable requirements, or how installations will communicate new or adjusted requirements to Army headquarters.

4.10.1.1.1 Environmental Conservation Funding

The purpose of environmental conservation funding is to enable the Army mission by funding characterization, monitoring, compliance and continuing oversight of installation natural and cultural resources. Conservation funding allows Army managers to exercise stewardship of natural and cultural resources by facilitation of the planned management of natural and cultural resources, via the Integrated Natural Resources Management Plan and Integrated Cultural Resource Management Plan. This is accomplished in coordination with facility managers, trainers and other land users, through funding and implementation of projects that help preserve, maintain, repair and improve natural and cultural resources for sustaining mission requirements. Volume II, Annex A lists environmental conservation funding requirements needed to implement this INRMP.

4.10.1.1.2 Environmental Compliance Funding

The purpose of environmental compliance funding is to enable the Army mission by funding implementation of legally mandated actions to protect and enhance environmental media from the negative effects of pollution and human alteration and allow sustained access to and use of operational ranges to meet doctrinal training requirements. While most of these funding requirements are not covered here in this INRMP, there are a few compliance funded projects that are intertwined with natural resources management. These compliance funded projects are listed in Volume II, Annex A.

4.10.1.2 Conservation Reimbursable Funding

Reimbursable programs support military readiness and land management, and revenues from these programs supplement base operations and other funding. Agriculture/grazing outleases are authorized by 10 USC 2667(d), and commercial forestry by 10 USC 2665. Reimbursable programs may be used to enhance and maintain wildlife habitats. The Army has about 800,000 acres of land leased under agriculture/grazing, and 1.4 million acres under some form of commercial forestry. The Army also has executive agent responsibilities over the Department of Defense Forestry Reserve Account.

4.10.1.2.1 Forestry Funds

Forestry funds are generated from sale of forest products on military lands and are centrally controlled by the Department of the Army. USAG-AK may be reimbursed for all costs associated with the maintenance and disposition of forest products. Forestry funds must be used only for projects directly related to forest ecosystem management. Such projects include timber management, reforestation, timber stand improvement, inventories, fire protection, construction and maintenance of timber area access roads, purchase of forestry equipment, disease and insect control, planning (including compliance with laws), marking, inspections, sales preparations, personnel training, and sales. Army Regulation 200-3 (chapter 5) outlines collection and expenditures systems. USAG-AK forestry funding requirements are listed in Volume II, Annex A.

4.10.1.2.2 Agricultural Outlease Funding

The Army agriculture/grazing outlease program is a reimbursable program. This means that proceeds from outleases on an installation are first used to cover authorized expenses. Proceeds are allocated to the installations and U.S. Army Corps of Engineer districts based on the Agricultural/Grazing Outlease protocol. The use of revenue from agricultural and grazing outleases are restricted by law. Revenue may be used for reimbursement of the administrative costs of outleasing and the financing of multiple land-use management activities through established budget procedures.

4.10.1.2.3 Fish and Wildlife Funding

Department of Defense fish and wildlife funds are collected through sales of permits for hunting, trapping or fishing on military controlled lands. They are authorized by the Sikes Act and regulated by Army Regulation 200-3 (chapter 6). These funds may be used only for fish and wildlife management on the

installation where they are collected. They cannot be used for recreational activities. They are exempt from equipment purchase amount limitations, and they do not expire (un-obligated funds carry over on 1 October). USAG-AK collects fees for hunting moose on Fort Richardson. Requirements for the Fish and Wildlife reimbursable funds are listed in Volume II, Annex A.

4.10.1.3 Facilities Program Funding

Army facilities are funded with two types of funding: Base Operating Support, and Sustainment, Restoration, and Modernization. It is the Army's plan during 2007-2011 to fund both of these accounts at 90% of the validated requirement.

4.10.1.3.1 Sustainment, Restoration, and Modernization

The purpose of sustainment funding is to enable the Army mission by funding the sustainment of range and other facilities in good working order to meet long-term doctrinal training requirements. The purpose of restoration funding is to restore failed or failing facilities, systems, and components damaged by a lack of sustainment, excessive age, fire, storm, flood, freeze, or other natural occurrences, improves facilities to current standards. Modernization funding adapts facilities to meet new standards and includes the erection, installation, or assembly of a new real property facility, the addition, expansion, extension, alteration, conversion, or complete replacement of an existing real property facility.

4.10.1.3.2 Base Operating Support

Real Property Services funding provides for those activities of an installation support nature. It includes those support elements and services identified as indirect overhead by Headquarters Department of Army and grounds maintenance activities. This includes abatement and disposal of building hazardous waste resulting from the performance of real property services.

4.10.1.4 Sustainable Range Program Funding

There are three types of range program funding that affect the management of natural resources: range operations, range modernization, and Integrated Training Area Management funding. Range operations funding provides for the operation and management of training ranges, range modernization funding upgrades range facilities, and Integrated Training Area Management funding rehabilitates and manages training areas.

4.10.1.4.1 Integrated Training Area Management

Integrated Training Area Management funding enables the Army mission by funding the management and maintenance of training lands to sustain and enhance the capability to meet long-term doctrinal requirements.

4.10.1.4.2 Range Operations

Range operations funding enables the Army mission by funding the operation of ranges and training lands to sustain long-term doctrinal training requirement. Range operations funding also provides for record keeping of the number and type of munitions fired, communication and coordination with local public on noise issues, and the design and installation of signage for access controls to ensure safety and security of range facilities.

4.10.1.4.3 Range Modernization

Range modernization funding enables the Army mission by funding the design and construction of ranges and the acquisition of training lands that are capable of sustaining long-term doctrinal training requirements.

4.10.1.5 Other Funding

The Legacy Program remains an additional source of funding. However, funding for the Legacy Program has been greatly reduced over past levels. The only types of Legacy projects available for funding are large projects, regional in scope, involving many other agencies as partners. While USAG-AK will continue to seek Legacy funding, it is not expected to be a viable source for implementing this INRMP.

4.10.2 Budgeting

The Environmental program works together with the Directorate of Resource Management to manage the environmental budget. USAG-AK uses work plans to communicate funding requirements to higher headquarters and to help manage the annual budget. USAG-AK uses both an environmental work plan (natural resources is included in this) and an Integrated Training Area Management work plan. There are also reimbursable program work plans that USAG-AK must submit annually to Headquarters, Department of the Army.

The Conservation annual work plan was created to develop requirements, plan spending, and track funding, obligations, and execution for natural resource projects and tasks. Each project contains the following information: project name, priority, project number and name, description, funding required, funding allocated, funding obligated, year funded, agency (in-house or contractor), National Environmental Policy Act requirements, Section 106 requirements, other permit requirements, primary USAG-AK point of contact, project status, and comments. The Conservation annual work plan is included as part of the environmental program work plan.

Reimbursable programs funding requirements are entered and tracked through the forestry, fish and wildlife, and agriculture outlease work plans in the Reimbursable Program Tracking System.

The Integrated Training Area Management Program works with the Deputy Chief of Staff for Resource Management to manage the Integrated Training Area Management budget. The installation work plan is developed in the summer and submitted in August of each year to reflect Integrated Training Area Management program requirements in detail for the following six fiscal years. The work plan reflects all Integrated Training Area Management activities for the installation. Once projects are identified, they are prioritized from most to least important. Approval of these projects and priorities is obtained from the U.S. Army Alaska Installation Range Office prior to completing the work plan. Once the projects are approved, they are entered into the Installation Workplan Analysis Module database.

4.10.3 Contracting

The contracting process includes two primary components – purchase/acquisition and contract management. Purchase and acquisition is necessary to get a contract in place then contract management is necessary to ensure good communication between the government and contractor to enable good contract performance.

4.10.3.1 Purchase and Acquisition

The first step in the contract process is purchase and acquisition. USAG-AK Environmental starts the process by clearly defining desired services in a statement of work, estimating costs, and initiating a purchase request. USAG-AK Environmental works together with a contracting agency to develop an acquisition strategy, using the Sikes Act priority to guide decision-making.

4.10.3.1.1 Sikes Act Priority for Contracting

The Sikes Act Committee Report defined natural resources management and conservation as "inherently governmental." Planning, implementation, enforcement or management of Army natural resources cannot be contracted. The first priority for implementation of this plan will be to use the USAG-AK in-house workforce. USAG-AK in-house capabilities include permanent natural resources employees, other Public Works organizations (such as roads and grounds, carpentry shop, etc.) and troop projects. These methods are usually the least expensive, but also tend to be the least flexible. All funds obligated toward in-house work must be expended in the current fiscal year. Due to the reduction of federal in-house positions, the amount of work that can be accomplished in-house dwindles every year.

Support to the natural resources program, where it can be separated from management, planning, implementation or enforcement actions of natural resources, may be contracted. The Sikes Act outlines priorities for contracting these implementation projects. When entering into contracts for services that implement natural resource management objectives or enforce natural resources laws (that is, wildlife management and endangered species plans and surveys), priority will be given to contracts with federal, state, and local agencies with responsibility for natural resources conservation. In other words, if an installation can not utilize governmental personnel to do natural resources conservation technical support, then other federal and state natural resources agencies have, by this law, a "right of first refusal" to accept this work. In these cases competitive bids are not required.

When in-house staff or cooperating federal and state agencies cannot perform work, USAG-AK looks to one of three contract mechanisms. The Government Services Administration environmental services schedule provides companies that have already gone through an open bid process to be on the Government Services Administration contract. Contracting to one of these companies is relatively simple and fast. The Job Order Contract in place in USAG-AK provides quick and efficient service. However, when none of these other options is available, USAG-AK can use the open bid process through a contracting agency.

4.10.3.1.2 Documents Required for Acquisition and Purchased

The Economy Act of 1932, as amended, allows federal agencies to obtain services directly from other federal agencies or utilize contracts already in place by other federal agencies. The Military Interdepartmental Purchase Request is used to acquire natural resource conservation services. Natural resources support services may also be obtained non-competitively through contracts with state and local agencies. In this case, a purchase request must be submitted through the Directorate of Resource Management to a contracting agency. Conservation personnel work together with the contracting agency to develop an acquisition strategy, statement of work, and government estimate. The government must prepare a statement of work and government estimate for each purchase request.

4.10.3.2 Contract Management

Once a contract is in place, USAG-AK Environmental must nominate a federal Contracting Officer's representative to help the Contracting Officer manage the contract. The Contracting Officer authorizes the Contracting Officer's representative to verify that the contractor performs the technical requirements of the contract, perform necessary inspections necessary, maintain liaison and direct communications with the contractor, monitor the contractor's performance, submit a monthly report concerning performance of services rendered and coordinate site entry for contractor personnel.

4.11 Regulatory Requirements

The Sikes Act Improvement Act of 1997 (SAIA), Public Law 105-85, Section 670a(a)(3), requires that INRMPs be prepared and implemented for each military installation, including withdrawn public lands. Each plan must be consistent with the use of military lands to ensure military preparedness and cannot result in any net loss in the capability of the installation to support the military mission.

The Migratory Bird Treaty Act prohibits the taking, possession, and trade of migratory birds, except as permitted by regulations. Penalties are enforced under 16 USC 707. The National Defense Authorization Act of 2003 (Public Law 107-314, 116 Stat.2458, Dec 2, 2002, 16 USC 703 note) Section 315, amended the Migratory Bird Treaty Act to allow authorization of "take/taking" incidental to military readiness activities if the military complies with certain conditions related to the management of effects on migratory birds. The "Authorization Act" further requires the Secretary of the Interior to promulgate such regulations with the concurrence of the Secretary of Defense.

The National Environmental Policy Act requires federal agencies to consider the environmental impact of actions taken. This act is a procedural and declarative act. For any federal action that is not a Categorical Exclusion, an environmental assessment must be made in order to determine if a full environmental impact statement must be prepared. The environmental impact statement must follow specific guidelines outlined in 50 CFR 1500-1508. The act does not require the federal agency to choose the least environmentally destructive alternative; only that the agency considers the environmental impact and alternatives to the action.

The Endangered Species Act of 1973 (PL 93-205; 16 USC 1531-1543) protects any species (fish, wildlife, or plants) listed on the endangered species and the threatened species list from hunting, taking for importation, or exportation to or from the United States.

The Clean Water Act of 1977 (33 USC 1251-1387) stipulates effluent standards for the discharge of pollutants into navigable waters of the U.S. and promotes research at the federal and state levels concerning issues of water pollution. The Coastal Zone Management Act (PL 92-583; 16 USC 1451 et seq.) preserves, protects, develops, restores, and enhances the nation's coastal zones.

The National Historic Preservation Act of 1966 (as amended PL 89-665; 16 USC 470 et seq.) protects and preserves historic and prehistoric objects, structures, sites, and districts which are included in or are eligible for inclusion in the National Register. This act defines a decision-making process to be followed when planning an action in the vicinity of a historic area.

The Military Land Withdrawal Act (PL 106-65) withdrew Fort Wainwright's Yukon Training Area and Donnelly Training Area from the public domain for military use. The Military Land Withdrawal Act requires that the Army conduct significant natural resources mitigation on withdrawn lands. The Army was required to prepare a legislative environmental impact statement prior to the withdrawal and the Public Law 106-65 was enacted in the place of a Record of Decision. This law effectively requires the Army to complete all the existing and proposed mitigation written in the environmental impact statement. Natural resources mitigation required by this legislative environmental impact statement is included in this INRMP and is classified as high priority. *The U.S. Army Alaska Transformation Environmental Impact Statement was* prepared to assess the impacts of the conversion of the 172nd Infantry Brigade to the 172nd Stryker Brigade Combat Team and the conversion of the 501st Infantry Regiment to an Airborne Task Force. The Record of Decision for the *U.S. Army Alaska Transformation of U.S. Army Alaska EIS, Feb. 2004*, requires USAG-AK to mitigate significant impacts to natural resources.

4.12 Command Support

Command support is essential to implementation of this INRMP. Without this support, priority projects for natural resources management will not occur. Failure to execute these projects risks violation of environmental laws, reduced mission readiness, and negative public reaction to a lack of environmental stewardship. The Installation Commander is responsible for compliance with environmental laws and sets the tone for environmental stewardship. Command emphasis on this INRMP ensures a healthy environment, sustainable resources, and quality future training lands.

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2007-2011
Integrated
Natural
Resources
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A1. Introduction

The Sikes Act Improvement Amendments of 1997, Public Law (PL) 105-85, Section 670a(a)(3), states that

"Consistent with the use of military installations to ensure the preparedness of the Armed Forces, the Secretaries of the military departments shall carry out the program required by this subsection to provide for the conservation and rehabilitation of natural resources on military installations; the sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping, and non-consumptive uses; and subject to safety requirements and military security, public access to military installations to facilitate the use."

To facilitate the program, the law requires that an Integrated Natural Resources Management Plan (INRMP) be prepared and implemented for each military installation, including withdrawn public lands. Each plan must be consistent with the use of military lands to ensure military preparedness and cannot result in any net loss in the capability of the installation to support the military mission. In accordance with Section 670a(b) of the act, to the extent appropriate and applicable, an INRMP should provide for the following:

- Fish and wildlife management, land management, forest management, and fish and wildlife-oriented recreation.
- Fish and wildlife habitat enhancements or modifications.
- Wetlands protection, enhancement, and restoration where necessary for support of fish, wildlife, or plants.
- Integration of and consistency among the various activities conducted under the plan.
- Establishment of specific natural resources management goals and objectives and time frames for proposed action.
- Sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources.
- Enforcement of applicable natural resources laws (including regulations).
- No net loss in the capability of military installation lands to support the military mission of the installation.
- Review of this INRMP and its effects every five years.
- Provisions for spending hunting and fishing permit fees exclusively for the protection, conservation, and management of fish and wildlife, including habitat improvement, and related activities in accordance with INRMPs.
- Exemption from procurement of services under Office of Management and Budget Circular A-76 and any of its successor circulars.
- Priority for contracts involving implementation of this INRMP to state and federal agencies having responsibility for conservation of fish and wildlife.
- Public access to the military installation that is necessary or appropriate for sustainable use of natural resources by the public to the extent that such use is consistent with the military mission and the needs of fish and wildlife resources, subject to requirements necessary to ensure safety and military security.

Implementation of the natural resources program consists primarily of full implementation of this INRMP. The Sikes Act requires each military installation to prepare, update, and fully implement an INRMP. The INRMP is considered to be fully implemented if all high priority projects are funded and executed, there are sufficient numbers of trained natural resources personnel, those personnel have sufficient supplies and equipment to carry out these projects. The following natural resources program

management section details the programs, policies, procedures, and other requirements necessary to fully implement this INRMP.

A2. Natural Resources Program Management

Natural resources program management includes all the tasks required to plan, organize, and implement, and operate the natural resources program for USAG-AK. Goals for natural resources program management are found below:

- Prepare, update, and submit conservation “must fund” projects on time annually.
- Develop, update, and execute conservation work plan annually.
- Obtain and execute 100% of natural resource funding annually.
- Contribute to Installation Status Report and Army Environmental Database - Environmental Quality report on time annually.
- Execute conservation implementation plan.
- Maintain designated natural resources professionals with appropriate training.
- Recruit and train adequate staff to conduct natural resources.
- Prepare, update, and execute cooperative agreements, Memoranda of Understanding and Memoranda of Agreement to accomplish natural resources management.

A2.1 Planning

Natural resource planning includes preparing, updating, implementing, and reviewing the INRMP annually. Natural resources management is also part of the conservation program. The conservation program in USAG-AK is guided by the USAG-AK conservation implementation plan.

A2.1.1 Integrated Natural Resources Management Plan (INRMP)

The centerpiece of natural resources planning and resourcing is the INRMP. An INRMP guides the natural resources management programs at each installation. Implementation of the INRMP measures, maintains, protects, and enhances the ecological integrity of the training lands and the biological communities inhabiting them. An INRMP is prepared to assist Installation Commanders in their efforts to conserve and rehabilitate natural resources "consistent with the use of military installations to ensure the preparedness of the Armed Forces." INRMPs are intended principally to help Installation Commanders manage natural resources more effectively so as to ensure that installation lands remain available and in good condition to support the installation's military mission (i.e., ensure "no net loss in the capability of military installation lands to support the military mission of the installation").

USAG-AK prepares this INRMP in cooperation with the U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, and with the Alaska Department of Fish and Game. This interagency participation results in a document that reflects the mutual agreement of Department of Defense, Department of the Interior, and the State of Alaska concerning conservation, protection, and management of natural resources. USAG-AK also provides an opportunity for the public to review and submit comments on this INRMP.

Mutual agreement is the goal with respect to the entire plan. Mutual agreement is required only with respect to those elements of the plan that are subject to the otherwise applicable legal authority of the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game to conserve, protect, and manage fish and wildlife resources. In regards to Department of Army lands, these laws include but may not be limited to the Endangered Species Act and the Migratory Bird Treaty Act. Nothing in the Sikes Act

Improvement Act is intended to either enlarge or diminish the existing responsibility and authority of the U.S. Fish and Wildlife Service or the Alaska Department of Fish and Game agencies concerning natural resources management on military lands.

Appropriate management objectives to protect mission capabilities of installation lands (from which annual projects are developed) should be clearly articulated in the planning process and should be high in INRMP resourcing priorities. The effectiveness of the INRMP in preventing "net loss" shall be evaluated annually. Mission requirements and priorities identified in the INRMP shall, where applicable, be integrated in other environmental programs and policies. It is not the intent that natural resources are to be consumed by mission requirements but sustained for the use of mission requirements. In order to achieve this, environmental programs and policies must have the goal of preserving the environment for the purpose of the mission.

There may be, however, instances in which a "net loss" may be unavoidable in order to fulfill regulatory requirements other than the Sikes Act, such as complying with a biological opinion under the provisions of the Endangered Species Act or the protection of wetlands under the provisions of the Clean Water Act. Loss of mission capability in these instances will be identified in the INRMP and a discussion included of measures being undertaken to recapture the net loss.

A2.1.1.1 Purpose of the Plan

The primary purpose of this INRMP is to establish natural resources goals, objectives, and policies that USAG-AK will use to manage Army lands in Alaska. It is the intent of the Department of Defense to clearly and openly express these goals, objectives and policies to the public through this INRMP. These goals are shown below:

- Complete, maintain, and update a current and Installation Management Agency-approved INRMP.
- Identify requirements for resourcing INRMPs in the Environmental Program Requirement Report.
- Involve public in the review of INRMP updates.
- Involve U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, and Bureau of Land Management as cooperators in the INRMP.
- Ensure INRMP components are clearly identified and compatible with the Installation’s Master Plan, Range Development Plan, Endangered Species Management Plan, and Integrated Cultural Resources Management Plan.

The secondary purpose of this INRMP is to guide USAG-AK natural resources managers and personnel in their decision-making regarding management of military land in Alaska and the implementation of proposed natural resource projects.

Implementing this INRMP would provide a land management program that conserves land as an essential asset for training, provides excellent stewardship, complies with environmental laws, and provides recreational opportunities that contributes to the quality of life.

A further purpose of this INRMP is to serve as a funding identification document for the management of natural resources on military lands.

A2.1.1.2 Scope of the Plan

The focus of this INRMP will be on the management of natural resources on the military installation. The management measures have been developed based on the current conditions of the resources, and the military mission and activities as they are anticipated. This INRMP will guide natural resources management of USAG-AK lands for the next five years (2007-2011) and provide a solid foundation from which to build and continue the program beyond the year 2011.

A2.1.1.3 Structure of the Plan

This INRMP is structured to demonstrate direct support of the overall military mission, which includes stewardship of natural and cultural resources, compliance, quality of life, and military training support. Every single project and task in the INRMP is focused to add to the accomplishment of one or more of these natural resources goals.

The standard Army INRMP template incorporates and consolidates all natural resource plans and ensures proper implementation at the installation level. The goal was a template for INRMPs that supports the Army's readiness mission, meets compliance requirements, provides for sustainment and rehabilitation of natural resources, and provides a consistent review process for legislatively mandated cooperators.

The new Army template streamlines the INRMP into operational, useable, and smaller documents. The overall INRMP will include the Main Plan, Annexes (component plans), Supplements, and Prescriptions. The sections will be made up of various topics that will fulfill the INRMP purpose. The INRMP will also include appendices of information and data that support the INRMP. At a minimum, planning level survey (e.g., flora, fauna, soils and wetlands) will be included as appendices.

Volume I, Main Plan: The Main Plan includes the Sikes Act road map, executive summary, introduction and overview, installation and description, management strategy and mission sustainability, and implementation.

The Sikes Act road map references the chapters and paragraphs in the INRMP where the ten criteria points required by the Sikes Act are found. The idea is that a stakeholder can see if the INRMP provides the information required under the Sikes Act. The road map will be inserted at the front of the INRMP, prior to the four sections. The Sikes Act requires the following 10 elements included where appropriate and applicable:

1. Fish and wildlife management, land management, forest management, and fish and wildlife oriented recreation.
2. Fish and wildlife habitat enhancement or modification.
3. Wetland protection, enhancement, and restoration, where necessary for support of fish and wildlife.
4. Integration of, and consistency among, the various activities conducted under the plan.
5. Establishment of specific natural resource management goals and objectives and time frames for proposed action.
6. Sustained use by the public of natural resources to the extent such use is not inconsistent with the needs of fish and wildlife resources management.
7. Public access to the military installation that is necessary or appropriate for the use described in subparagraph (F), subject to requirements necessary to ensure safety and military security.
8. Enforcement of applicable natural resource laws and regulations.
9. No net loss in the capability of military installation lands to support the military mission of the installation.
10. Such other activities as the secretary of the military department determines appropriate.

The Executive Summary provides a quick overview of the entire Integrated Natural Resources Management Plan. Chapter 1, Introduction and Overview, describes the overall natural resources goals and objectives, gives a brief review of past natural resources management actions, defines joint management and stewardship of USAG-AK lands, and states the military mission. Military, federal, state, and local responsibilities and partnerships are also explained. Chapter 2, Installation Description and Mission, describes the U.S. Army Alaska mission and the environment on USAG-AK lands. Chapter 3, Management Strategy and Mission Sustainability, describes the natural resources management program goals, objectives, planning, inventory and monitoring. Various components of the program area explained, and proposed management alternatives are listed. Chapter 4, Implementation Physical Resources Management Alternatives, describes land, watershed and minerals management programs. Goals, objectives, planning, inventory, monitoring and responsibilities are discussed, and proposed management alternatives are listed.

Volume II, Annexes: Detailed program information and program work plans are found in the Annexes to this INRMP. These component plans include the following:

A. Implementation
B. Watershed Management
C. Forestry/Wildfire Management
D. Fish and Wildlife Management
E. Recreation Management
F. Rare, Threatened, and Endangered Species.

The Integrated Cultural Resources Management Plans and Installation Pest Management Plans are written as separate plans. They also have their own supporting National Environmental Policy Act documentation.

Volume III, Supplements: Management protocols, methods, and standard procedures are found in the Supplements to this plan. They include Monitoring and Inventory, Management, Outreach, and Institutional Controls.

Volume IV, Prescriptions: The Prescriptions contain goals, objectives, and specific management prescriptions for each major ecosystem management unit. The ecosystem management systems are listed below:

PA. Fort Wainwright Main Post
PB. Tanana Flats Training Area
PC. Yukon Training Area
PD. Donnelly East Training Area
PE. Donnelly West Training Area
PF. Gerstle River Training Area
PG. Black Rapids and Whistler Creek Training Area
PH. Fort Richardson North Post
PI. Fort Richardson South Post
PJ. Other USAG-AG Training Areas

Environmental Assessment of the USAG-AK Integrated Natural Resources Management Plan: The environmental assessment is the environmental analysis of the proposed INRMP and potential effects upon the environment due to the proposed plan and its alternatives. In addition to evaluating the environmental impacts associated with natural resources management, the environmental assessment affords the public an opportunity to comment on the proposed plan.

A2.1.1.4 Preparation

The installation natural resources management plan will be prepared and kept current by qualified professional natural resources personnel. INRMPs must satisfy the following:

- Be consistent with the installations' planning level surveys, characterize the kinds of natural resources under management or indicate that the purpose of the INRMP is to conduct planning level surveys.
- Assess how ecological resources are functioning in the landscape relative to Army stewardship requirements for ecological sustainment and compliance.
- Assess how ecological resources should function in the landscape relative to Army stewardship requirements for ecological sustainment and compliance.
- Assess what specific actions are necessary to meet Army stewardship requirements for ecological sustainment and compliance, and set goals for measuring progress and sustainment.
- Optimize access and use of ecological resources for conducting primary activities, consistent with stewardship requirements for ecological sustainment and compliance.
- Ensure secondary activities do not conflict with primary activities in space and time or exceed resource capacities for ecological sustainment. The INRMP must address the impact of reimbursable activities (commercial forestry and grazing) on the composition, structure, and function of natural communities and biological diversity.
- On installations where integrated training area management is fielded, integrate the components of the Integrated Training Area Management program as a primary implementation vehicle of the INRMP and ensure the INRMP reflects mission requirements for ranges and land (current and future) as developed through the Ranges and Training Land program, specifically the Range Development Plan.
- Contain a detailed schedule of work (projects, milestones, labor, equipment) necessary to meet stewardship requirements and ensure no net loss of lands for accomplishing primary activities.
- Estimate resources (funds, staff, etc) required to execute the plan.
- Integrate and append the Endangered Species Management Plan, Cooperative Fish and Wildlife Management Plan, and Integrated Training Area Management work plan (where applicable).
- Be integrated with other plans/programs (e.g., Master Plan, Range and Training Land Program, Army Compatible Use Buffers and cultural resources management program).
- Include and integrate pest management activities that are driven by natural resources management issues.
- Ensure that the Integrated Wildland Fire Management Plan is compliant and integral with the INRMP.

A2.1.1.5 Integration

INRMPs shall be prepared in coordination with the installation's Master Plan, range plan, training plan, Integrated Cultural Resources Management Plan, pest management plan, installation restoration plan that address contaminants and other appropriate plans and offices. It is not intended that INRMPs will function as a comprehensive compilation of detailed information on all these related topics. Rather, the INRMP should briefly summarize the key interrelationships with these plans, reference where the plans may be obtained, and describe where detailed information can be found.

Integrated natural resources planning is accomplished through preparing and updating the INRMP at least every five years. Integrating the many components of natural resources can be a complex challenge. One of the objectives of ecosystem management in USAG-AK is to develop a process to objectively identify

requirements for all species and users of the environment. In addition, natural and cultural resources projects can only be classified as military use (and therefore valid expenditures of military funds) if there is a direct link back to the accomplishment of the overall military mission.

Plans will be used to assist planners and implementers of mission activities as well as natural resources managers. The integrated natural resources management plan will be a component and supporting element of the installation master plan. New and continuing mission activities that impact on natural resources will be coordinated with appropriate natural resources managers.

A natural resources management plan is integrated when the following criteria are met:

- All renewable natural resources and areas of critical or special concern are adequately addressed from both technical and policy standpoints.
- The natural resources management methodologies will sustain the capabilities of the renewable resources to support military requirements.
- The plan includes current inventories and conditions of natural resources; goals; management methods; schedules of activities and projects; priorities; responsibilities of installation planners and decision-makers; monitoring systems; protection and enforcement systems; land use restrictions, limitations, and potentials or capabilities; and resource requirements, including professional and technical manpower.
- Each plan segment or component (that is, land, forest, fish and wildlife, and outdoor recreation) exhibits compatible methodologies and goals including compliance with the Endangered Species Act and applicable Endangered Species Management Plans.
- The plan is compatible with the installation's Master Plan, Pest Management Plan, and Master Training Schedule.

16 USC 670a provides a requirement whereby USAG-AK, the U.S. Fish and Wildlife Service, and the Alaska Department of Fish and Game cooperate in planning, maintaining, and coordinating fish and wildlife management activities on installations. A cooperative plan (that is Part IV Fish and Wildlife Management of the Natural Resources Management Plan) will be signed by the Garrison Commander, the U.S. Fish and Wildlife Service, and the appropriate state agency, only after ensuring compatibility with the applicable integrated natural resources management plan. Fish and wildlife cooperative plans will be reviewed annually by cooperators and revised no less than every five years.

A2.1.1.6 Revisions

The installation natural resources management plan will be reviewed annually by the installation and a determination made if the plan must be updated to attain Army objectives for mission and stewardship. Any revision will utilize binders that facilitate page changes. Each updated INRMP shall not be considered approved or executable until approved by the Installation Management Agency. INRMPs must be updated by the installation and approved by the Installation Management Agency at least every five years. The Installation Management Agency must ensure that revised plans are based on current information; including updated planning level surveys. Landscape planting plans will be revised as needed. Information relating to soils, natural vegetation and environmental data, not requiring revision, should be retained in the plan.

A2.1.1.7 Review and Approval

Cooperative efforts among the U.S. Fish and Wildlife Service, the state fish and game agency, and the Army shall be accomplished within the framework of the INRMP, starting at the draft INRMP stage. The

draft INRMP and any major revisions thereof shall be forwarded to the Installation Management Agency for approval. Installation Management Agency natural resources staff, real property management staff, and mission operations staff will review the draft plan for its adherence to stewardship requirements (environmental staff), consistency with real property Master Plans (Master Planning staff), and focus on integration with the primary activity (operations staff). After incorporation of Installation Management Agency requirements, the draft INRMP is subject to public comment through the National Environmental Policy Act process, finalized by the installation (Final INRMP), signed by the Garrison Commander, and, on the fish and wildlife aspects of the INRMP, signed (or concurred with in coordination letter) by the state wildlife agency and U.S. Fish and Wildlife Service. The signed INRMP is provided to the Installation Management Agency and is executable after notification from the Installation Management Agency.

A2.1.1.7.1 Review for Operation and Effect

The requirement to "review" the Integrated Natural Resources Management Plan "on a regular basis, but not les than every five years" does not mean that every INRMP necessarily needs to be revised. The Sikes Act specifically directs that INRMPs be reviewed "as to operation and effect," emphasizing that the review is intended to determine whether existing INRMPs are being implemented to meet the requirements of the Sikes Act and contribute to the conservation and rehabilitation of natural resources on military installations. It is expected that many INRMPs will be determined to be adequate and not in need of revision.

Reviews for operation and effect must be performed no less frequently than every five years by all three parties to the INRMP, which include the USAG-AK Garrison Commander, Region 7 Director of the U.S. Fish and Wildlife Service, and Director of Alaska Department of Fish and Game. Although it is not expressly required by the Sikes Act, it is Army policy for installations to document the outcome of the joint review for operation and effect in a memorandum or letter summarizing the rationale for the conclusion the parties have reached. The document should be jointly executed or in some other way reflect the parties' mutual agreement.

A2.1.1.7.2 Annual Reviews

INRMPs shall be reviewed annually by installations in cooperation with other parties to the INRMP. The review shall be used in place of an annual Environmental Performance Assessment review. Annual reviews will be documented by the USAG-AK Garrison Commander responsible for the INRMP by a letter to the U.S. Fish and Wildlife Service Anchorage and Fairbanks office, the U.S. Fish and Wildlife Service Region 7 Director, the south-central and Interior offices of Alaska Department of Fish and Game, the Alaska Department of Fish and Game Director, and by a memorandum to the Installation Management Agency Pacific Region Regional Office. Annual reviews may be used, as appropriate, to determine if INRMP revisions are necessary. The annual reviews may be used to expedite the more formal review for operation and effect, or, if comprehensive and supported with documentation that ensures mutual agreement of the three parties, may accomplish the more formal review for operation and effect.

Annual reviews shall verify that:

- Current information on all conservation metrics is available.
- All "must fund" projects and activities have been budgeted for and implementation is on schedule.
- All required trained natural resources positions are filled or are in the process of being filled.
- Projects and activities for the upcoming year have been identified and included in the INRMP. An updated project list does not necessitate INRMP revision.

- All required coordination has occurred.
- All significant changes to the installation's mission requirements or its natural resources have been identified.
- The INRMP goals and objectives remain valid.

A2.1.1.7.3 Public Review

The National Environmental Policy Act (NEPA) process may be used to meet the Army's INRMP public review requirements and to document the decision to formally adopt the INRMP. The NEPA process, however, will satisfy Sikes Act Improvement Act public comment requirements only if the public is provided a meaningful opportunity to comment upon the draft INRMP as part of the NEPA process. Absent extraordinary circumstances, the public shall be afforded a minimum of 30 days to review and comment upon a draft INRMP, whether as part of the NEPA process or through some other process. USAG-AK must afford the cooperating agencies the opportunity to review all public comments received on its INRMP. This will inform these offices of potential issues sufficiently early in the review process to permit appropriate consideration during the overall review of the INRMP.

There is no need for public review if the three parties to an INRMP mutually agree upon a decision to continue implementation of an existing INRMP. If, upon review, the three parties to an INRMP determine that revisions to the plan are necessary, public comment shall be invited in conjunction with any required NEPA analysis. If only limited revisions to an existing INRMP are thought to be required, and these revisions are not expected to result in biophysical consequences materially different from those anticipated in the existing INRMP and materially different from those analyzed in an existing NEPA document, then neither additional NEPA analysis nor an opportunity for public comment should be necessary. If more substantial revisions to an existing INRMP are thought to be required, and these revisions are expected to result in biophysical consequences materially different from those anticipated in the existing INRMP and materially different from those analyzed in an existing NEPA document, then a new or supplemental NEPA analysis must be prepared and the public provided a reasonable opportunity to comment on the revised INRMP. Absent extraordinary circumstances, the public shall be afforded a minimum of 30 days to review and comment on these INRMP revisions.

A2.1.1.7.4 Coordination Requirements

USAG-AK must establish and maintain regular communications with the appropriate U.S. Fish and Wildlife Service and Alaska Department of Fish and Game field offices to address issues concerning natural resources management that are not addressed in the INRMP. At a minimum, this shall include annual coordination with all cooperating offices.

USAG-AK must invite the U.S. Fish and Wildlife Service and Alaska Department of Fish and Game to participate cooperatively in the scoping, design, and preparation of the INRMP. This will serve to inform these offices about the Army's mission, invite them to consider solutions to difficult resource management problems, and expedite final INRMP coordination. USAG-AK will advise all appropriate internal and external stakeholders of the intent to prepare or revise an INRMP within 30 days of starting such an action. When providing this notification, USAG-AK shall concurrently request the U.S. Fish and Wildlife Service and Alaska Department of Fish and Game to participate in the development or revision of the INRMP. USAG-AK shall notify U.S. Fish and Wildlife Service and Alaska Department of Fish and Game of its intent to provide a draft INRMP for review and coordination at least 60 days prior to delivering such document.

For the U.S. Fish and Wildlife Service, the appropriate office for initial contact by USAG-AK, for development and review of INRMPs, will be a field office. Pursuant to current U.S. Fish and Wildlife Service Sikes Act guidance, a field office must review the INRMP and provide preliminary agreement

concerning the conservation, protection and management of fish and wildlife resources detailed in the INRMP prior to review in the regional office and final action by a regional director.

The following process is used to facilitate coordination within and between the various organizations and to ensure adequate documentation of the coordination process. USAG-AK shall send an initial draft INRMP to the U.S. Fish and Wildlife Service field office and Alaska Department of Fish and Game office for review and comment. A copy of the forwarding letter shall be sent to the Sikes Act Coordinator at the U.S. Fish and Wildlife Service regional office to inform them that the review process has begun. USAG-AK shall request the U.S. Fish and Wildlife Service and Alaska Department of Fish and Game to provide written acknowledgement within 15 days of the date of their receipt of a draft INRMP sent for formal review and comment. USAG-AK shall request the U.S. Fish and Wildlife Service field office to provide written comments to the installation, and furnish copies of the letter to the Sikes Act Coordinator at the U.S. Fish and Wildlife Service regional office, and to the Alaska Department of Fish and Game director's office. USAG-AK will request the Alaska Department of Fish and Game office to provide written comments to the installation, and furnish copies of the letter to the Sikes Act Coordinator at the U.S. Fish and Wildlife Service regional office.

USAG-AK shall consider all comments received and send a final draft of the Integrated Natural Resources Management Plan to the U.S. Fish and Wildlife Service regional office and the Alaska Department of Fish and Game director's office with a letter documenting the actions taken on the draft comments. The installation shall furnish a copy of the letter to the U.S. Fish and Wildlife Service field office. USAG-AK shou1d request that the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game director provide consolidated written comments from all appropriate offices and divisions within 60 days of receipt of the final draft INRMP, unless the participants mutually agree upon a longer review period because an installation has a particularly large or complex INRMP.

A2.1.1.8 Plan Implementation

The Sikes Act Improvement Act requires not just preparation and update of an INRMP, but “implementation” of the INRMP. The following section discusses the definition and funding implications of implementation.

A2.1.1.8.1 Implementation Definition

Implementation anticipates the execution of all “must fund” projects and activities in accordance with specific timeframes identified in the INRMP.

An INRMP is considered to be “implemented” if an installation:

- Actively requests, receives, and uses funds for “must fund” projects and activities.
- Ensures that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the INRMP.
- Coordinates annually with all internal and external cooperating offices.
- Documents specific INRMP action accomplishments undertaken each year.

A2.1.1.8.2 Identifying and Budgeting for Integrated Natural Resources Management Plan Projects

Natural resource requirements defined by the Office of the Secretary of Defense as environmental "must fund" are those projects and activities required to meet recurring natural resources conservation management requirements or current natural resources compliance needs. The Army equivalent to Office of the Secretary of Defense's "must fund" projects are projects as described in classes 0, 1 and 2 High (2H) in current Army policy and guidance for identifying environmental program requirements.

All projects listed in an INRMP are not necessarily environmental class 0, 1 or 2H. Implementation of INRMPs is a shared responsibility among those activities that use the land (e.g., trainers, facility managers, provost marshal) as well as those who ensure compliance and provide overall program oversight. Accordingly, projects necessary to implement INRMPs are not limited to environmental funds. However, INRMPs should include all projects.

Projects are contained in Appendix AA2 of this plan and will be reviewed and updated annually upon completion of Army review and validation processes.

A2.1.1.9 Relationship to Other Plans

A2.1.1.9.1 Bureau of Land Management Resource Management Plans

The Federal Land Policy and Management Act of 1976 requires the Bureau of Land Management to develop, maintain, and, when appropriate, revise land use plans. Public Law 106-65, which withdraws portions of Fort Wainwright lands for 25 years from the public domain, requires that Bureau of Land Management prepare a Resource Management Plan for the military withdrawal. The objective of Bureau of Land Management's land use planning is to ensure that public lands are managed under the principles of multiple use and sustained yield by:

- Providing a process for evaluating resources information, which includes consideration of social and economic factors, to decide appropriate public land uses.
- Ensuring participation by the public, state and local governments, Indian tribes, and appropriate federal agencies.
- Using collaborative and multi-jurisdictional approaches to ensure consistent decision-making across different land ownerships and jurisdictions.
- Providing a documented record of land allocations and permissible resource uses and constraints that are available to the public.
- Providing a framework to guide subsequent implementation decisions.

Bureau of Land Management has developed a comprehensive land use planning base consisting of decisions reached in its Resource Management Plans. Bureau of Land Management land management is an ongoing process of decision-making, implementation, monitoring and assessment, and adjustment that allows for continuous corrections and reduces the need for major plan revisions. New information or proposals might necessitate a plan revision or an update to a plan's associated NEPA analysis. Bureau of Land Management's nine-step planning process, in 43 CFR Part 1600, integrates the NEPA decision-making process. New Resource Management Plans and Resource Management Plan revisions require an environmental impact statement. The USAG-AK 2007-2011 INRMP does not conflict with the current Bureau of Land Management Resource Management Plan.

A2.1.1.9.2 Sustainable Range Program Range Development Plan

The U.S. Army Alaska Sustainable Range Program Range Development Plan outlines the range development requirements for USAG-AK training lands. The Range Development Plan creates the framework within which natural resources management occurs. The INRMP does not conflict with the Range Development Plan; rather, it complements the siting of new range facilities by providing information that minimizes impact to natural resources.

A2.1.1.9.3 Land Withdrawal and Transformation Environmental Impact Statement

In the *Transformation of U.S. Army Alaska Environmental Impact Statement,* U.S. Army Alaska military mission impacts are addressed. This environmental impact statement addressed the regular ongoing impacts of the current mission as well as the predicted impacts due to the transformation of the 172nd

Brigade (Separate) into a Stryker Brigade Combat Team. Prediction of military mission impacts were made by using the Army's Army Training and Testing Area Carrying Capacity methodology. The Transformation Environmental Impact Statement required full implementation of the INRMP and the natural resources management program as mitigation outlined in the Record of Decision. The Land Withdrawal Legislative Environmental Impact Statement analyzed the impacts of continuing withdrawal of Yukon Training Area and Donnelly Training Area. The Land Withdrawal Legislative Environmental Impact Statement also included a number of natural resources mitigation requirements. The mitigation included in the Legislative Environmental Impact Statement became law with the enactment of PL 106-65, Military Lands Withdrawal Act.

A2.1.2 Conservation Program Implementation Plan

The purpose for the U.S. Army Alaska conservation implementation plan (1998) was to gain approval and provide programmatic guidance to USAG-AK conservation program managers on the future structure of the conservation program. The Sikes Act, as amended in 1998, stipulates that planning level surveys, INRMPs and implementation of these plans are required for all Department of Defense lands. Implementation of these plans required a higher level of effort than had occurred prior to 1998 and was not possible because of low priority for funding. This plan outlines the steps and identifies the resources necessary to comply with the Sikes Act by supplementing the USAG-AK conservation program. The five objectives of the conservation implementation plan are:

- Prepare streamlined INRMP and Integrated Cultural Resources Management Plan to make them the basis for project management for Fort Wainwright, Fort Richardson, and Fort Greely.
- Realign current staff and request additional staff to implement INRMP and Integrated Cultural Resources Management Plan.
- Develop program management mechanisms to implement INRMP and Integrated Cultural Resources Management Plan.
- Update Environmental Program Requirement to reflect realistic requirements outlined in INRMP and Integrated Cultural Resources Management Plan.
- Obtain Command support.

These five objectives are now the basis for natural resources program implementation.

A2.1.3 Conservation and Integrated Training Area Management Work Plans

The USAG-AK conservation annual work plan was created to track funding, obligations, and execution for natural resource projects and tasks. Each project contains the following information: project name, priority, Environmental Program Requirement Report number and name, description, funding required, funding allocated, funding obligated, year funded, agency (in-house or contractor), NEPA requirements, Section 106 requirements, other permit requirements, primary USAG-AK point of contact, project status, and comments. The conservation annual work plan does not replace the Environmental Program Requirement Report; rather, it enhances the planning and execution of projects.

The integrated training area management work plan is created by the integrated training area management coordinator, submitted by the U.S. Army Alaska Directorate of Plans, Training and Mobilization, validated by U.S. Army Pacific, and turned in to the Army G3, DAMO-TRS as the basis for integrated training area management funding. The purpose of the integrated training area management work plan is to:

- Define individual project and work activities.
- Designate, prioritize, and identify a cost to execute those projects.

- Track project execution during a fiscal year.
- Describe multi-year Integrated Training Area Management programs and requirements at installations, Major Command Headquarters and supporting agencies.
- Report all integrated training area management resources requirements, based on the set of standard work categories.
- Capture program execution and adjustments over the course of a fiscal year.

The installation work plan is developed in the early spring of each year to reflect Integrated Training Area Management program requirements in detail for the following five fiscal years. The work plan reflects all integrated training area management activities for the installation. Once projects are identified, they are prioritized from most to least important. Approval of these projects and priorities is obtained from the Directorate of Plans, Training and Mobilization prior to completing the work plan. Once the projects are approved, they are entered into the Installation Work Plan Analysis Module database.

Each project is described to convey the scope of work. Costs should include all labor, material, and equipment necessary to execute the work. Once the Directorate of Plans, Training and Mobilization or equivalent approves the installation submission package, the entire package is submitted electronically to the Major Command Integrated Training Area Management program manager. The Major Command Integrated Training Area Management program manager, in conjunction with his environmental staff counterpart, will review and validate, by project, the installation work plans, using the Major Command version of the Work Plan Analysis Module. Once validated, the work plan becomes a Major Command-recognized integrated training area management resources requirement.

A2.2 Reporting

USAG-AK is responsible for submitting reports for funding requirements, funding work plans, and environmental quality status. USAG-AK must annually submit the Army Environmental Database - Environmental Quality, the Installation Status Report part II Environmental, and Reimbursable Project Tracking System. The Environmental Program Requirements report, the basis for reporting environmental funding requirements, was discontinued in 2005.

A2.2.1 Environmental Program Requirement

The Environmental Program Requirements, an annual report submitted by USAG-AK, was discontinued in 2005. The Environmental Program Requirement Report served as both an environmental project status report and a project requirement submission, detailing environmental projects required to obtain or remain in compliance with environmental laws. The conservation portion of the report covered all natural and cultural resources projects and program areas. The Environmental Program Requirement Report was used as a planning tool for integrated natural resources management and is the basis for funding conservation projects (except integrated training area management). Environmental Program Requirement Report natural resources projects were based on projects presented in this INRMP.

Currently, no replacement report has been designated. The final Environmental Program Requirement Report submission in 2005 serves as the basis for funding requirements in 2007-2011. It is unknown how new natural resource conservation project requirements will be communicated to higher headquarters.

A2.2.2 Reimbursable Project Tracking System

The Army Reimbursable Project Tracking System tracks money collected for agricultural outlease, forestry, and fish and wildlife programs. Reimbursable Project Tracking System is also the program report where USAG-AK creates annual work plans for these reimbursable programs.

A2.2.3 Army Environmental Database - Environmental Quality

The Army Environmental Database - Environmental Quality is an annual report submitted by USAG-AK that meets a Congressional mandate for the Army to report on the environmental quality of their installations. USAG-AK must report on the status of meeting Department of Defense Measures of Merit targets.

A2.2.4 Installation Status Report

The Installation Status Report is a senior decision-maker system designed to provide standardized reporting of installation capabilities and condition based on uniform Army-wide criteria. The system provides executive level information on the condition of installations. Army Chief of Staff for Installation Management is the proponent for Installation Status Report; however, each agency should proactively work to ensure that its facilities and programs are accurately portrayed. The system includes three parts: Part I - Infrastructure, Part II - Environment, and Part III – Services. Together these three sections are designed to provide an overall picture of an installation's status and show how deficiencies in installation condition affect the environment and mission performance.

Integrated training area management is contained in Part I of the Installation Status Report. (i.e., the evaluation of maneuver land). Installation Status Report Part I is both a quantitative and qualitative evaluation of all major facility groups, including ranges and maneuver land. The Installation Status Report uses data as the basis for quantitative measurements of facility shortfalls and/or excesses at the installation level, with Major Command and Army-wide roll-ups. User evaluations, based on standard criteria, determine the qualitative portion of the Installation Status Report. Because ranges and maneuver lands are included in this section of the Installation Status Report, the accuracy and effectiveness is of importance to the integrated training area management community. In fact, the establishment of an effective integrated training area management program is included as a qualitative factor for maneuver land.

Conservation is contained in Part II of the Installation Status Report. The conservation portion of the Installation Status Report focuses on progress of natural resources programs, funding applied to all components of the program, and compliance with various natural and cultural resources related laws.

A2.3 Partnering

Partnership is defined as a process by which two or more organizations with shared interests act as a team to achieve mutually beneficial goals. USAG-AK undertakes management of its lands with a number of federal, state, local, and public partners. Land management issues do not stop at property boundaries, but instead have an ecosystem or watershed dimension. All agencies are tied by policy to an ecosystem management approach to land management. Cooperative relations among the military services and other land management agencies foster regional approaches to dealing with stewardship issues that provide benefits beyond what could be achieved by each agency separately.

A2.3.1 Federal Agencies

USAG-AK partners with other federal agencies for natural resources management support, including the Department of Interior (U.S. Fish and Wildlife Service, Bureau of Land Management, and Office of Aircraft Services), Department of Agriculture (U.S. Forest Service and Natural Resources Conservation Service), as well as other Department of Defense agencies (U.S. Army Corps of Engineers Research and Development Laboratories). Accredited conservation representatives of federal agencies furnishing professional advice and technical assistance under this plan will be allowed access to the installation, in accordance with appropriate arrangements.

A2.3.1.1 U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service is a signatory cooperator in the implementation of this plan in accordance with the Sikes Act. The U.S. Fish and Wildlife Service is interested in the effects of erosion on wetlands; environmental contamination; non-point discharge permits; cumulative effects of forest cutting on wildlife, especially in riparian areas; and overall habitat conservation. Neotropical migratory birds are also of special interest. U.S. Fish and Wildlife Service is a partner, along with the Army and Alaska Department of Fish and Game, in the management of fish and wildlife on USAG-AK posts, as outlined in this plan. Major cooperative efforts involving U.S. Fish and Wildlife Service include species inventories and wetlands management, particularly within Eagle River Flats located at Fort Richardson. In 1987, U.S. Fish and Wildlife Service became part of a five-member interagency task force formed to identify the cause of wildlife mortality in Eagle River Flats and undertook remedial actions (CH2M Hill 1994b).

The U.S. Fish and Wildlife Service is available for reimbursable work on USAG-AK lands, especially involving migratory birds, wetlands, and fisheries. Appendix AA.1 includes specific items of cooperation between the U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, and USAG-AK as required by the Sikes Act.

A2.3.1.2 Bureau of Land Management

The Department of Interior, Bureau of Land Management is a signatory and cooperator in implementation of this Integrated Natural Resources Management Plan. Bureau of Land Management is the Secretary of Interior's authorized delegate for jurisdiction responsibilities regarding vegetative (i.e., timber) and mineral resources on specific USAG-AK lands. These lands are identified through various public laws, public land orders, and executive orders. Further, the Secretary of Interior, through Bureau of Land Management, reserves authority to change use and grant various rights to others to use the lands (rights-of-way, utility lines, gas, water, electric, cable, TV, sewer, telephone, fiber optics, etc.), with the concurrence of the Army.

The Defense Appropriations Act of 2001 (PL106-65) stipulated that Bureau of Land Management is responsible for developing a Resource Management Plan for military withdrawals in Alaska. A Resource Management Plan and associated Final Environmental Impact Statement were developed in accordance with the previous act (PL 99-606) (Bureau of Land Management and U.S. Army 1994a/b). Many items within the Resource Management Plan are included within this INRMP. The Resource Management Plans were amended in 2004 and remain in effect.

The Bureau of Land Management, Alaska Fire Service provides fire suppression, prescribed burning, and fire planning support to USAG-AK. In return, USAG-AK provides facilities for the Alaska Fire Service on Fort Wainwright.

Bureau of Land Management also has a strong interest in the protection of cultural resources on withdrawn lands. Annex AA.3 includes specific items of cooperation between USAG-AK and Bureau of Land Management.

A2.3.1.3 U.S. Forest Service

The U.S. Forest Service provides technical assistance for forest management on USAG-AK's lands. The U.S. Forest Service has particular interest in forest pests and forest inventory. Several U.S. Forest Service inventory plots are located on USAG-AK lands. USAG-AK has no lands owned or controlled by the U.S. Forest Service.

The U.S. Forest Service may be called upon to provide technical assistance for forest management. U.S. Forest Service is especially concerned with forest pests and wildfires on the post. In 1991, Oregon State University, in collaboration with Chugach National Forest, obtained approval to conduct a long-term forest research study on Fort Richardson. This research includes a white spruce (*Picea glauca*) regeneration study, a field transplant nursery, and an evaluation of different site preparation techniques. In addition, Oregon State University obtained funding in 1994 from Alaska Science and Technical Foundation for reforestation studies in several regions of Alaska. USAG-AK has been participating in the study by providing land for field research plots representative of south-central Alaska. The research is investigating site preparation techniques and white spruce regeneration. Fort Richardson also has a land-use permit for glacier and mountaineering training on Spencer Glacier in the Chugach National Forest on the Kenai Peninsula. Every five years or so, remeasurements of these plots is conducted.

A2.3.1.4 **National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS)**

The National Marine Fisheries Service, Alaska Region, works to ensure the viability of protected species, especially marine mammals, to protect and enhance marine habitat and to ensure sustainability of commercial fisheries in Alaska.

The NMFS provides technical assistance for project design and reviews and makes recommendations on NEPA documents. They also review Biological Assessments on potential effects to the CI beluga population from USAG-AK projects and render Biological Opinions on said projects. USAG-AK may or may not be required to enter into consultation (formal or informal) with the NMFS, depending on the project, pursuant to section 7 of the Endangered Species Act.

The NMFS and USAG-AK have cooperated successfully for years on projects involving the now endangered Cook Inlet beluga whales. Past NMFS projects that USAG-AK has participated in include annual aerial abundance surveys, beluga tagging, capture of fish from Knik Arm for the National Marine Mammal Laboratory catalog of lipid compositions of beluga prey species, capture of fish from Knik Arm for a polyaromatic hydrocarbon analysis of potential beluga prey, beluga necropsies and an investigation of the acoustical environment throughout Cook Inlet. USAG-AK also shares beluga observational and photographic data gathered annually from the mouth of Eagle River with NMFS

A2.3.1.5Natural Resources Conservation Service

The Natural Resources Conservation Service cooperates in land management and soil conservation on USAG-AK posts. Projects that the Natural Resources Conservation Service is cooperating with USAG-AK include:

- Assessment and treatment of soil erosion in cooperation with the U.S. Army Alaska's Integrated Training Area Management program. Conducted and completed soil surveys at Forts Richardson (100% coverage in 2002), Wainwright's Yukon Training Area (100% coverage in 2004), Fort Greely and Donnelly Training Area (100% coverage for Donnelly Training Area 2005).
- The Natural Resources Conservation Service is available for limited, reimbursable engineering support for the Land Rehabilitation and Maintenance program.
- The Delta-Clearwater watershed project, located near the eastern boundary of Donnelly Training Area, is a critical Natural Resources Conservation Service erosion prevention project. The Natural Resources Conservation Service is concerned with flooding occurring north of the Alaska Highway, that comes across Donnelly Training Area, and then causes erosion from the agricultural area into the Delta-Clearwater River. The Natural Resources Conservation Service is constructing water bars on Army lands to divert this runoff to avoid any potential adverse affects. They have a strong interest in the Army maintaining these structures and minimizing any military or recreational damage.
- The Natural Resources Conservation Service maintains a snow survey site on Donnelly Training Area near the Battalion Bivouac Site.

A2.3.1.6 U.S. Geological Survey

U.S. Geological Survey is an independent fact-finding federal agency that collects, monitors, analyzes, and provides scientific understanding about natural resources conditions, issues and problems. Fort Wainwright and Donnelly Training Area have a cooperative association with U.S. Geological Survey with regards to Annual Breeding Bird surveys. U.S. Geological Survey is available for reimbursable work on USAG-AK lands.

A2.3.1.7 Office of Aircraft Support

The Department of Interior, Office of Aircraft Services provides reimbursable contract aircraft for implementation of this INRMP. During the last five years the Office of Aircraft Services has been used for natural resources management on USAG-AK lands. This trend will continue if USAG-AK requests support from Office of Aircraft Services in the form of helicopter and/or fixed wing aircraft.

A2.3.1.8 U.S. Army Corps of Engineers Cold Regions Research Laboratory

U.S. Army Engineer Research and Development Center Cold Regions Research and Engineering Laboratory provides cooperative support in water quality, hydrology, vegetative, and permafrost studies.

A2.3.2 State Agencies

USAG-AK also partners with a number of state agencies with expertise in natural resources management. Alaska Department of Fish and Game, Alaska Department of Natural Resources, Alaska Department of Environmental Conservation, and Universities all play significant roles supporting natural resource management on USAG-AK lands. Garrison Commanders provide installation access, subject to safety requirements and military security, to designated state fish and wildlife or conservation officials at such times and under such conditions as mutually agreed between the Garrison Commander and the appropriate designated official of the state in which the installation is located.

A2.3.2.1 Alaska Department of Fish and Game

The Alaska Department of Fish and Game is a signatory and cooperating agency in the implementation of this plan as required by the Sikes Act. It is also the primary state agency for fish and wildlife management

In Alaska. USAG-AK and Alaska Department of Fish and Game partner on monitoring and population management for a number of species, primarily moose, bison, caribou, and bear.

Alaska Department of Fish and Game manages wildlife populations on USAG-AK lands. Fort Wainwright is part of the Fairbanks Management Area for fisheries areas and Game Management Units 20A and 20B. The regional Alaska Department of Fish and Game office is in Fairbanks. The agency also stocks fish in two lakes on Fort Wainwright and monitors angler use. Alaska Department of Fish and Game monitors moose and assists with habitat improvement on Fort Wainwright. Alaska Department of Fish and Game is conducting research on the effects of large-scale logging on game and nongame species and is interested in plans for timber harvesting on Fort Wainwright.

Donnelly Training Area is in the Delta Junction Management Area for fisheries and encompasses parts of Game Management Subunits 20A and 20D. Alaska Department of Fish and Game stocks fish in 16 lakes on Donnelly Training Area and monitors angler use. It is interested in increasing angler use of Donnelly Training Area, especially at lakes along Meadows Road. Alaska Department of Fish and Game is also enhancing bison habitat off-post to move the herd off of Texas and Washington ranges, which are used heavily for munitions testing and training by the Army. Alaska Department of Fish and Game monitors moose and assists with habitat improvement on Donnelly Training Area. The agency is also interested in monitoring sharptail grouse and hares. Alaska Department of Fish and Game is conducting state-wide research on the effects of large-scale logging on game and nongame species and is interested in plans for timber harvesting on Donnelly Training Area.

Fort Richardson is part of the Cook Inlet Management Area for fisheries, and Game Management Unit 14C for wildlife. Within Game Management Unit 14C, Fort Richardson has been given its own designation as a special management area by the state game board. It is officially referred to as the Fort Richardson Management Area. Alaska Department of Fish and Game has assisted in most areas of fish and wildlife management (including moose and bear management) on Fort Richardson in accordance with the Fort Richardson Integrated Natural Resources Management Plan (2002-2006). In 1987, Alaska Department of Fish and Game joined an interagency task force for investigation and management of Eagle River Flats. Appendix AA.1 includes specific items of cooperation between the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, and USAG-AK as required by the Sikes Act.

A2.3.2.2 Alaska Department of Natural Resources

A2.3.2.2.1 Division of Forestry

The Alaska Department of Natural Resources, Division of Forestry is a cooperating agency for forest management on USAG-AK lands. Alaska Department of Natural Resources' specific concerns include prescribed burns and fire suppression; forest pest management; and forest inventory, harvesting, and regeneration.

The Alaska Department of Natural Resources, Division of Forestry is responsible for fire suppression on all lands, regardless of ownership, in the southern half of the state. Fort Richardson falls within a Coastal Zone Management Unit administered by the Alaska Department of Natural Resources, Office of Project Management and Permitting.

A2.3.2.2.2 Office of Habitat Management and Permitting

The Alaska Department of Natural Resources, Office of Habitat Management and Permitting is a relationship that is primarily regulatory. The Office of Habitat Management and Permitting regulates all actions or activities in or along streams that support fish.

A2.3.2.2.3 Soil and Water Conservation Districts

USAG-AK partners with the Palmer Soil and Water Conservation District for enhancing, rehabilitating, and maintaining Fort Richardson training lands to ensure their continued long-term use and effectiveness. The district historically partnered with USAG-AK to conduct land rehabilitation and maintenance, erosion control, and habitat management projects and will continue to back up the Palmer Soil and Water Conservation District for these types of projects if needed.

USAG-AK also partners with the Salcha-Delta Soil and Water Conservation District for enhancing, rehabilitating, and maintaining Fort Wainwright and Donnelly Training Area training lands to ensure their continued long-term use and effectiveness. The district partners with USAG-AK to conduct land rehabilitation and maintenance, erosion control, and habitat management projects.

A2.3.2.2.4 Division of Parks and Outdoor Recreation

The Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation manages the 254,080-acre Chena River State Recreation Area, which borders Yukon Training Area to the north. Approximately 13,000 acres of land within Yukon Training Area were designated as part of the Chena River State Recreation Area by the Alaska state legislature. This state action neither transferred title of the land nor was it supported by federal agencies.

The Division of Parks and Outdoor Recreation is involved with USAG-AK on issues of public access and tourism within the Anchorage area. It also has an interest in joint recreational facilities projects between USAG-AK and the state of Alaska. Since Fort Richardson's largest neighbor is Chugach State Park, the Division of Parks and Outdoor Recreation has an obvious interest in natural resources management on the post. Most of the southeastern boundary of Fort Richardson borders the park. Chugach State Park and Fort Richardson share interior forest, alpine, and subalpine habitats. Areas of cooperation and concern include forest management, outdoor recreation, wildlife management, fire management, and forest pest management.

A2.3.2.3 Alaska Department of Environmental Conservation

The Alaska Department of Environmental Conservation is responsible for air and water quality in Alaska. The Alaska Department of Environmental Conservation regulates air and water quality on all USAG-AK posts and sub installations (including prescribed burning). The relationship between the Alaska Department of Environmental Conservation and USAG-AK is primarily regulatory. The Alaska Department of Environmental Conservation is also the state's primary regulatory agency responsible for insuring the appropriate remediation of Eagle River Flats.

A2.3.2.4 Alaska Department of Commerce and Economic Development

The Alaska Department of Commerce and Economic Development is a state agency interested in USAG-AK's role in supporting tourism within Alaska.

A2.3.2.5 Universities

USAG-AK partners with universities for natural resources management expertise. Experts from universities have provided specialized knowledge needed to effectively manage natural resources on USAG-AK lands. University of Alaska facilities at Anchorage and Fairbanks are the installations' nearest resources for academic research. Over the years, the Anchorage campus has maintained a close relationship with the Fort Richardson community. Researchers at the Fairbanks campus completed a small mammal survey on the post and contributed to a survey of vascular plants and the more common lichens and mosses. University of Alaska, Fairbanks conducts research on Willow Island, located within Tanana

Flats Training Area, as part of the National Science Foundation's Long-Term Ecological Research Program. University of Alaska Fairbanks has also assisted with a graduate study of food habits of the Delta bison herd.

For large, specialized needs, USAG-AK may request assistance from academic resources outside of Alaska. Through a Cooperative Agreement with USAG-AK, the Center for Environmental Management of Military Lands at Colorado State University is a source of support for the development of integrated training area management, Geographical Information System databases, and general natural resources inventory and management planning. Colorado State University also provides on-site support to implement natural resources programs.

A2.3.3 Local Government

Local governments are important partners in natural resource management of military lands in Alaska.

A2.3.3.1 Fairbanks North Star Borough

Primary interests of the Fairbanks North Star Borough with regard to the military include:

- Protect active airports from the encroachment of incompatible land uses by rezoning areas adjacent to Eielson Air Force Base and the Fort Wainwright airport to include an "airport noise sensitive area" overlay zone to enhance the coexistence of the airports and the public.
- Pursue an appropriate realignment route for the Alaska Railroad that will meet both the needs of the military and the borough.
- Pursue joint land use studies between the military and the borough.
- Create alternative access to private land east of Fort Wainwright.

Specific natural resources management concerns regarding Fort Wainwright were not expressed by the borough (Fairbanks North Star Borough Regional Comprehensive Plan 2005).

A2.3.3.2 Municipality of Anchorage

Primary interests of the city of Anchorage with regard to natural resources management on Fort Richardson are outdoor recreation, moose management, Ship Creek, and surface water and groundwater resources. The municipality controls air quality permits, which limits the ability of USAG-AK to use prescribed burning. The municipality is also interested in rights-of-way through Fort Richardson for utility corridors and recreation.

A2.3.3.3 City of Delta Junction

Primary interests of the city of Delta Junction with regard to natural resources management on Donnelly Training Area are outdoor recreation and impacts to natural resources associated with new range development.

A2.3.4 Tribal Government

Executive Order 13175, "*Consultation and Coordination with Tribal Governments,*" issued in 2000 along with subsequent policy, require the Army recognize the inherent right of tribal self-government. This policy emphasizes the Army, as a federal agency, shares a government-to-government relationship with Alaska Native tribes.

Maintaining a working relationship between the Army and Alaska Native tribes has become an important component of the Army's operations in Alaska. Fort Richardson lies within the traditional lands of the Dena'ina northern Athabascan tribes of Cook Inlet. Fort Wainwright and associated training areas lie within the traditional lands of the Tanana Athabascan tribes of interior Alaska. These Army-withdrawn lands hold resources that were traditionally used by Alaska Native tribes and therefore tribal governments continue to have an interest in the management of these lands.

Twelve federally recognized tribes have been invited to scoping and information sharing meetings, which provide an opportunity for the tribes to learn about the Integrated Natural Resources Management Plan (INRMP). One-on-one government-to-government consultation in the villages will be offered for those tribes that have identified tribal rights, resources, or interests that may be affected by the INRMP.

Native Alaskan tribes are a tremendous source of traditional knowledge for managing natural resources. USAG-AK has conducted tribal consultation during the preparation of this INRMP. Perhaps more importantly, USAG-AK has entered into long-term cooperative relationships with some Alaskan tribes.

A2.3.4.1 Native Village of Eklutna

USAG-AK and the Native Village of Eklutna work cooperatively to manage natural and cultural resources on Fort Richardson. USAG-AK and the Native Village of Eklutna entered into a Memorandum of Agreement in 2004 proscribing procedures for government-to-government relations.

A2.3.4.2 Tanacross Village

USAG-AK and Tanacross Village are seeking to enter into a Memorandum of Agreement proscribing procedures for government-to-government relations, sacred sites surveys on Donnelly Training Area, and detailed procedures for implementation of the Historic Properties component of the Integrated Cultural Resources Management Plan.

A2.3.4.3 Upper Tanana Inter-tribal Coalition

USAG-AK committed to meeting quarterly with the tribes of the Upper Tanana Inter-Tribal Coalition. Natural, cultural, compliance and clean-up issues are discussed. The Upper Tanana Inter-Tribal Coalition consists of member tribes including Tanacross, Dot Lake, Northway, Healy Lake, Tetlin, and Eagle.

A2.3.5 Non-Governmental Agencies

Non-government organizations play an extremely important role in the management of natural resources on Army lands in Alaska.

A2.3.5.1 Boreal Partners in Flight

USAG-AK participates with the Boreal Partners in Flight, a partnership of federal and state agencies, educational institutions, and nongovernmental organizations committed to managing neotropical migratory birds. The program integrates neotropical migratory bird management efforts into existing natural resource and land management programs consistent with the military mission. The program focuses on inventory, on-the-ground management practices, education, and long-term monitoring to determine changes in populations of these birds on USAG-AK lands. Currently USAG-AK has representation in the Boreal Partners in Flight, (Alaska Chapter). USAG-AK is actively establishing cooperative working relations on various projects including Statewide Raptor Survey and Interior Boreal Owl nest box monitoring studies.

A2.3.5.2 The Nature Conservancy

USAG-AK is a partner with The Nature Conservancy in an effort to look at regional ecosystem management in Upper Cook Inlet. The project integrates efforts to identify important habitat in the Upper Cook Inlet region, including Fort Richardson.

A2.3.5.3 Invasive Species Working Group

USAG-AK is a member of the newly formed Alaska Invasive Species Working Group. This multi-agency working group recommends initiatives to combat the spread of invasive species throughout the state of Alaska.

A2.3.5.4 Fort Richardson and Gerstle River Expansion Area Restoration Advisory Boards

These public Restoration Advisory Boards may at times be used to explain changes in future INRMP planning processes and invite public comment.

A2.3.5.5 Interior Alaska Airboat Association

As a result of concern over long- term recreation management of Tanana Flats, USAG-AK partners with the Interior Alaska Airboat Association. The Interior Alaska Airboat Association has donated airboat use, signs, and other equipment contributing to the recreational use impact study of Tanana Flats.

A2.3.5.6 Delta Bison Working Group

USAG-AK participates on the Delta Bison Working Group, a group established to advise Alaska Department of Fish and Game on the management of the Delta bison herd. The bison herd spends considerable time on Donnelly Training Area, and USAG-AK participation is critical to the functioning of the working group. The working group meets annually to review Alaska Department of Fish and Game progress toward meeting the goals and objectives of the Delta Bison Management Plan.

A2.3.5.7 Tanana – Yukon Historic Society

The Tanana – Yukon Historical Society is dedicated to preserving the cultural character of the interior region of Alaska through its publications, lectures, and Wickersham House Museum.

A2.3.5.8 Tanana Chiefs Conference

The Tanana Chiefs Conference, Inc., organized as Dena' Nena' Henash, (Our Land Speaks), is a non-profit Alaska Native corporation located in Fairbanks, Alaska. Tanana Chiefs Conference is a consortium of 42 member tribes and Alaska Native organizations, 37 of which are federally recognized tribal governments. The Tanana Chiefs Conference region approximates the size of Texas at 235,000 square miles or a third of Alaska. Tanana Chiefs Conference contracts a wide variety of services from federal, state, and private sectors. Tanana Chiefs Conference operates more than 200 service programs to benefit more than 15,000 Athabascan and other Alaska Natives and stateside Native Americans living in interior Alaska. These services include reality functions of the Bureau of Indian Affairs on more than 190,000 acres of restricted status lands (Native allotments and restricted townsites) pursuant to PL 93-638.

A2.3.6 Cooperative Agreements

A priority for partnering and accomplishing work to implement this plan is through cooperative agreements. Army Regulation 200-3 directs that where applicable, an installation should enter into cooperative plans, in accordance with 16 USC 670a, with state and federal conservation agencies for the conservation and development of fish and wildlife, soil, outdoor recreation, and other resources.

A2.3.6.1 Fish and Wildlife Cooperative Plan

In accordance with 16 USC 670a, the Fish and Wildlife Cooperative Plan is that component of the INRMP that describes how the fish and wildlife resources at an installation will be managed. It is a tripartite agreement between the USAG-AK, the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game. The cooperative plan provides a program of planning for, and the development, maintenance, and coordination of wildlife, fish, and game conservation. Signature by the three agencies on the Integrated Natural Resources Management Plan enacts the fish and wildlife cooperative plan. A summary of items agreed to by the three agencies is consolidated in Appendix AA.1

Each Fish and Wildlife Cooperative Plan will provide for, but not be limited to:

- Fish and wildlife habitat improvements or modifications.
- Wildlife considerations in all range rehabilitation.
- Control of off-road vehicle traffic.
- Endangered Species Management Component plans for listed and proposed species and critical habitat including specific habitat improvement projects and related activities.
- Use and protection of fish and wildlife resources, to include both consumptive and non-consumptive use, and natural resources law enforcement requirements.
- Designated responsibilities for the control and disposal of feral animals.

A cooperative plan will be adopted by the Garrison Commander only after ensuring its compatibility with the rest of the INRMP, the Migratory Bird Treaty Act, and other applicable federal, state, and local laws and regulations. Agreement by all three parties regarding the fish and wildlife management plan for an installation makes that plan a cooperative plan pursuant to 16 USC 670a and the exclusive fish and wildlife component of the INRMP. Cooperative plans will be reviewed and updated annually to incorporate new findings and changes and revised at least every five years.

A2.3.6.2 Department of Defense Agreements

Memorandums of Understanding between Department of Defense and other resources agencies provide the authority for installations to develop their own cooperative agreements in attainment of mutual conservation objectives with these agencies.

Memoranda of understanding have been established between the Department of Defense and the Departments of Agriculture (March 27, 1963) and Interior (April 7, 1978), which are applicable to continental U.S. installations. The memorandums authorize execution of cooperative agreements in attainment of mutual conservation objectives. Installations may develop cooperative agreements with the following:

- Department of Agriculture functioning through the Agriculture Research Service, the Soil Conservation Service, and the Forest Service for the use, development, protection, and conservation of forest and other vegetative cover resources, for soil and water conservation, and for research relating thereto.

- The Department of the Interior functioning through the U.S. Fish and Wildlife Service for the conservation of fish and wildlife resources.
- The Department of the Interior functioning through the National Park Service for the development and management of outdoor recreation activities.
- The Department of Agriculture functioning through the Animal and Plant Health Inspection Service and Animal Damage Control for animal damage control on military installations. A formal Memorandum of Understanding between the Department of Defense and U.S. Department of Agriculture, Animal and Plant Health Inspection Service was signed May 15, 1990. This Memorandum of Understanding establishes procedures for planning, scheduling, and conducting animal damage control activities, exclusive of routine vertebrate pest control operations, on U.S. military installations within the United States and its territories.
- Assistance may also be obtained from other government agencies not specifically included in the above memorandums of understanding (for example, Agricultural Extension Service, Bureau of Land Management, Environmental Protection Agency, State Historic Preservation Officer, universities, state, and local conservation agencies).

Memorandum of Agreement between the U.S. Department of Agriculture (U.S. Forest Service), and the U.S. Department of Defense (December 1990), for the conduct of insect and disease suppression on lands administered by Department of Defense. Section 5 of the Cooperative Forestry Assistance Act of 1978 (16 U.S.C. 2101) authorizes the Secretary of Agriculture to protect trees and forests, wood products, stored wood and wood in use from insects and diseases. The U.S. Forest Service has been delegated the responsibility for carrying out the provisions of the Cooperative Forestry Assistance Act. Annual appropriations, based on estimated suppression costs developed by the Forest Service, Department of Defense, other federal agencies, states, and other cooperating entities, are necessary to implement this responsibility.

A Master Agreement between the Department of Defense and the Department of Agriculture (September 1988) establishes the standards for the use of national forest system lands for military activity.

A Cooperative Agreement between the Department of Defense and The Nature Conservancy (December 13, 1988) declared a policy of cooperation and establishes procedures for planning and conducting cooperative efforts between The Nature Conservancy and Department of Defense on Department of Defense lands. Under this agreement, Installation Commanders can obtain technical assistance from The Nature Conservancy and State Heritage Programs, as well as allowing The Nature Conservancy to study significant ecosystems under the Army's control.

Army Compatible Use Buffers program is a formal agreement between the Army and eligible entities for acquisition by the entities of land and/or interest in land and water rights from willing sellers. Formal agreements include limiting encroachment through acquisition of development rights, cooperative agreements, conservation easements, and other means to support land acquisition or affect land use in accordance with applicable laws. Development and implementation of an Army Compatible Use Buffer does not constitute an acquisition of real property.

In June 1999, the heads of participating federal agencies signed a Memorandum of Understanding establishing the Cooperative Ecosystem Studies Unit Network. Department of Defense joined the network in September 2000 and now serves as a council member and technical advisor on one of the Cooperative Ecosystem Studies Units. Cooperative Ecosystem Studies Units provide research, technical assistance, and education to federal land management, environmental, and research agencies, and their partners. The Cooperative Ecosystem Studies Unit Network has several benefits: a broadened scope of scientific

services for federal agencies, increased technical assistance to resource managers, additional scientific resources and opportunities for universities, and increased diversity of research scientists and institutions.

A2.3.6.3 Other USAG-AK Agreements

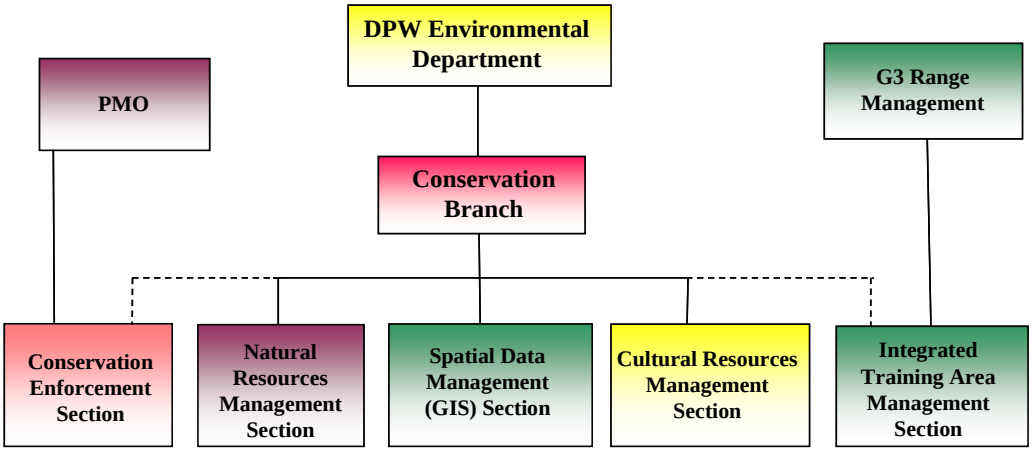
USAG-AK has developed the following cooperative agreements to implement this plan and the conservation program.

- *Memorandum of Understanding between the Bureau of Land Management and the United States Army Alaska concerning the management of certain public lands withdrawn for military use.* This Memorandum of Understanding, developed and entered into by the Bureau of Land Management's Alaska State Office and the United States Army Alaska established cooperative efforts for the management of public lands withdrawn for military use in accordance with the Military Lands Withdrawal Act of 1986 (Public Law 99-606). It implements the Fort Greely Resource Management Plan and the Fort Wainwright Yukon Maneuver Area Resource Management Plan.
- *Draft Memorandum of Agreement between Bureau of Land Management and U.S. Army Garrison Alaska for Natural and Cultural Resources Management of All Army Lands in Alaska*. This document lists specific of cooperation between the Bureau of Land Management and USAG-AK for cooperative management of all public lands withdrawn for military use by the Army in Alaska, to include military lands withdrawn under the Defense Appropriations Act of 2001 (Public Law 106-65). This document also serves as the Memorandum of Agreement required by PL 106-65 to implement the Bureau of Land Management Resource Management Plans. When signed, this document would supercede the Memorandum of Understanding for management of certain military lands listed above.
- *Cooperative Agreement between Alaska District Corps of Engineers and Bureau of Land Management, Alaska.* This agreement between the Department of the Army, Alaska District, Corps of Engineers and the Department of the Interior, Bureau of Land Management, Alaska State Office defines the responsibilities for authorizing use (rights-of-way, leases, licenses, permits) by others of public lands in Alaska withdrawn for the Department of the Army and the Department of the Air Force.
- *Memorandum of Agreement for Fire Suppression on Army Lands in Alaska.* The Army has an agreement with the Bureau of Land Management, Alaska Fire Service whereby the Alaska Fire Service is provided facilities on Fort Wainwright in exchange for fire protection on all Army lands in Alaska.
- *Cooperative Agreement for Natural and Cultural Resource Support.* This agreement between USAG-AK and the University of Alaska provides natural and cultural resource support.
- *Cooperative Agreement for Natural, Cultural, and Environmental Support*. This agreement with the Center for Environmental Management of Military Lands at Colorado State University provides support for natural and cultural resources, as well as environmental management.
- *Cooperative Agreement for Erosion Control and Habitat Management.* USAG-AK has entered into cooperative agreements with both the Salcha-Delta Soil and Water Conservation District and the Palmer Soil and Water Conservation District for enhancing, rehabilitating, and maintaining USAG-AK training lands to ensure their continued long-term use and effectiveness. The districts partner with USAG-AK to conduct land rehabilitation and maintenance, erosion control, and habitat management projects.

A2.4 Organizational Enhancement, Roles, and Responsibilities

A2.4.1 Organization

The Conservation Branch is a sub-component of the USAG-AK's Environmental Resources Department. Other branches within Environmental Resources Department include Planning Branch, Compliance Branch, and Clean-up Branch. The Natural Resources Section is a part of Conservation Branch. The Conservation Enforcement Section reports directly to the Provost Marshal's Office, while the Integrated Training Area Management Section reports directly to the Directorate of Plans, Training and Mobilization Range Management Division. Both of these sections are integrated in terms of personnel and implementation of projects with Conservation Branch.



A2.4.2 Staffing

The management and conservation of natural resources under Army stewardship is an inherently governmental function. Therefore, the provisions of Army Regulation 5-20 (*Competitive Sourcing Program*) do not apply to the planning, implementation, enforcement, or management of Army natural resources management programs. This includes all positions (for example, professional, technical, equipment operators, natural resources law enforcement professionals, laborers, and so on) that have been validated as a requirement to perform natural resources management. However, support to the natural resources program, where it is severable from management, planning, implementation or enforcement actions of natural resources, may be subject to the provisions of Army Regulation 5-20. Personnel positions associated with activities that support (on an as-needed basis), the natural resources program (for example, equipment operators or laborers from a pool or another shop) may be subject to the provisions of Army Regulation 5-20.

The ideal situation would be for all positions to be full-time, permanent federal positions. Considering current Army personnel policies, the addition of permanent full-time federal positions is not likely in the foreseeable future. A blended workforce appears to be a necessity. USAG-AK is also directed by Army Regulation 200-3 to seek technical assistance from appropriate natural resources agencies (federal, state, and local). USAG-AK will pursue options to fill staff positions in a manner that will accomplish the most efficient blended workforce as possible.

Since the natural resources disciplines encompassed within this INRMP are the natural sciences, USAG-AK is mandated by Army Regulation 200-3 to establish the optimum staffing of natural resources

management professionals, appropriate to the resources, to ensure necessary technical guidance in the planning and execution of the natural resources program. USAG-AK will establish positions as needed and fill validated positions in accordance with current Department of Defense/Department of Army policy. Positions required to meet Sikes Act requirements for implementation of this INRMP are shown below in Table A2-1.

Table A2-1. USAG-AK Positions Required to Implement the Integrated Natural Resources Management Plan.

Location	POSITION TITLE	Area of Responsibility	Organization	CLASSIFICATION
FRA	Conservation Branch Chief / U.S. Army Alaska Integrated Training Area Management Coordinator	USAG-AK	Directorate of Public Works Environmental	Federal GS-12
FRA	Conservation Enforcement Chief	USAG-AK	Directorate of Public Works Environmental	Federal GS-11
FRA	4 Conservation Enforcement Officers	FRA	Provost Marshal's Office	Military Police Game Wardens
FWA	6 Conservation Enforcement Officers	FWA / DTA	Provost Marshal's Office	Military Police Game Wardens
FRA	Geographic Information System Coordinator	USAG-AK	Directorate of Public Works Environmental	IPA
FRA	Geographic Information System Technician	USAG-AK	Directorate of Plans, Training and Mobilization Integrated Training Area Management	University Support
FWA	Geographic Information System Technician	FWA / DTA	Directorate of Public Works Environmental	University Support
FWA	Natural Resources Coordinator	FWA / DTA	Directorate of Public Works Environmental	Federal GS-11
FWA	Fish and Wildlife Biologist	FWA / DTA	Directorate of Public Works Environmental	University Support
FWA	Natural Resources Recreation Specialist	FWA / DTA	Directorate of Public Works Environmental	University Support
DTA	Fish and Wildlife Biologist	FWA / DTA	Directorate of Public Works Environmental	University Support
FRA	Natural Resources Coordinator	FRA	Directorate of Public Works Environmental	IPA / Federal GS-11
FRA	Fish and Wildlife Biologist	FRA	Directorate of Public Works Environmental	Federal GS-11
FRA	Natural Resources Recreation Specialist	FRA	Directorate of Public Works Environmental	University Support
FRA	Natural Resources Specialist	FRA	Directorate of Public Works Environmental	University Support
FWA	Forester	USAG-AK	Directorate of Public Works Environmental	IPA
FWA	Forest Technician	USAG-AK	Directorate of Public	University Support

			Works Environmental	
DTA	DTA Integrated Training Area Management Coordinator	DTA	Directorate of Plans, Training and Mobilization Integrated Training Area Management	IPA
DTA	DTA Range and Training Land Assessment Coordinator	DTA	Directorate of Plans, Training and Mobilization Integrated Training Area Management	University Support
FWA	FWA Integrated Training Area Management Coordinator	FWA	Directorate of Plans, Training and Mobilization Integrated Training Area Management	IPA
FWA	FWA Range and Training Land Assessment Coordinator	FWA	Directorate of Plans, Training and Mobilization Integrated Training Area Management	University Support
FRA	FRA Integrated Training Area Management Coordinator	FRA	Directorate of Plans, Training and Mobilization Integrated Training Area Management	IPA
FRA	FRA Range and Training Land Assessment Coordinator	FRA	Directorate of Plans, Training and Mobilization Integrated Training Area Management	University Support

DTA – Donnelly Training Area
FRA – Fort Richardson Alaska
FWA – Fort Wainwright Alaska
IPA – Intergovernmental Personnel Act

Full implementation of this INRMP requires full-time federal natural resource positions, as well as assistance from USAG-AK's partners and cooperators, both signatory and otherwise. Specific needs from organizations external to USAG-AK are indicated throughout this document. It is impossible for USAG-AK to hire the specialized expertise needed for some projects within this INRMP. USAG-AK will require considerable expertise from universities, agencies, and contractors to accomplish some tasks. USAG-AK will reimburse parties for much of this assistance.

Federal In-house Capabilities: USAG-AK has limited in-house federal positions as a result of manpower restrictions. To meet the intent of the Sikes Act, an additional eight federal positions are required for the planning, management, and enforcement of natural resources. Six of those positions could be filled by military game wardens.

Federal Agency Support: USAG-AK could utilize support from other federal agency personnel; however, this option has not been used previously and is not anticipated to be used during 2007-2011. These types of personnel meet Sikes Act requirements for "Government in Nature" positions for planning, management, and enforcement of natural resources.

***State Agency Support**:* The Intergovernmental Personnel Act of 1972 is a means to obtain personnel support. The Intergovernmental Personnel Act agreement is a system where a federal (or state) agency "borrows" other federal or state agency personnel for a limited time to do a specific job. Any state or federal agency is authorized to participate. The installation pays the borrowed employee's salary and administrative overhead. Major advantages are that personnel are not considered contractors, can represent and obligate the federal government, and manpower authorizations are not required. Intergovernmental Personnel Act agreement employees are considered part of the USAG-AK staff and can be directly supervised by federal employees. Intergovernmental Personnel Act agreement employees are bound by ethics rules of both their home state agency as well as federal ethics regulations. These types of personnel meet Sikes Act requirements for "government in nature" positions for planning, management, and enforcement of natural resources.

Another "borrowed personnel" option for securing manpower assistance is through the Oak Ridge Institute for Science and Education. Oak Ridge Associated Universities manages and operates the Oak Ridge Institute for Science and Education research participation program for the U.S. Department of Energy. Oak Ridge Institute for Science and Education is a consortium of 88 doctoral-granting colleges and universities, providing students and post graduates opportunities to gain experience in their respective fields by working on Army installations. Oak Ridge Institute for Science and Education program coordinators at the Army Environmental Center are points of contact for the program. Oak Ridge Institute for Science and Education personnel are appointed research participants who will gain hands-on experience by completing multiple tasks for the duration of their employment. Stipends are equivalent to salaries for employees hired with similar educational backgrounds, with a 30% overhead added. Oak Ridge Institute for Science and Education personnel can be appointed for a maximum three-year term. Installations may assist in the selection of Oak Ridge Institute for Science and Education personnel. These personnel support positions are not considered "government in nature."

University Assistance. Support to the natural resources program, where it is severable from management, planning, implementation or enforcement actions of natural resources, may be provided by on-site contract personnel. Due to the Sikes Act preference for other federal and state agencies with natural resource expertise, state universities receive first preference for providing on-site natural resources contract personnel support. USAG-AK has used several universities in recent years to help with specialized needs. University of Alaska has provided research support to USAG-AK. The primary source of on-site university personnel assistance has been Colorado State University to help implement the USAG-AK Conservation and Integrated Training Area Management programs. These on-site support positions are not considered "government in nature."

Contractor Support. As a final option for manpower assistance, USAG-AK may turn to outside contractors for tasks that are severable from management, planning, implementation or enforcement actions of natural resources. Contractors give USAG-AK access to a wide variety of expertise. Contractors may be used for projects such as plan preparation, National Environmental Policy Act documentation, aerial census and photography, land rehabilitation and maintenance implementation, and similar activities.

A2.4.3 Coordination and Training

Staff coordination and communication can be challenging as the conservation staff is spread out over three locations hundreds of miles apart. A significant strength of the conservation program is the integration with other Army directorates, namely the Provost Marshal's Office and the Directorate of Plans, Training and Mobilization. However, this split chain of command also makes communication and coordination very difficult. On-the-job training is often difficult because some supervisors work in

different locations from their staff. A blended workforce consisting of federal employees, Intergovernmental Agency Act agreement personnel, university personnel, and contract personnel also contributes to chain of command challenges. Therefore, USAG-AK has instituted a framework of natural resource teams, in-progress reviews, and periodic training to meet these challenges.

A2.4.3.1 In-Progress Review

The USAG-AK Conservation/Integrated Training Area Management In-Progress Review process is the forum by which conservation personnel report annual accomplishments and brief future plans and requirements to the USAG-AK Environmental Chief, USAG-AK Range Manager, and Range Officers from each post. The In-Progress Review provides an opportunity for discussion between the conservation personnel from each post and the USAG-AK range and environmental staff. Installation Management Agency Pacific Area Region Office Conservation and Major Command Integrated Training Area Management personnel are invited to participate.

The Conservation Chief hosts the In-Progress Review on a semi-annual basis. In-Progress Reviews are identified as In-Progress Review FY XX-1, held in October, and In-Progress Review FY XX-2, held in April. The Conservation Chief chairs the In-Progress Reviews.

The purpose of In-Progress Review FY XX-1 is to conduct the following:

- Report on accomplishments from each post and functional area.
- Provide an after-action review of projects that includes lessons learned.
- Set current fiscal year project tasks and deadlines.
- Develop future fiscal year goals and objectives.
- Obtain approval for future endeavors.

Based on the In-Progress Review FY XX-1 discussions, the Conservation Chief formulates a plan of action for accomplishing current and future fiscal year projects.

The In-Progress Review FY XX-2 is held in April prior to the upcoming field season. The purpose of In-Progress Review FY XX-2 is for project managers to brief their plans for summer field projects. This allows project managers to ensure integration among the many field projects. This also allows National Environmental Policy Act and cultural resources coordinators to ensure that proper project documentation has been completed or is in progress.

A2.4.3.2 Conservation Team

The USAG-AK conservation team exists to promote integration and enhance project execution. All natural and cultural resources employees of USAG-AK are members of the conservation team. The conservation team was created to allow free exchange of ideas and information amongst the members on all three posts. The conservation team also exists to tackle technical scientific issues necessary to carry out projects. There are three permanent components of the USAG-AK conservation team: the conservation team north of the Range (Fort Wainwright and Donnelly Training Area), the conservation team south of the Range (Fort Richardson), and the conservation steering committee. Ad hoc committees are created and convene as necessary. Ad hoc committees include the ecosystem management team and the range and training land assessment team. Conservation personnel often serve on a number of these permanent and ad hoc teams.

The conservation teams north and south of the range meet quarterly. Each conservation team elects a team leader who is responsible for scheduling meetings, setting an agenda, and moderating meetings. The north

and south of the range conservation teams conduct project coordination and track project execution based on the conservation work plan. Teams also develop new requirements for future projects. All members have the authority to raise or discuss issues in the team forum. The conservation steering committee meets weekly to prioritize program and project requirements as developed from the teams. The conservation steering committee is responsible for preparing and updating the conservation work plan.

A2.4.3.3 Training

Interdisciplinary training is essential for Department of Defense natural resource managers. It addresses practical job disciplines, statutory compliance requirements, applicable Department of Defense/Department of Army regulations, pertinent state and local laws, and current scientific and professional standards as related to the conservation of our nation's natural resources. The natural resource training objective is to identify technical requirements as well as the resources (cooperative agreements, Legacy, integrated training area management, Memorandum of Understandings, and so forth) available to implement and execute a successful and proactive program. The goal being to maintain and enhance the military mission, biodiversity, conservation stewardship, and the management of the total ecosystem from the practical standpoint of day-to-day operations as well as long-term planning.

The Directorate of Public Works, or appropriate environmental directorate, will provide for periodic and comprehensive technical instruction and training of natural resource management personnel responsible for the control of insects and plant pests. Personnel engaged in weed control operations (including control of objectionable trees, brush, poisonous plants, and aquatic plants) require special training in handling pesticides and associated equipment. Training and certification requirements are outlined in Army Regulation 200-5. Persons involved in natural resource law enforcement require special training to meet legal requirements and liability protection. Persons involved in natural resource protection and management should participate in training related to wetlands classification, mitigation, rehabilitation and protection. Wetland training courses are available from the Corps of Engineers.

Maximum utilization will be made of locally available training (for example, extension service, university, professional and trade organizations, government, commercial) and that offered by the Armed Services. Professional natural resource management personnel (agronomists, wildlife biologists, foresters, and range conservationists) are encouraged to participate in continuing their educational opportunities at universities and professional society functions. This includes leadership, management and compliance training, certification, and professional development.

All personnel engaged in a hazardous waste operation must fulfill the training requirements set forth in Title 40 Code of Federal Regulations Part 264.16.

A2.5 Decision Support

Decision support system goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. Decision support system goals and objectives are:

- Provide a decision support capability to natural resources, range, and engineer planners and managers.
- Develop and maintain USAG-AK Geographic Information System spatial database and data layers.
- Maintain Geographic Information System data in accordance with Federal Geographic Data Committee standards and Tri-Services Spatial Data Standards, including metadata standards.

- Coordinate and synchronize the three decision support systems.

There are three management components of the decision support systems used in USAG-AK. These three components are Geographic Information System, Range Facility Management Support System and Integrated Facility System.

A2.5.1 Geographic Information Systems

The USAG-AK Geographic Information System (GIS) is a foundational capability of natural resource management. GIS is a computer-based tool capable of assembling, storing, manipulating, and displaying geographically referenced information, (i.e., data identified according to their locations). The system can be used to analyze and model (manipulate, overlay, measure, compute, and retrieve) the digital spatial data and display the new map products and tabular resources information showing the results of the spatial analysis. GIS technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps. These abilities distinguish GIS from other information systems.

The USAG-AK GIS integrates these five key components: people, hardware and software, user-interface, methods, and data.

People: GIS technology is of limited value without the people who manage the system and develop plans for applying it to real-world problems. GIS users range from technical specialists who design and maintain the system to those who use it to help them perform their everyday work. Typically, people within an organization fall into one of three user categories – viewers, users, and doers. It is from these three categories that it is possible to identify the requirements necessary to build a functional GIS network and operating system. Viewers are individuals who need to view the GIS and ask simple questions of that information. Users are individuals who need to ask more complex questions of a GIS. This may involve asking very specific spatial and network analysis questions. Some people may need to make basic changes to the GIS data. Doers are individuals with an intimate knowledge of the GIS who develop, maintain, and make the GIS data available across the enterprise.

Hardware and Software: The USAG-AK GIS consists of a server and multiple workstations. The primary USAG-AK GIS software is Earth Systems Research Institute ArcInfo.

USAG-AK Geographic Information System User Interface: A user interface simplifies the connection between hardware, software, and GIS users. USAG-AK developed a specific GIS software application called MapServer, which provides a controlled, simplified interface to GIS capabilities such as viewing and printing standard GIS data layers and map-sets or performing standard analyses of geographic data. The USAG-AK GIS User Interfaces were tailored to the specific needs of the military user.

Methods: A successful GIS operates according to a well-designed plan, executive direction, and business rules, which are the models and operating practices unique to each organization. The Federal Geographic Data Committee endorsed a geo-spatial data standard known as Spatial Data Standards for Facilities, Infrastructure, and Environment (formerly called TSSDS and Spatial Data Standards). This standard defines a series of spatial features as well as the graphical representation of those features supported in a variety of formats. The Spatial Data Standards for Facilities, Infrastructure, and Environment was established to promote the development, use, sharing, and dissemination of geo-spatial data on a national basis.

Data: Possibly the most important component of a GIS is the data. Tasks associated with data include acquisition, input, management, and decision support. Collect spatial field data necessary for analysis and

map production. Acquire spatial data from a variety of sources. Geographic data and related tabular data can be collected in-house or purchased from a commercial data provider. A GIS will integrate spatial data with other data resources. Some common practices of inputting spatial data are into the GIS using a variety of methods, to include download, digitizing, and re-projecting data from outside sources to Alaska standards. Spatial data storage involves developing and maintaining data storage, procedures, and standards necessary to protect GIS data. Spatial data maintenance includes all the actions necessary to update and maintain data and metadata per Army standards. Spatial data analysis is the heart of the GIS and sets GIS apart from being merely a cartographic map-making system. Data analysis allows creation of new data layers from existing data layers, enabling a number of powerful tools to support decision-making. Spatial data access and distribution involves the actions required to promote access to the GIS database and distribution of spatial data to the many GIS users. A final task for GIS is to produce hardcopy and digital spatial data products for garrison, mission, units, other agencies, and higher command.

A2.5.2 Range Facilities Management Support System

The Range Facilities Management Support System is a multi-user, personal computer-based software package that automates the real property inventory, scheduling, firing (operations) desk, and management functions at an installation Range Control Center. The Range Facilities Management Support System was developed to optimize the scheduling, use, and operations and maintenance functions for an installation's live-fire ranges, maneuver training areas, and other related training facilities and assets under Army Regulation 210-21.

The basic modules of the Range Facilities Management Support System are scheduling and fire desk operations. In addition to the basic tabular database management functions that are automated in the Range Facilities Management Support System, several modules have been added to increase data collection, storage, and analytical capabilities. A brief description of three of the modules that affect natural resources management follows:

The Automated Surface Danger Zone application digitizes the range firing fans and surface safety fans for all of the Army's current and projected direct fire, indirect fire, and aerial delivery systems. These surface danger zones are contained in Army Regulation and Department of the Army Pamphlet 385-63, *Range Safety Program.* Automated surface danger zones allows Range Control managers to better serve users in the planning and conduct of complicated combined arms live-fire and non live-fire training events.

The Training Facility Inventory/Utilization application is currently under development and will allow Range Control managers to quantify facility usage data (electronically or manually) and perform the mathematical functions to determine the utilization trends for each range facility or training area. This application will also interface with the training requirements integration application of integrated training area management for effective and efficient land management planning consistent with current and future environmental prevention considerations.

The Range, Target, and Standards in Training Commission application automates the frequency of direct fire and indirect fire lane or firing points training requirements for specific units and activities. Among other things, the Range, Target, and Standards in Training Commission Application captures amounts and types of munitions fired at each range. This data is required for Emergency Planning and Community Right to Know Act reporting, an environmental reporting requirement.

A2.5.3 Integrated Facility System

The Integrated Facility System is a facility engineer automated information evaluation system that encompasses life cycle management of real property resources, and is the Army Chief of Staff for Installation Management's official source of real property information. The current version is the Integrated Facility System – Micro or Mini. In addition to real property information, the system performs a wide variety of other functions, such as work estimating and work-order tracking. The system has two levels: one for the installation level and one for the headquarters level (now called the Executive Information System). The U.S. Army Corps of Engineers Center for Public Works manages the Integrated Facility System.

A2.6 Outreach

Outreach is another extremely foundational component of natural resources implementation. Each natural resource program area conducts outreach activities, and the natural resources program management function integrates those efforts through the conservation web page and the conservation newsletter.

A2.6.1 Conservation Web Page

The USAG-AK conservation web site is the official means for obtaining the most current natural and cultural resources information, such as publications available for public review, published documents, hunting, fishing, and trapping information, firewood and Christmas tree information, and conservation personnel telephone and e-mail addresses. All information on this site is unclassified and accessible by the public via the Internet. Everything on the site may be distributed and reproduced. Maintenance includes adding new features and links to other web sites, and updating, adding, or deleting content. Anyone may request an update to the conservation web site. To request an update to the web site, send an e-mail to the conservation webmaster via the email address provided on the site. The web site can be accessed at *http://www.usarak.army.mil/conservation/*.

A2.6.2 Conservation Newsletter

The conservation newsletter is an official USAG-AK publication and is a means by which conservation personnel can share information about trends, events, and current thoughts related to the conservation program with the public. The newsletter will also be used to inform the public about upcoming conservation-related events, and will serve as a reminder that documents are available on the web site. Installation success in the conservation program depends on involvement of the public. The submission deadlines for the conservation newsletter are included in each issue and are also posted on the conservation web site. Unless articles appearing in the newsletter are copyrighted, they may be reproduced and shared.

A2.6.3 Alaska Forum on the Environment, Earth Day, Arbor Day, Greenstar, Newcomer’s Briefings

USAG-AK helps to plan, organize, and conduct the annual Alaska Forum on the Environment. USAG-AK environmental personnel are invited to give outreach presentations and to set up a booth. Earth Day is celebrated every year on April 22. Each year, the U.S. Army celebrates Earth Day at approximately 200 major commands, installations and organizations in the continental United States, Alaska, Hawaii, Korea, Japan, Italy and Germany. Earth Day celebrations in Alaska are usually aligned with Arbor Day, since the weather is warmer. USAG-AK conducts Arbor Day celebrations in partial requirements for the Tree City USA designation annually. USAG-AK also conducts outreach activities and sets up a booth at the Greenstar show, the Alaska Bear Festival, and the Alaska Sportmen’s show.

A2.7 Financial Management

Another significant component of USAG-AK natural resource program management is financial management. Financial management consists of funding, budgeting, and contracting. These three components all are extremely important to USAG-AK's ability to implement this plan.

A2.7.1 Funding

The intent of the funding section of this INRMP is to link resources with the goals established. The funding section of this plan will therefore be used to develop and support environmental funding requirements.

The Installation Management Agency will insure that all garrison natural resource plans will include the following:

- Articulate the desired end state that individual plan goals seek to reach.
- Cover at least five years of resourcing.
- Include a section in the plan that lays out the funding required to achieve the established goals for each of the years covered.
- Be signed by the Garrison Commander.

Until the latter part of the 1980s, natural resources funding was primarily Operations and Maintenance dollars within Directorate of Public Works. As environmental funds (internally "fenced" Operations and Maintenance) increased and regular Operations and Maintenance funding decreased, natural resources projects came to rely more heavily upon environmental compliance funding. As was the case in the eighties, the Army once again plans to reduce the amount funded through the environmental account and increase funding through facilities and range program accounts. Below are general discussions about different sources of funding necessary to implement this INRMP.

A2.7.1.1 Environmental Program Funding

Environmental funds are a special category of Operations and Maintenance's budget. Until 2005, the Environmental Program Requirements process governed environmental funding. They were special in that they were fenced by Department of Defense, but they are still subject to restrictions of Operations and Maintenance funds. "Must fund" classifications included mitigation identified within Findings of No Significant Impact, items required within Federal Facilities Compliance Agreements, and planning level surveys. This INRMP is a Federal Facilities Requirement Agreement that contains projects and programs to mitigate various military activities. Currently, the Environmental Program Requirement Report system has been replaced by the Environmental Cost Standardization model to implement the Army Strategy for the Environment. The Environmental Cost Standardization uses a cost model to develop installation environmental requirements that are predictable. A great deal of confusion exists concerning environmental funding of new or unpredictable requirements, or how installations will communicate new or adjusted requirements to Army headquarters.

A2.7.1.1.1 Environmental Conservation Funding

The purpose of environmental conservation funding is to enable the Army mission by funding characterization, monitoring, compliance and continuing oversight of installation natural and cultural resources. Conservation funding allows Army managers to exercise stewardship of natural and cultural resources by facilitation of the planned management of natural and cultural resources, via the Integrated Natural Resources Management Plan and Integrated Cultural Resources Management Plan. This is

accomplished in coordination with facility managers, trainers and other land users, through funding and implementation of projects that help preserve, maintain, repair and improve natural and cultural resources for sustaining mission requirements. Table A2-2 indicates environmental conservation funding requirements needed to implement this INRMP.

Table A2-2. Conservation Funding Requirements.

Priority	Project Number	Project Name	2007	2008	2009	2010	2011
High	DTA0200002	DTA Integrated Natural Resources Management Plan	$25,000	$25,000	$25,000	$50,000	$25,000
High	FRA0200015	Wetlands Monitoring And Management Mitigation	$45,000	$45,000	$45,000	$45,000	$45,000
High	FRA0200016	Forestry Monitoring And Management	$55,000	$55,000	$55,000	$55,000	$55,000
High	FRA0500002	Conservation Program Mgmt (Contract Support)	$945,000	$950,000	$955,000	$960,000	$965,000
High	FRA0500003	Ecosystem Management And Monitoring Mitigation	$62,000	$62,000	$62,000	$62,000	$62,000
High	FRA0500005	Watershed Monitoring And Management Mitigation	$50,000	$50,000			
High	FRA0500014	Government To Government Consultation	$126,180	$126,180	$126,180	$126,180	$126,180
High	FRA0500018	Conservation Program Mgmt (Travel)	$36,000	$36,000	$36,000	$36,000	$36,000
High	FRA0500019	Conservation Program Mgmt (Supplies And Equipment)	$40,000	$40,000	$40,000	$40,000	$40,000
High	FRA0500022	Pest Management Training		$10,000			$10,000
High	FRA0500027	Surface Water Planning Level Survey	$80,000	$80,000	$80,000	$80,000	$80,000
High	FRA0500028	Conservation Program Mgmt (Training)	$7,000	$7,500	$8,000	$8,500	$9,000
High	FRA9100035	Wetlands Planning Level Surveys					$130,000
High	FRA910019	Integrated Natural Resources Management Plan	$25,000	$25,000	$25,000	$25,000	$50,000
High	FRA9200016	Conservation Program Management (Federal Salaries)	$255,000	$265,000	$275,000	$285,000	$295,000
High	FRA9500026	Soils Planning Level Survey	$49,600	$49,600	$49,600	$49,600	$49,600
High	FRA9700011	Fauna Planning Level Surveys	$25,000	$25,000	$25,000	$25,000	$25,000
High	FRA9800002	Vegetation Planning Level Surveys	$37,000	$37,000	$37,000	$37,000	$37,000
High	FRA9800003	Flora Planning Level Surveys					$100,000
High	FRA9800005	Fish And Wildlife Monitoring And Management	$45,000	$45,000	$45,000	$45,000	$45,000
High	FRA9900005	Installation Pest Management Plan	$5,000	$5,000	$5,000	$5,000	$50,000
High	FWA0200012	Forest Monitoring And Management	$65,000	$65,000	$65,000	$65,000	$65,000
High	FWA0200016	Geographic Information Systems	$38,000	$38,000	$38,000	$38,000	$38,000
High	FWA0300001	Pest Management Training		$10,000			$10,000

Priority	Project Number	Project Name	2007	2008	2009	2010	2011
High	FRA0200013	Endangered, Threatened And Rare Species Management	$25,000	$25,000	$25,000	$200000	$250,000
High		Compile a inventory of fish assemblages in Eagle River and Eagle Bay					
High		Map the bathymetry of Eagle River and Eagle Bay using a multi-beam sonar					
High	FWA0400004	Wetlands Planning Level Survey	$240,000	$240,000	$240,000	$240,000	$240,000
High	FWA0400006	Ecosystem Monitoring And Management	$160,000	$160,000	$160,000	$160,000	$160,000
High	FWA0500001	Conservation Program In-House Contract Support	$1,056,000	$1,059,000	$1,062,000	$1,065,000	$1,068,000
High	FWA0500018	Surface Water Planning Level Survey	$80,000	$80,000	$80,000	$80,000	$80,000
High	FWA0500023	Wetlands Monitoring And Management	$143,000	$143,000	$143,000	$143,000	$143,000
High	FWA9100028	Integrated Natural Resource Management Plan	$25,000	$25,000	$25,000	$50,000	$25,000
High	FWA9400016	Soils Planning Level Survey	$160,000	$160,000	$160,000	$160,000	$160,000
High	FWA9800010	Conservation Program Management (Supplies & Equip)	$50,000	$50,000	$50,000	$50,000	$50,000
High	FWA9800014	Flora Planning Level Survey		$160,000			
High	FWA9800015	Vegetation Planning Level Survey	$80,000	$80,000	$80,000	$80,000	$80,000
High	FWA9800016	Erosion Control & Streambank Stabilization	$117,000	$117,000	$117,000	$117,000	$117,000
High	FWA9800020	Fauna Planning Level Surveys	$65,000	$65,000	$65,000	$65,000	$65,000
High	FWA9800021	Fish And Wildlife Monitoring And Management	$45,000	$45,000	$45,000	$45,000	$45,000
High	FWA9800024	Forest Management Plan				$30,000	
High	FWA9900005	Integrated Pest Management Plan	$5,000	$5,000	$5,000	$40,000	$5,000
			$4,466,780	$4,465,280	$4,253,780	$ 4,428,280	$ 4,835,780
Medium	FRA0200018	Special Interest Area Management	$25,000	$25,000	$25,000	$25,000	$25,000
Medium	FRA0400009	Ecosystem Management Monitoring	$40,000	$40,000	$45,000	$45,000	$50,000
Medium	FRA0500001	Education, Awareness, And Public Outreach	$25,000	$25,000	$25,000	$25,000	$25,000
Medium	FRA0500008	Fire Management	$30,000	$30,000	$30,000	$30,000	$30,000
Medium	FRA0500010	Erosion Control And Streambank Stabilization	$58,500	$58,500	$58,500	$58,500	$58,500
Medium	FRA0500011	Habitat Management	$50,000	$55,000	$55,000	$60,000	$60,000
Medium	FRA0500024	Conduct Fish And Wildlife	$45,000	$45,000	$45,000	$45,000	$45,000

Priority	Project Number	Project Name	2007	2008	2009	2010	2011
		Monitoring					
Medium	FRA0500026	Geographic Information Systems	$170,000	$175,000	$175,000	$180,000	$180,000
Medium	FRA9800004	Wetlands Management And Revegetation	$50,000	$50,000	$50,000	$50,000	$50,000
Medium	FWA0200015	Special Interest Areas Management	$30,000	$30,000	$30,000	$30,000	$30,000
Medium	FWA0400008	Manage Recreational Use And Impacts	$45,000	$50,000	$55,000	$60,000	$65,000
Medium	FWA0500003	Endangered, Threatened And Rare Species Management	$55,000	$55,000	$55,000	$55,000	$55,000
Medium	FWA0500004	Fire Management	$30,000	$30,000	$30,000	$30,000	$30,000
Medium	FWA0500019	Outdoor Recreation Management Plan				$65,000	
Medium	FWA0500021	Recreational Impact Monitoring And Management	$65,000	$65,000	$65,000	$65,000	$65,000
Medium	FWA9500007	Habitat Management	$140,000	$200,000	$220,000	$215,000	$220,000
Medium	FWA9700001	Conduct Fish And Wildlife Monitoring	$50,000	$55,000	$55,000	$60,000	$60,000
			$908,500	$988,500	$1,018,500	$1,098,500	$1,048,500
Low	FRA0500025	Recreation Impact Monitoring And Management	$45,000	$45,000	$45,000	$45,000	$45,000
Low	FRA9500006	Natural Resource Management In Urban Areas	$25,000	$25,000	$25,000	$25,000	$25,000
Low	FRA9600007	Monitor Recreational Use To Assess Impacts	$30,000	$30,000	$30,000	$30,000	$30,000
Low	FWA0500020	Education, Awareness, And Public Outreach	$50,000	$50,000	$50,000	$50,000	$50,000
Low	FWA0500022	Topography Planning Level Survey	$80,000	$80,000	$80,000	$80,000	
			$230,00	$ 230,000	$ 230,000	$230,000	$150,000
			$5,405,280	$5,683,780	$5,502,280	$5,890,780	$ 6,034,208

The environmental conservation funding required to implement this plan is $21,858,900 for 2007-2011 or an average of $4,371,781 per year. Environmental conservation funding required to fully implement this plan would require $28,116,400 for 2007-2011or $5,623,280 annually. These estimates will be adjusted each year as needed.

A2.7.1.1.2 Environmental Compliance Funding

The purpose of environmental compliance funding is to enable the Army mission by funding implementation of legally mandated actions to protect and enhance environmental media from the negative effects of pollution and human alteration and to allow sustained access to and use of operational ranges to meet doctrinal training requirements. While most of these funding requirements are not covered here in this INRMP, there are a few compliance funded projects that are intertwined with natural resources management. These compliance funded projects are listed below in Table A2-3.

Table A2-3. Compliance Funding Requirements Supporting Natural Resources Management.

Priority	Project Number	Project Name	2007	2008	2009	2010	2011
High	FRA0300007	Air Emission Inventory			$ 35,000		
High	FRA0500004	Soil And Water Quality Monitoring	$ 90,000	$ 80,000	$ 80,000	$ 30,000	$ 30,000
High	FRA0500020	Storm Water Plan Implementation	$ 45,000	$ 45,000	$ 45,000	$ 45,000	$ 45,000
High	FRA9200023	Storm Water Pollution Prevention Plan				$ 65,000	
High	FRA9500029	Clean Water Non-Point Discharge Elimination System Monitoring	$ 45,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000
Medium	FRA0200002	Implement Storm Water Best Management Practices	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000
Medium	FRA0300015	Water Resource Management Plan	$ 25,000			$ 25,000	
High	FWA0000010	Storm Water Pollution Prevention Plan Updates					$ 65,000
High	FWA0500005	Soil And Water Quality Monitoring	$ 250,000	$ 45,000	$ 45,000	$ 45,000	$ 45,000
High	FWA0500010	Storm Water Program Implementation	$ 45,000	$ 45,000	$ 45,000	$ 45,000	$ 45,000
High	FWA9800003	Clean Water Non-Point Discharge Elimination System Monitoring	$ 30,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000
Medium	FWA0200002	Implement Storm Water Best Management Practices	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000
Medium	FWA0300015	Water Resource Management Plan	$ 25,000			$ 25,000	
			$ 855,000	$ 565,000	$ 565,000	$ 630,000	$ 580,000

A2.7.1.2 Conservation Reimbursable Funding

Reimbursable programs support military readiness and land management, and revenues from these programs supplement base operations and other funding. Agriculture/grazing outleases are authorized by 10 USC 2667(d), and commercial forestry by 10 USC 2665. Reimbursable programs may be used to enhance and maintain wildlife habitats. The Army has about 800,000 acres of land leased under agriculture/grazing, and 1.4 million acres under some form of commercial forestry. The Army also has executive agent responsibilities over the Department of Defense Forestry Reserve Account.

The Reimbursable Program Tracking System is a web-based application designed to provide an automated financial budgeting and reporting mechanism for installations, Major Commands, U.S. Army Corps of Engineer districts and the Defense Finance and Accounting System. The purpose of the Reimbursable Program Tracking System is to increase efficiency in managing the Army's forestry and agricultural grazing outlease programs. The system allows for the entering/updating of records, can

generate various reports, has a multi-user capability, and has read-only ability for a possible larger audience.

A2.7.1.2.1 Forestry Funds

Forestry funds are generated from sale of forest products on military lands and are centrally controlled by the Department of the Army. USAG-AK may be reimbursed for all costs associated with the maintenance and disposition of forest products. Forestry funds must be used only for projects directly related to forest ecosystem management. Such projects include timber management, reforestation, timber stand improvement, inventories, fire protection, construction and maintenance of timber area access roads, purchase of forestry equipment, disease and insect control, planning (including compliance with laws), marking, inspections, sales preparations, personnel training, and sales. Army Regulation 200-3 (chapter 5) outlines collection and expenditures systems.

The harvesting of forest products is allowed and encouraged when conducted consistent with protecting and maintaining a viable, self-sustaining forest ecosystem. All proceeds from forest product sales shall be deposited into the Conservation Reimbursable Forestry Account.

Installation forest management and silvicultural expenses may be charged to various Army accounts, including Base Operations - Environmental Conservation, Maintenance and Repair - Grounds, Fire and Emergency Response Services. Forest management and silvicultural activities that meet the criteria outlined in section III, paragraph 2 may be supplemented by the Conservation Reimbursable Forestry Account.

Forest product revenue generation is cyclic. The Conservation Reimbursable Forestry Account is a supplemental fund that fluctuates, in terms of total Army-wide proceeds, from year to year based on mission needs, threatcon, forest product market conditions, etc. Installations must not rely on this account to fund fixed costs related to forest management, such as employee salary.

Requests for Conservation Reimbursable Forestry Account funds will be submitted annually through the Reimbursable Programs Tracking System. The Assistant Chief of Staff for Installation Management will provide installation specific budget authority as determined through the process outlined in the Protocol for Determining Recommended Installation Specific Forestry Automatic Reimbursable Authority - Initial Budget Build and Continuing Adjustments. Command and installation budget documents pertaining to this account will be coordinated with appropriate training mission and natural resources management personnel.

Requirements for Conservation Reimbursable Forestry Account funds will be identified annually through the proponent organization to U.S. Army Environmental Center to the Office of the Director of Environmental Programs. The Director of Environmental Programs will issue Conservation Reimbursable Forestry Account to the proponent organization, for identified requirements and Army needs. Forestry funding requirements are listed below in Table A2-4.

Table A2-4. Forestry Funding Requirements 2007-2011.

Priority	Location	Project Title	RPTS Category	FY07	FY08	FY09	FY10	FY11
High	FWA	Bolio Lake Training Area Timber Stand Improvement	Forest Land Improvement	$ 72,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000
High	FWA	Forest Stand Mapping	Forest Land Improvement	$ 30,000	$ 30,000	$ 10,000	$ 15,000	$ 15,000

High	FWA	Donnelly Training Area Fuel Reduction	Forest Land Improvement	$ 72,000	$ 72,000	$ 72,000	$ 72,000	$ 72,000
High	FWA	Jarvis North Training Area Timber and Maneuver-ability Improvement Project	Forest Land Improvement	$ 70,000	$ 70,000	$ 95,000	$ 95,000	$ 95,000
High	FWA	Moose Creek Timber Stand Improvement	Forest Land Improvement	$ 24,000	$ 30,000	$ 30,000	$ 0.00	$ 0.00
High	FWA	Stuart Creek Fuels Assessment	Forest Land Improvement	$ 32,000	$ 0.00	$ 24,000	$ 0.00	$ 24,000
Moderate	FWA	Continuous Forest Inventory	Forest Land Improvement	$ 0.00	$ 40,000	$ 40,000	$ 60,000	$ 60,000
Moderate	FWA	Yukon Training Area Timber and Maneuver-ability Improvement Project	Forest Land Improvement	$ 0.00	$ 70,000	$ 75,000	$ 0.00	$0.00
Low	FWA	Donnelly West Fuel Break	Forest Land Improvement	$ 16,000	$ 0.00	$ 0.00	$ 0.00	$ 0.00
Low	FWA	Hays Lake Fuel Break	Forest Land Improvement	$ 24,000	$ 0.00	$ 0.00	$ 24,000	$ 24,000
Low	FWA	Personal use firewood and house log areas	Forest Land Improvement	$ 0.00	$ 20,000	$ 0.00	$ 0.00	$ 0.00
Low	FWA	Stuart Creek East Fuel Break	Forest Land Improvement	$0.00	$ 30,000	$ 0.00	$ 0.00	$ 0.00
Low	FWA	Delta River Bison Range Habitat Enhancement	Natural Resources	$ 24,000	$ 0.00	$ 8,000	$ 0.00	$ 0.00
Low	FWA	Grouse Habitat Enhancement	Natural Resources	$ 24,000	$ 14,000	$ 0.00	$ 14,000	$ 0.00
Low	FWA	Tanana Flats Habitat Enhancement	Natural Resources	$ 24,000	$ 0.00	$ 0.00	$ 0.00	$ 0.00
High	FRA	Forest Stand Mapping	Forest Improvement	$ 10,000	$ 10,000	$ 10,000	$ 15,000	$ 15,000
High	FRA	Grezelka Range Area Timber Stand Improvement	Forest Improvement	$ 16,000	$ 90,000	$ 0.00	$ 0.00	$ 0.00
High	FRA	Ft. Richardson Small Arms Complex Fuel Break	Forest Improvement	$ 8,000	$ 24,000	$ 0.00	$ 0.00	$ 0.00
Moderate	FRA	Forest Inventory	Forest Improvement	$ 0.00	$ 20,000	$ 20,000	$ 30,000	$ 30,000
Moderate	FRA	Waldon Lake Training Area Timber and Maneuverability Improvement Project	Forest Improvement	$ 0.00	$ 0.00	$180,000	$185,000	$0.00
				$446,000	$560,000	$604,000	$550,000	$375,000

The Department of Defense Forestry Reserve Account was established under 10 USC 2665, to collect surplus funds from the sale of forest products. These funds are the monies remaining after program expenses are reimbursed and the state entitlements are paid. Installations of all the Services may apply for Department of Defense Forestry Reserve Account funds to fund natural resources management projects, even if that installation has not received Conservation Reimbursable Forestry Account dollars. Forestry reserve account funds must be used in the fiscal year issued.

Within 90 days after the conclusion of each fiscal year, Defense Finance & Accounting Service – Indianapolis Center, Directorate of Accounting, Budget Execution and Reporting Division will compute the concluding fiscal year's unfilled forestry orders (transferring excess to or removing required funds from that fiscal year's General Fund Budget Clearing Account, 21F3875.3960), compute and provide 40% of the net proceeds per installation to the appropriate states and deposit the remaining net proceeds into the Department of Defense Forestry Reserve Account, 21X5285. The Department of Defense Forestry Reserve Account funds are made available for military departments for use in Continental U.S., for improvements of forest lands, unanticipated contingencies in the administration of forest lands, and natural resources management that implements approved plans and agreements. Department of Defense has designated the Army as the executive agent for the Department of Defense Forestry Reserve Account.

Periodically the Director of Environmental Programs will request that Army Materiel Command, Base Realignment and Closure Office, Installation Management Agency, National Guard Bureau submit a prioritized list of installation requirements for use of Department of Defense Forestry Reserve Account funds. The U.S. Army Environmental Center will consolidate requests and submit a recommended list of projects for funding to the Office of the Director of Environmental Programs. Uses of Department of Defense Forestry Reserve Account funds are restricted to Continental U.S. for the following purposes:

- Improvements of forest lands.
- Unanticipated contingencies in the administration and management of forest lands and the production of forest products for which other sources of funds are not available in a timely manner.
- Natural resources management that implements approved plans and agreements.

Natural resources management projects are eligible for Department of Defense Reserve Account funds if they are specifically included in an approved INRMP and provide for one of the following purposes:

- Fish and wildlife habitat improvements or modifications.
- Range rehabilitation where necessary to support wildlife.
- Control of off-road vehicle traffic.
- Specific habitat improvement projects and related activities and adequate protection for species of fish, wildlife, and plants considered threatened or endangered.

Equipment purchases may be eligible for Forestry Reserve Account funding if used in direct support of Department of Defense's conservation reimbursable forestry program, but not for general natural resources management. All revenue from the sale of equipment procured with Forestry Reserve Account funds shall be deposited to the Conservation Reimbursable Forestry Account. Additional guidance regarding the purchase of forestry equipment can be found in Army Forestry Vehicle Purchasing and Leasing Guide (see appendix 8 of the guide).

Forestry funds are generated from the sale of timber on lands where the military controls vegetation management. The sale of timber on withdrawn Public Law 106-65 lands is managed by the Bureau of Land Management, with sales receipts deposited in the U.S. Treasury. USAG-AK will generate a very

small amount of forestry funds from other withdrawn lands and Department of Defense fee simple lands in 2007-2011 through its firewood, Christmas tree, and salvage sales program.

A2.7.1.2.2 Agricultural Outlease Funding

The Army agriculture/grazing outlease program is a reimbursable program. This means that proceeds from outleases on an installation are first used to cover authorized expenses. Proceeds are allocated to the installations and U.S. Army Corps of Engineers districts based on the Agricultural/Grazing Outlease Protocol. The Office of the Director of Environmental Programs of Headquarters, Department of Army, provides annual reimbursement authority, based on submitted annual work plans, to installations and U.S. Army Corps of Engineers districts. Incurred expenses are reimbursed by the Defense Finance Accounting Service-Indianapolis Center.

Military land will be routinely examined to determine what areas, if any, can be made available for outleases. In accordance with the concept of multiple land use, areas that are required to support the military mission may also be outleased for agricultural purposes. Leasing of land for uses that are compatible with mission requirements can reduce installation maintenance efforts, provide opportunities for accomplishing land maintenance by the lessee at no cost to the installation, provide funds which the Army can use to support leasing efforts and other natural resources requirements, and support community relations and the local economy.

The use of revenue from agricultural and grazing outleases are restricted by law. Revenue may be used for reimbursement of the administrative costs of outleasing and the financing of multiple land-use management activities through established budget procedures.

All revenues from agriculture and grazing outleases will be deposited to the Conservation Reimbursable Agriculture/Grazing Outlease Account established for that purpose and will be available through established budget procedures (section 2667, title 10, United States Code (10 USC 2667), Outleasing for Grazing and Agriculture on Military Lands). The purpose of the Conservation Reimbursable Agriculture/Grazing Outlease Account is to assist with the implementation of Army natural resources management. Activities outlined in the installation's agricultural management plan may be supplemented by agricultural/grazing outlease conservation reimbursable account funds.

- Administrative and operational expenses of agricultural leases.
- Initiation, improvement, and perpetuation of agricultural leases.
- Preparation, revisions, and requirements of integrated natural resources management plans.
- Implementation of integrated natural resources management plans.

Expenses not directly associated with agriculture/grazing outleases must be funded from appropriated resources. The natural resources program manager will be included in all budget planning and programming activities necessary to ensure all natural resources requirements are considered.

Requirements for agricultural/grazing outlease conservation reimbursable account funds will be identified annually through the proponent organization to U.S. Army Environmental Center to the Office of the Director of Environmental Programs using the Reimbursable Programs Tracking System. The Director of Environmental Programs will issue automatic reimbursement authority directly to the installation for identified requirements and Army needs.

Administrative costs of outleasing and the financing of multiple land-use management activities may be supplemented with Conservation Reimbursable Agriculture/Grazing Outlease Account funds if they incorporate the following principles and requirements:

- Administration of agricultural/grazing outleases.
- Initiation, improvement, and perpetuation of agricultural outleases.
- Natural resources management activities, to include purchase of equipment and materials to support natural resources management.
- Agriculture/grazing outleases program management costs for personnel at all levels (installation, Installation Management Agency, District, Division, Field Operating Activity, Army Staff, United States Property and Fiscal Officers, and auxiliary or contracted staff (e.g., through interagency agreements, Oak Ridge Institute for Science and Education, etc.).
- Army-wide initiatives that improve the management of natural resources.
- Surveys and studies needed to evaluate the status of natural resources as affected by agriculture/grazing outlease activity—water quality, soil erosion, and biodiversity (particularly threatened and endangered species and neotropical migrants).
- Projects to integrate agriculture/grazing outlease with mission activities (e.g., tactical concealment areas).
- Soil erosion control projects to reduce erosion that has been accelerated by agriculture/grazing outlease activities.
- Surveys and studies needed to evaluate the status of cultural resources as affected by agriculture/grazing.

The Conservation Reimbursable Agriculture/Grazing Outlease Account may be used to secure office/storage space and equipment directly supporting agriculture/grazing outlease programs, but it may not be used for major construction, ornamental landscaping, or decorative plants. Organizations may exchange or sell similar items of federal property and may apply the exchange allowance or proceeds of sale in whole or in part-payment for the property being acquired in accordance with Department of Defense 4140.1-R Department of Defense Materiel Management Regulation; note that the exchange/sell procedure excludes firefighting equipment.

Installations must obtain prior approval to exceed the capital expenditure limit for equipment or procure centrally controlled equipment if using automatic reimbursement authority or Department of Defense forestry reserve account for the purchase. Requests for approval are submitted by installations to their proponent organization and from the proponent organization through U.S. Army Environmental Center to Office of the Director of Environmental Programs. The detailed procedure is provided in Army Reimbursable Authority Protocol for Determining Recommended Installation Specific Agriculture/Grazing Army Reimbursable Authority.

Agricultural/grazing dollars shall not be used to cover real property services or compliance costs.

Conservation Reimbursable Agriculture/Grazing Outlease Account may not be used to augment the general operating expenses of the installation as overhead. For example, overhead outside of the agriculture outlease, such as Joint Logistic Support Center or Net Operating Result surcharges, may not be charged to the extent that the adjustments include costs that do not directly benefit the agriculture outleasing program.

Requirements for funds derived from lease proceeds are identified annually. Agricultural outlease funding requirements are identified in Table A2-5.

Table A2-5. Agricultural Outlease Account Funding Requirements 2007-2011.

Priority	Location	Project Title	FY07	FY08	FY09	FY10	FY11

Med	FWA	Timber Stand Improvement in Support of Military Operations	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000
Med	FRA	Timber Stand Improvement in Support of Military Operations	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000

A2.7.1.2.3Fish and Wildlife Funding

Department of Defense fish and wildlife funds are collected through sales of permits for hunting, trapping or fishing on military controlled lands. They are authorized by the Sikes Act and regulated by Army Regulation 200-3 (chapter 6). These funds may be used only for fish and wildlife management on the installation where they are collected. They cannot be used for recreational activities. They are exempt from equipment purchase amount limitations, and they do not expire (un-obligated funds carry over on 1 October). USAG-AK collects fees for hunting moose on Fort Richardson.

Such fees are to be used on the installation from which they are collected for the protection, conservation, and management of fish and wildlife, including habitat restoration and improvement, biologist staff and support costs, and related activities, as stipulated in the Fish and Wildlife Cooperative Plan, but for no other purpose. Funds that are required to support hunting and fishing fee collection administration (that is, printing and issuing of permits) will not exceed 10% of the annual revenues from hunting, fishing, and trapping fees (Army Regulation215-1, Chapter 8, Section 18). Furthermore, funds collected pursuant to an Integrated Natural Resources Management Plan prepared in accordance with the Sikes Act Improvement Act (AAIA) (ACCOUNT 21X5095) may be used only to defray the costs of fish and wildlife management programs. The quality of hunting and fishing opportunities through habitat improvement and expansion will receive primary emphasis when planning activities. Hunting and fishing permit funds will not be used for the construction of recreational structures. Management of this source of funds will be the responsibility of the installations' natural resources management professional.

All fees collected will be accounted for in accordance with guidance provided for the appropriation titled "Wildlife Conservation, Military Reservations," Army Account 21X5095 (Army Regulation 37-100 and Army Regulation 37-108). Unobligated balances will be accumulated with current fee collections, and the total amount accumulated at an installation will be available for obligation as apportioned by the Office of Management and Budget. Budget and support information, required to obtain obligation authorities, will be provided annually to the Army Chief of Staff for Installation Management ATTN: DAIM-ED, 2511 Jefferson Davis Hwy, NC1 (Presidential Tower), Suite 9300, Arlington, Virginia 22202. The policies and procedures in paragraph 6.4.1 apply to those outdoor recreation programs and opportunities as defined in the glossary and take precedence over Army Regulation 215-1.

Funds collected pursuant to the Sikes Act (Account 21X5095) may be used only to defray the costs of fish and wildlife management programs. The quality of hunting and fishing opportunities are usually in direct relationship with the effort expended for habitat protection and improvement and will receive primary emphasis when developing annual work plans to implement the fish and wildlife management program. Funds collected for hunting and fishing permits will not be used for construction of recreational structures (for example, blinds, deer stands, fishing piers, and so on) or for transportation of hunters to designated stations, unless the only means of participation is by transportation which is required to reach the hunting and/or fishing areas. Such facilities are primarily for recreational use and, therefore, should be funded from the installation Morale, Welfare, and Recreation account.

The revenues generated from this program in the current fiscal year and deposited in the 21X5095 account are considered to be "no year" funds and remain available for obligation indefinitely. Installations

are encouraged to use the un-obligated balances for the collection of hunting, fishing, and trapping fees for the protection, conservation, and management of fish and wildlife.

Funds available for obligation in the current year consist of the following:

- Un-obligated funds carried forwarded that are not reflected on the current year fund allowance system document.
- Prior year recoveries that are not reflected on the current year fund allowance system document.
- Current year collections/receipts that are received and authorized on the current year fund allowance system document. Obligations from current year collections/receipts are limited to the lesser of current year obligation authority issued on fund allowance system document.

Installations have access to all un-obligated balances from previous years since once past year funds have been apportioned, they do not need to be apportioned again. Permission to spend un-obligated prior year balances (21X5095) is not required; however, the Installation Management Agency may require associated work plans as part of its oversight function. Also, Installation Commanders must ensure that obligations do not exceed available funds as indicated by monthly Defense Finance and Accounting Service reports or the amount authorized in their Funding Allowance Document, whichever is the lesser amount.

If the actual current year collections exceed the amount on an installation's funding allowance document and the installation wants to obligate them in the current fiscal year, then a revised apportionment is required. Installations must request revisions to their apportionment through Installation Management Agency. Installation Management Agency may redistribute the apportionment or request an increase to their apportionment through the Office of the Director of Environmental Programs. If a revised apportionment is not requested and approved, any current year collections that exceed the current year apportionment at an installation may not be obligated until the following fiscal when they are apportioned as un-obligated funds brought forward. Fish and wildlife conservation is a natural resources program executed at Army installations and is managed by the installations' natural resource managers.

Installations must identify projects and plan yearly expenditures well in advance of execution to ensure maximum effectiveness of the program. The Installation Management Agency will conduct appropriate reviews of program expenditures. Installations may accumulate un-obligated balances for larger projects. However, the Installation Management Agency should encourage an installation that continues to compound an excessive un-obligated balance to spend the funds for their intended purpose if the purpose for the accumulation of funds is not apparent from the installation's management plan.

Commanders are responsible for authorizing expenditures of 21X5095 funds only as permitted under the Sikes Act Improvement Act and this guide. A separate community recreation hunting and fishing activity fee, not accounted for as Sikes Act hunting and fishing permit fees (16 USC 670a), may be charged to users of optional hunting and fishing services. These fees should be used for items not authorized in the paragraph above (for example, prizes for fishing rodeos, use of blinds or fishing piers only when they are not a requirement to hunt or fish on the installation, rental of hunting and/or fishing equipment, and so on).

Table A2-6. Fish and Wildlife Conservation Account Funding Requirements 2007-2011.

Section / Project	2007	2008	2009	2010	2011
Fish and Wildlife Habitat Improvement	$25,000	$25,000	$25,000	$25,000	$25,000

TOTAL	$25,000	$25,000	$25,000	$25,000	$25,000

A2.7.1.3 Facilities Program Funding

Army facilities are funded with two types of funding: Base Operating Support and Sustainment, and Restoration, and Modernization. It is the Army's plan during 2007-2011 to fund both of these accounts at 90% of the validated requirement.

A2.7.1.3.1 Sustainment, Restoration, and Modernization

The purpose of sustainment funding is to enable the Army mission by funding the sustainment of range and other facilities in good working order to meet long-term doctrinal training requirements. Types of sustainment projects include:

- Sustainment of paved and unpaved roads, including roads in the range complex.
- Sustainment of all installation training areas and ranges to prevent excessive soil erosion/sedimentation.
- Sustainment of all real property assets supporting the range operations. Sanitary sewer and grey water generation and disposal are included in the real property inventory (e.g., wash racks, permanent structures, field showers, potable/non-potable water, etc). Includes facility/infrastructure upgrades and/or replacements to comply with new or more stringent legal environmental requirements or to bring a system back into compliance with environmental regulations.
- Berm maintenance to maintain consistency with original design specification. Although the sustainment requirement does not currently include lead removal, the funding for sustainment can be used for lead removal.
- Maintenance of hazardous waste storage facilities excluding permit required specialized hazardous waste handling equipment within the facility. Includes facility/infrastructure upgrades and/or replacement to comply with new or more stringent legal environmental requirements or to bring a system back into compliance with environmental regulations.
- Sustainment of facilities for the enclosure of land parcels for both security and decorative purposes and facilities providing protection and over-watch of land parcels (e.g., entry gates and secured areas). Includes facility/infrastructure upgrades and/or replacements to comply with new or more stringent legal environmental requirements or to bring a system back into compliance with environmental regulations.
- Resource Conservation and Recovery Act – Subtitle D Solid Waste Reduction, Diversion, and Operations: Sustainment of all real property supporting collection and disposal of solid waste. Includes facility or infrastructure upgrades, replacements, or maintenance to comply with new or more stringent legal environmental requirements or to bring a system back into compliance with environmental regulations.

The purpose of restoration funding is to restore failed or failing facilities, systems, and components damaged by a lack of sustainment, excessive age, fire, storm, flood, freeze, or other natural occurrences, and to improve facilities to current standards. Modernization funding adapts facilities to meet new standards and includes the erection, installation, or assembly of a new real property facility, the addition, expansion, extension, alteration, conversion, or complete replacement of an existing real property facility. Types of restoration and maintenance projects are:

- Restoration of paved and unpaved roads, including roads in the range complex.

- Restoration of all installation training areas and ranges to prevent excessive soil erosion/sedimentation.
- Restoration and modernization of all real property supporting the range operations, sanitary and grey water generation and disposal while complying with existing environmental regulations.
- Restoration and modernization of all real property supporting hazardous waste storage while complying with existing environmental regulations.
- Restoration and modernization of all real property supporting access controls while complying with existing environmental regulations.
- Restoration and modernization of all real property supporting collection and disposal of solid waste while complying with existing environmental regulations.

2.7.1.3.2 Real Property Services

Real Property Services funding provides for those activities of an installation support nature. It includes those support elements and services identified as indirect overhead by Headquarters, Department of Army and grounds maintenance activities. This includes abatement and disposal of building hazardous waste resulting from the performance of real property services. Types of real property services projects are:

- Management of ponds, lakes, streams, swamps and estuaries and ranges and maneuver areas. Planting vegetation and utilization of structural measures and non-vegetative surface treatments to correct dust, natural erosion (excluding erosion caused by maneuver training damage), and surface water on ranges and maneuver ranges (excludes impact areas).
- Provides Real Property Services supporting ongoing range operations (e.g., servicing vault latrines). Range mission funding reimburses the Real Property Services account for Real Property Services support (e.g., vault latrines) for special events or temporary ranges.
- Protection and development of ponds, lakes, streams, swamps, and estuaries for training and ranges. Planting vegetation and utilization of structural measures and non-vegetative surface treatment to control dust, erosion, and surface water on maneuver areas and ranges. Does not include initial cost of constructing wetland mitigation site. Includes management of wetlands used for the treatment of storm water or waste water.
- Develop and implement open space and building/facility pest management strategies. Includes personnel to conduct pest surveillance, identification, breeding site removal, pesticide applications and other required actions. Also includes mowing, prescribed burning, and application of herbicides to control weeds (to include invasive species and noxious weeds) brush, vegetative fire hazards and poisonous plants on training areas and ranges.
- Administration of agriculture and grazing leases and management expenses for forest areas, except for responsibilities under Conservation.
- Funds for protection and development of land, water, and renewable natural resources, fish and wildlife habitats, training areas and ranges, administration of agriculture and grazing leases and management expenses for forest areas, except for responsibilities under Conservation.
- Mowing, prescribed burning and application of herbicides to control weeds, brush, vegetative fire hazards and poisonous plants on small arms ranges, maneuver areas, and artillery ranges. Wildland fire prevention, response, and control of fires when necessary to protect people, property, equipment or mission capability of all facilities on Army installations. Includes maintenance of established fire breaks.
- Collect and dispose of solid waste by all methods, including contracts. Provide for recycling collection and transportation, operation, and maintenance of Army owned recovery/recycling centers; drop off points and associated equipment. Includes all costs associated with source separation of recyclable materials for the purposes of sale for recycling, and sale of salvage by Defense Reutilization and Marketing Office. Provide design, construction, management, operation, inspection, and closure (to include preparation of closure plans) of Army operated

landfills and associated facilities for municipal solid waste, construction/demolition debris and other Resources Conservation and Recovery Act Part D permitted waste. Ensure sanitary condition of facilities, equipment and containers. Does not include activities associated with Resources Conservation and Recovery Act Part C hazardous waste.

A2.7.1.4 Sustainable Range Program Funding

There are three types of range program funding that affect the management of natural resources: range operations, range modernization, and integrated training area management funding. Range operations funding provides for the operation and management of training ranges, range modernization funding upgrades range facilities, and integrated training area management funding rehabilitates and manages training areas.

A2.7.1.4.1 Integrated Training Area Management

Integrated training area management funding enables the Army mission by funding the management and maintenance of training lands to sustain and enhance the capability to meet long-term doctrinal requirements. Types of integrated training area management projects include:

- Conducting erosion impact surveys necessary to make training requirements integration decisions or to assess cause/effect relationships relevant to training activities.
- Designing and implementing land rehabilitation and maintenance projects and conducting monitoring under range and training land assessment within the range complex.
- Constructing or maintaining maneuver area trails (for tactical vehicles), hardened water crossings (for tactical vehicles), and erosion control structures needed to repair damage caused by maneuver training or increase capability.
- Vegetative and non-vegetative surface treatments. Does not pay for roads or naturally caused erosion with the training areas.
- Costs of placing markers (e.g., Seibert stakes) to designate off-limits site for threatened and endangered species and habitats in maneuver areas.
- Removal of vegetation that inhibits maneuver training activities. Creating maneuver corridors in high vegetation areas. Clearing other natural or manmade material to open land to maneuver and training.
- Costs of placing markers (e.g., Seibert stakes) or other mechanisms to designate off-limits cultural site areas in maneuver areas.

Table A2-7. Integrated Training Area Management Funding Requirements during 2007-2011.

Section / Project	2007	2008	2009	2010	2011
Land Rehabilitation and Maintenance	$2,450,000	$2,270,000	$2,215,000	$3,102,000	$4,369,000
Sustainable Range Awareness	$40,000	$40,000	$40,000	$40,000	$40,000
Training Requirements Integration	$445,000	$445,000	$445,000	$455,000	$455,000
Range and Training Land Assessment	$240,000	$240,000	$255,000	$330,000	$330,000
Geographic Information System	$145,000	$145,000	$160,000	$75,000	$75,000
TOTAL	**$3,320,000**	**$3,140,000**	**$3,105,000**	**$4,002,000**	**$5,269,000**

A2.7.1.4.2 Range Operations

Range operations funding enables the Army mission by funding the operation of ranges and training lands to sustain long-term doctrinal training requirement. Range operations funding also provides for record keeping of the number and type of munitions fired, communication and coordination with local public on noise issues, and the design and installation of signage for access controls to ensure safety and security of range facilities.

A2.7.1.4.3 Range Modernization

Range modernization funding enables the Army mission by funding the design and construction of ranges and the acquisition of training lands that are capable of sustaining long-term doctrinal training requirements. Many environmental factors are considered through standard operating procedures and implemented during construction. Erosion control analysis is part of design standard operating procedures for all military construction projects. Local hydrological criteria stipulate allowable surface flow discharge volume. The completed military construction project will include design and installation of materials or structures (retention, detention, crossings) that will minimize erosion. Examples of erosion control structures include storm water controls, landscape design, initial plantings, bullet pockets, target coffins, and catch basins. Current standard operating procedures for range design employ wetlands "design avoidance" to minimize wetlands disturbance. This is accomplished during design by coordination with environmental representatives. Threatened and endangered species and habitat disturbance is considered during design as a matter of U.S. Army Corps of Engineers policy. Threatened and endangered species and habitat disturbance mitigation requirements are derived from National Environmental Policy Act consultation and agreements. Sustainable design features are integrated into all U.S. Army Corps of Engineers-reviewed range military construction projects as required by U.S. Army Corps of Engineers standard operating procedures. Specific to wildfires, design and construction may include initial establishment of firebreaks or other features associated with ranges to mitigate potential range fires. Design and installation of signage for access controls to ensure safety and security of range facilities constructed under range modernization program. Protect, preserve, and mitigate damage to previously unknown archaeological objects or findings discovered during construction up to 1% of the military construction project amount (Public Law 93-291). A secondary consideration for this 1% is to compensate the construction contractor for contractual impacts and delays resulting from the discovery of previously unknown archaeological objects or findings during construction.

A2.7.1.5 Other Funding

The Legacy Program remains an additional source of funding. However, funding for the Legacy Program has been greatly reduced over past levels. The only types of Legacy projects available for funding are large projects, regional in scope, involving many other agencies as partners. While USAG-AK will continue to seek Legacy funding, it is not expected to be a viable source for implementing this Integrated Natural Resources Management Plan. The law authorizing the program is still in effect and this allows Department of Defense to enter into cooperative agreements to conduct projects that "implement the purposes of the Legacy Resources Management Program" (see Public Law 101-511 [Fiscal Year 1991 Appropriations Act, Section 8120]), whether or not separately earmarked Legacy money is available. USAG-AK intends to use such cooperative agreements during 2002-2006.

A2.7.2 Budgeting

The environmental program works together with the Directorate of Resource Management to manage the environmental budget. USAG-AK uses work plans to communicate funding requirements to higher headquarters and to help manage the annual budget. USAG-AK uses both an environmental work plan (natural resources is included in this) and an integrated training area management work plan. There are

also reimbursable program work plans that USAG-AK must submit annually to Headquarters, Department of the Army.

The Conservation annual work plan was created to develop requirements, plan spending, and track funding, obligations, and execution for natural resource projects and tasks. Each project contains the following information: project name, priority, Project number and name, description, funding required, funding allocated, funding obligated, year funded, agency (in-house or contractor), National Environmental Policy Act requirements, National Historic Preservation Act Section 106 requirements, other permit requirements, primary USAG-AK point of contact, project status, and comments. The Conservation annual work plan is included as part of the environmental program work plan.

Reimbursable programs funding requirements are entered and tracked through the forestry, fish and wildlife, and agriculture oulease work plans in the Reimbursable Program Tracking System.

The Integrated Training Area Management program works with the G8 to manage the integrated training area management budget. The purpose of the integrated training area management work plan is to:

- Define individual project and work activities.
- Designate, prioritize, and identify a cost to execute those projects.
- Track project execution during a fiscal year.
- Describe multi-year integrated training area management programs and requirements at installations, Major Command Headquarters and supporting agencies.
- Report all integrated training area management resources requirements, based on the set of standard work categories.
- Capture program execution and adjustments over the course of a fiscal year.

The installation work plan is developed in the summer and submitted in August of each year to reflect Integrated Training Area Management program requirements in detail for the following six fiscal years. The work plan reflects all integrated training area management activities for the installation. Once projects are identified, they are prioritized from most to least important. Approval of these projects and priorities is obtained from the U.S. Army Alaska Range Management Division prior to completing the work plan. Once the projects are approved, they are entered into the Installation Work Plan Analysis Module database.

The integrated training area management work plan is created by the Integrated Training Area Management Coordinator, submitted by U.S. Army Alaska Directorate of Plans, Training and Mobilization, validated by U.S. Army Pacific and turned in to Headquarters Army G3 as the basis for integrated training area management funding.

Each project is described to convey the scope of work. Costs should include all labor, material, and equipment necessary to execute the work. Once the U.S. Army Alaska Directorate of Plans, Training and Mobilization approves the integrated training area management submission package, the entire package is submitted electronically to the U.S. Army Pacific Integrated Training Area Management program manager. The U.S. Army Pacific Integrated Training Area Management program manager, in conjunction with his environmental staff counterpart, will review and validate, by project, the installation work plans, using the U.S. Army Pacific version of the Work Plan Analysis Module. Once validated, the work plan becomes a U.S. Army Pacific-recognized integrated training area management resources requirement.

A2.7.3 Contracting

The contracting process includes two primary components, purchase/acquisition and contract management. Purchase and acquisition is necessary to get a contract in place, then contract management is necessary to ensure good communication between the government and contractor to enable good contract performance.

A2.7.3.1 Purchase and Acquisition

The first step in the contract process is purchase and acquisition. USAG-AK Environmental starts the process by clearly defining desired services in a statement of work, estimating costs, and initiating a purchase request. USAG-AK Environmental works together with a contracting agency to develop an acquisition strategy, using the Sikes Act priority to guide decision-making.

A2.7.3.1.1 Sikes Act Priority for Contracting

The Sikes Act Committee Report defined natural resources management and conservation as "inherently governmental." Planning, implementation, enforcement or management of Army natural resources cannot be contracted. The first priority for implementation of this plan will be to use the USAG-AK in-house workforce. USAG-AK in-house capabilities include permanent natural resources employees, other Public Works organizations (such as roads and grounds, carpentry shop, etc.) and troop projects. These methods are usually the least expensive, but also tend to be the least flexible. All funds obligated toward in-house work must be expended in the current fiscal year. Due to the reduction of federal in-house positions, the amount of work that can be accomplished in-house dwindles every year.

Support to the natural resources program, where it can be separated from management, planning, implementation or enforcement actions of natural resources, may be contracted. The Sikes Act outlines priorities for contracting these implementation projects. When entering into contracts for services that implement natural resource management objectives or enforce natural resources laws (that is, wildlife management and endangered species plans and surveys), priority will be given to contracts with federal, state, and local agencies with responsibility for natural resources conservation. In other words, if an installation cannot utilize governmental personnel to do natural resources conservation technical support, then other federal and state natural resources agencies have, by this law, a "right of first refusal" to accept this work. In these cases competitive bids are not required.

When in-house staff or cooperating federal and state agencies cannot perform work, USAG-AK looks to one of three contract mechanisms. The Government Services Administration environmental services schedule provides companies that have already gone through an open bid process to be on the Government Services Administration contract. Contracting to one of these companies is relatively simple and fast. The Job Order Contract in place in USAG-AK provides quick and efficient service. However, when none of these other options is available, USAG-AK can use the open bid process through a contracting agency.

A2.7.3.1.2 Purchase Request

The Economy Act allows federal agencies to obtain services directly from other federal agencies or utilize contracts already in place by other federal agencies. The Military Interdepartmental Purchase Request is used to acquire natural resource conservation services. Per the Sikes Act, the receiving agency has up to 18 months to utilize approved funding to provide services outlined in the Military Interdepartmental Purchase Request and statement of work or obligate funding against an existing contract agreement. If funding is obligated to an existing contract, the period of performance for services is dictated by the delivery date in the statement of work, which may not exceed five years.

Natural resources support services may also be obtained non-competitively through contracts with state and local agencies. In this case, a purchase request must be submitted through the Directorate of Resource

Management to a contracting agency. Conservation personnel work together with the contracting agency to develop an acquisition strategy, statement of work, and government estimate.

A2.7.3.1.3 Statement of Work

A statement of work must clearly and completely describe requirements and tasks necessary to communicate to the contractor the desired services. The statement of work should include, at a minimum, purpose, objectives, general requirements, specific requirements and tasks, deliverables, government provided items, delivery dates, and points of contact. If the service desired fits within the scope of natural resources as described in the Sikes Act, then the Sikes Act priority description should also be included.

A2.7.3.1.4 Government Estimate

The government estimate details estimated costs for each task and subtask. Traditionally this is accomplished by estimating labor, equipment, and supply costs. The cost estimate is the basis for the cost information in the purchase request.

A2.7.3.2 Contract Management

Once a contract is in place, USAG-AK Environmental must nominate a federal Contracting Officer's representative to help the Contract Officer manage the contract. The Contracting Officer authorizes the Contracting Officer's representative to take action with respect to the following:

- Verify that the contractor performs the technical requirements of the contract in accordance with the contract terms, conditions and specifications. Specific emphasis should be placed on the quality provisions, for both adherence to the contract provisions and to the contractor's own quality control program.
- Perform, or cause to be performed, inspections necessary to verify that the contractor has corrected all deficiencies. Perform acceptance for the government of services performed under this contract.
- Maintain liaison and direct communications with the contractor. Written communications with the contractor and other documents pertaining to the contract shall be signed, as "Contracting Officer's representative" and a copy shall be furnished to the Contracting Officer.
- Monitor the contractor's performance, notify the contractor of deficiencies observed during surveillance and direct appropriate action to effect correction. Record and report to the Contracting Officer incidents of faulty or non-conforming work delays or problems. In addition,
- Submit a monthly report concerning performance of services rendered under this contract.
- Coordinate site entry for contractor personnel, and insure that any government-furnished property is available when required.

The Contracting Officer's representative is not empowered to award, agree to or sign any contract (including delivery orders) or contract modification or in any way to obligate the payment of money by the government. The Contracting Officer's representative may not take any action that may affect contract or delivery order schedules, funds or scope. All contractual agreements, commitments, or modifications, which involve price, quantity, quality, delivery schedules, or other terms and conditions of the contract, must be made by the Contracting Officer. The Contracting Officer's representative may be personally liable for unauthorized acts. The Contracting Officer's representative may not re-delegate Contracting Officer's representative authority.

The Contracting Officer's representative is required to maintain adequate records to sufficiently describe the performance of Contracting Officer's representative duties as a Contracting Officer's representative

during the life of the contract and to dispose of such records as directed by the Contracting Officer. As a minimum, the Contracting Officer's representative file shall contain the following:

- A copy of the letter of appointment from the Contracting Officer, and/or a copy of any changes to that letter and a copy of any termination letter.
- A copy of the contract or the appropriate part of the contract and all contract modifications.
- A copy of the applicable quality assurance surveillance plan.
- All correspondence initiated by authorized representative concerning performance of the contract.
- The names and position titles of individuals who serve on the contract administration team. The Contracting Officer must approve all those who serve on this team.
- A record of inspections performed and the results.
- Memoranda for record or minutes of any pre-performance conferences.
- Memoranda for record of minutes of any meetings and discussions with the contractor or others pertaining to the contract or contract performance.
- Applicable laboratory test reports.
- Records relating to the contractor's quality control system and plan and the results of the quality control effort.
- A copy of the surveillance schedule.
- Documentation pertaining to acceptance of performance of services, including reports and other data.

All personnel engaged in contracting and related activities shall conduct business dealings with industry in a manner above reproach in every aspect and shall protect the U.S. government's interest, as well as maintain its reputation for fair and equal dealings with all contractors. Department of Defense 5500.7-R sets forth standards of conduct for all personnel directly and indirectly involved in contracting.

A2.8 Regulatory Requirements

There are many regulatory requirements that impact the implementation of natural resource management on military lands. The Sikes Act requires the military to manage natural resources on military lands (including withdrawn lands) by preparing and implementing an Integrated Natural Resources Management Plan (INRMP); the Migratory Bird Treaty Act mandates protection for migratory birds and requires permits for intentional take; the Endangered Species Act protects federally listed threatened and endangered species; the Clean Water Act protects wetlands and water quality and requires permits for fill in wetlands; the Coastal Zone Management Act protects coastal zones; and the National Environmental Policy Act requires documentation and analysis of federal decisions that may affect natural resources.

A2.8.1 Sikes Act

The Sikes Act (16 USC 670a(a)(3), as amended through 2003 by PL 108-136), states:

Consistent with the use of military installations to ensure the preparedness of the Armed Forces, the Secretaries of the military departments shall carry out the program required by this subsection to provide for the conservation and rehabilitation of natural resources on military installations; the sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping, and non-consumptive uses; and subject to safety requirements and military security, public access to military installations to facilitate the use.

To facilitate the program, the law requires that INRMPs be prepared and implemented for each military installation, including withdrawn public lands. Each plan must be consistent with the use of military lands to ensure military preparedness and cannot result in any net loss in the capability of the installation to support the military mission. In accordance with Section 670a(b) of the Sikes Act Improvement Act, to the extent appropriate and applicable, an INRMP should provide for the following:

- Fish and wildlife management, land management, forest management, and fish and wildlife-oriented recreation.
- Fish and wildlife habitat enhancement or modifications.
- Wetland protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants.
- Integration of and consistency among the various activities conducted under the plan.
- Establishment of specific natural resource management goals and objectives and time frames for proposed actions.
- Sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources.
- Public access to the military installation that is necessary or appropriate for the use described above, subject to requirements necessary to ensure safety and military security.
- Enforcement of applicable natural resource laws (including regulations).
- No net loss in the capability of military installation lands to support the military mission of the installation.
- Such other activities as the secretary of the military department determines appropriate.

An INRMP guides the natural resources management programs at each installation. Implementation of the INRMP management measures will enable USAG-AK to maintain, protect, and enhance the ecological integrity of the training lands and the biological communities inhabiting them. USAG-AK prepares its INRMP in cooperation with the Bureau of Land Management, U.S. Fish and Wildlife Service, and with the Alaska Department of Fish and Game. This continuous interagency participation results in a document that reflects the mutual agreement of Department of Defense, Department of the Interior, and the state of Alaska concerning conservation, protection, and management of natural resources on Fort Greely and Donnelly Training Area. USAG-AK also provides an opportunity for the public to review and comment on the INRMP.

A2.8.2 Migratory Bird Treaty Act

- Policy to prohibit the taking, possession, and trade of migratory birds, except as permitted by regulations.
- Penalties are enforced under 16 USC 707.
- The National Defense Authorization Act of FY 03 (Public Law 107-314, 116 Stat.2458, Dec 2, 2002, 16 USC 703 note) Section 315, amended the Migratory Bird Treaty Act to allow authorization of "take/taking" incidental to military readiness activities if the military complies with certain conditions related to the management of effects on migratory birds. The "Authorization Act" further requires the Secretary of the Interior to promulgate such regulations with the concurrence of the Secretary of Defense.

A2.8.3 Endangered Species Act of 1973 (PL 93-205; 16 USC 1531-1543)

- Policy to protect any species (fish, wildlife, or plants) listed on the endangered species and the threatened species list from hunting, taking for importation, or exportation to or from the United States. Establishes the endangered and threatened species list.

- Penalties - Criminal: Fines up to $25,000 and/or one year imprisonment. Civil: Fines up to $10,000 for violation of this act. Forfeiture of any fish, wildlife, plants taken and equipment and vehicles used in violation of this act.

A2.8.4 Clean Water Act of 1977 (33 USC 1251-1387)

- This act stipulates effluent standards for the discharge of pollutants into navigable waters of the U.S. Promotes research at the federal and state levels concerning issues of water pollution.
- Penalties - Criminal: Negligent violations, fines up to $25,000 per day of violation and/or up to one year imprisonment. Doubled for repeat offenders. Knowledgeable violations, fines up to $50,000 per day of violation and/or up to three years imprisonment. Doubled for repeat offenders. Knowledgeable endangerment, fines up to $230,000 and/or up to 15-year imprisonment. If violator is an organization, fines up to $1,000.000. Doubled for repeat offenders. Civil: Accidental violation, fines up to $50,000. Willful violation, fines up to $250,000. Owners or operators of vessels or facilities may be liable for clean-up costs up to the amount of $30,000,000. Citizen Suits: Any citizen may bring suit against any person, the U.S. government, or governmental agency for violations of this act.

A2.8.5 Coastal Zone Management Act (PL 92-583; 16 USC 1451 et seq.)

- Policy to preserve, protect, develop, restore, and enhance the nation's coastal zones. Provides funding opportunities to accomplish this goal. Establishes the Walter B. Jones excellence in coastal zone management awards. Also established the National Estuarine Research System.
- No penalties are directly associated with this act.

A2.8.6 National Environmental Policy Act of 1969 (as amended, PL 91-190; 42 USC 4321-4347)

- Policy to require federal agencies to consider the environmental impact of actions taken. Mandates a decision-making process to achieve the goal. This act is a procedural and declarative act. For any federal action that is not a Categorical Exclusion, an environmental assessment must be made in order to determine if a full environmental impact statement must be prepared. The environmental impact statement must follow specific guidelines outlined in 50 CFR 1500-1508. The act does not require the federal agency to choose the least environmentally destructive alternative; only that the agency considers the environmental impact and alternatives to the action.
- No penalties are directly associated with this act.

A2.8.6.1 U.S. Army Alaska Transformation Environmental Impact Statement and Record of Decision

In October 1999, the Secretary of the Army and the Chief of Staff of the Army articulated a vision about people, readiness, and transformation of the Army to meet the demands of the 21st century. According to this "Army Vision," the transformed Army would need to be substantially more responsive, deployable, agile, versatile, lethal, survivable, and sustainable than the current Army force structure. In December 2000, the Army proposed to undertake a synchronized program of transformation to occur in three phases over a 30-year period, as stated in the Army Transformation Campaign Plan, the Programmatic Environmental Impact Statement for Army Transformation and the Record of Decision. Transformation would affect most aspects of the Army's doctrine, training, leader development, organizations,

installations, materiel, and Soldiers. U.S. Army Alaska, which includes Forts Richardson and Wainwright and the Donnelly Training Area (formerly Fort Greely), was selected to transform into a Stryker Brigade Combat Team as part of the overall Army transformation process.

In the Record of Decision for the Transformation Environmental Impact Statement, the Army agreed to a number of natural resource mitigation projects aimed at sustaining the military mission in Alaska and providing for stewardship of the environment. Since transformation was more of a programmatic change, the mitigation agreed upon in the Record of Decision was also more programmatic than project specific. Transformation mitigation is listed below in Table A2-8.

Table A2-8. Natural Resource Mitigation Requirements from the Transformation Environmental Impact Statement Record of Decision.

Project	Description	Status
Implement Environmental Management System	An environmental management system is a system used to incorporate good environmental practices in all business practices.	An environmental management system has been implemented for USAG-AK
Continue to Implement Integrated Natural Resource Management Plan	Fully implement the Integrated Natural Resources Management Plan.	The 2002-2006 Integrated Natural Resources Management Plan was completed in 2002 and is revised with this five year update.
Implement Ecosystem Management	Use the ecosystem management process (see Volume III, Supplements) to manage natural resources.	Ecosystem management process used in natural resources decision-making starting in 2004 and continues with implementation of this Integrated Natural Resources Management Plan.
Watershed Monitoring and Management, Erosion Control and Streambank Stabilization	Improve water quality, protect wetlands and reduce erosion through a watershed approach to land management.	Watershed monitoring and management, erosion control and streambank stabilization all component of this Integrated Natural Resources Management Plan (see Volume II, Annex B) continues with implementation of this Integrated Natural Resources Management Plan.
Public Awareness, Education and Outreach	Public outreach essential to the effective management of natural resources.	Public outreach continues with implementation of this Integrated Natural Resources Management Plan.
Implement Wildfire Fuel Reduction	Reduce the potential for wildfire escaping USAG-AK lands by reducing fuel loading.	Wildfire fuel reduction continues with implementation of this Integrated Natural Resources Management Plan.
Implement Conservation Enforcement	Conduct natural resources enforcement on USAG-AK lands.	Proponency for implementation of conservation enforcement has moved to the Provost Marshal's Office.
Continue to Implement Sustainable Range Program	The sustainable range program manages training ranges, training lands, and range upgrades to support the military mission.	The sustainable range program continues with implementation of the Range Development Plan.
Implement Sustainable Range Practices	Implement best management practices for sustainable range program that reduces impacts on the environment.	Sustainable Range program still implementing best management practices.
Continue to Implement Integrated Training Area Management Program	The Integrated Training Area Management program repairs maneuver damage, monitors range conditions, educates soldiers to reduce unnecessary damage and schedules smarter.	Integrated training area management continues with implementation of this Integrated Natural Resources Management Plan and with the Integrated Training Area Management Plan.

Implement Training Area Recovery Program	The Training Area Recovery Program focuses land rehabilitation and maintenance repair efforts on training areas in a rotation basis.	Partial implementation of the Training Area Recovery Program continues with the implementation of the Integrated Training Area Management Plan.

A2.8.6.2 Battle Area Complex / Combined Arms Collective Training Facility Environmental Impact Statement and Record of Decision

The Battle Area Complex and Combined Arms Collective Training Facility Environmental Impact Statement was completed in 2006. This environmental impact statement analysis and resulting Record of Decision will likely require natural resources mitigation. These mitigations will be included in this section when those documents are complete.

A2.8.7 Military Land Withdrawal Act (PL 106-65) and Legislative Environmental Impact Statement

The public lands and interests in lands withdrawn and reserved by Public Law 106-65 include the Fort Greely East and West Training Areas and the Fort Wainwright Yukon Training Area. This area is comprised of approximately 869,862 acres of land in the Fairbanks North Star Borough and the Unorganized Borough, Alaska, in accordance with Section 3012.

The Military Land Withdrawal Act (Public Law 106-65) requires that the Army conduct significant natural resources mitigation on Donnelly Training Area (formerly known as Fort Greely East and West Training Areas) and Fort Wainwright's Yukon Training Area. Since this was a Legislative Environmental Impact Statement, the Public Law 106-65 was enacted in the place of a Record of Decision. This law effectively requires the Army to complete all the existing and proposed mitigation written in the environmental impact statement. Natural resources mitigation required by this Legislative Environmental Impact Statement is included in this INRMP and is classified as high priority. A list of some of the natural resources mitigation required by the Legislative Environmental Impact Statement is shown below in Table A2-9.

Table A2-9. Legislative Environmental Impact Statement Natural Resource Mitigation Requirements.

Project	Description	Status
1. Implement U.S. Army Alaska Range Regulation 350-2	This regulation outlines the procedures for planning, scheduling, and operating ranges and training areas, and identifies environmental requirements. Methods are presented to reduce training impacts to natural resources.	This regulation has been in place and is used to reduce training impacts continually since 1999.
2. Implement the Integrated Training Area Management Program Annually	This program guides and regulates the actions of Army personnel using and managing training lands. The goals of integrated training area management are to inventory and monitor, repair, maintain, and enhance training lands.	Integrated training area management has been implemented annually since 1999.
3. Conduct Range and Training Land Analysis Monitoring Annually	This program inventories land conditions and monitors vegetation trends on training lands. Collected data provide installation-wide summaries of land use, disturbance, plant cover, vegetation communities, tactical concealment, birds, and small mammals.	Range and training land assessment has been conducted annually since 1999.
4. Conduct Land	This program repairs damaged areas and	Land rehabilitation and maintenance has been

Project	Description	Status
Rehabilitation and Maintenance Annually	uses land construction technology, such as revegetation and erosion control, to minimize future damage to training lands.	conducted annually since 1999.
5. Army Integrated Natural Resource Management Plan	This Army plan guides installation-wide land management issues and is reviewed and updated every five years. Recreational use and associated impacts are also investigated through these plans.	The Integrated Natural Resources Management Plan for these withdrawn lands has been in place and updated since 1999.
6. Bureau of Land Management Resource Management Plans	These Bureau of Land Management resource management plans guide land use decisions on withdrawn lands.	Resource management plans for withdrawn lands were completed in 2004.
7. Conduct Soil Surveys	Surveys include the description, classification, and an inventory of soil properties.	The Natural Resource Conservation Service completed soil surveys of withdrawn lands in 2005.
8. Implement USAG-AK Regulation 200-4 and Spill Prevention Control and Countermeasure Plans	These documents outline procedures relating to the management of hazardous wastes and the prevention of spills near surface and/or groundwater sources.	These plans were completed and have been in place since 1999.
9. Conduct Wetland Planning-Level Surveys and Develop Management Plan	Wetland planning level surveys document the wetlands resources on Fort Wainwright and Fort Greely. Compliance with Section 404 of the Clean Water Act is also required when the Army conducts activities in wetlands.	Wetland planning-level surveys have been completed for the PL106-65 withdrawal lands. In addition, a wetlands management plan is incorporated into this Integrated Natural Resources Management Plan.
10. Ecological Land Classification	This survey will allow USAG-AK to manage lands on an ecosystem level.	Ecological Land Classification surveys have been completed for PL106-65 lands.
11. Forest Management Plan	This is a plan for inventory and management of forest resources.	These plans for both Fort Wainwright and Fort Greely are being prepared as part of the Integrated Natural Resources Management Plan.
12. Habitat Management Plan	These plans for both Fort Wainwright and Fort identify sensitive habitats and implement management to protect these areas.	Habitat management plans are included as part of this Integrated Natural Resources Management Plan.
13. Ruffed Grouse Habitat Improvement Project	Conduct ruffed grouse habitat enhancement projects in Yukon Training Area, Fort Wainwright.	Projects were completed in 2000.
14. Raptor, Neotropical Birds, and Small Mammal Habitat Survey	Conduct avian and small mammal surveys on Fort Wainwright and Donnelly Training Area.	Neotropical bird monitoring is conducted annually on Fort Wainwright and Donnelly Training Area. Small mammal surveys were completed in 2003 on Donnelly Training Area. Small mammal surveys have not been completed for Fort Wainwright.
15. Breeding Bird Survey	Use established breeding bird survey routes on Fort Wainwright and Donnelly Training Area.	Breeding bird surveys have been conducted annually on Fort Wainwright and Donnelly Training Area.
16. Bird Air Strike Hazard (BASH) Program	Conduct Bird Airstrike Hazard program on Fort Wainwright's Ladd Field.	BASH is conducted annually on Ladd Field by Airfield Operations.
17. Ice Bridge Permits	These permits, issued with the concurrence of the Alaska Department of Natural Resources Office of Habitat Management and Permitting, outline various measures to protect wild fisheries during the winter months in areas where ice bridges are to be constructed.	Permits have been obtained annually since 1999.

Project	Description	Status
18. Threatened and Endangered Species Surveys	Surveys are not planned that address threatened and endangered species on the withdrawal lands directly.	Surveys for these species have been incorporated into other surveys. No threatened or endangered species have been identified on Fort Wainwright or Donnelly Training Area.
19. Fire Management Plans and Prescribed Burn Plans	The Integrated Natural Resources Management Plan serves as the fire management plan. The prescribed burn plans are developed for each prescribed burn.	These prescribed burn plans have been written in cooperation with the Bureau of Land Management, Alaska Fire Service and assess current fire hazards and list recommendations to reduce them.
20. Range Bulletins and the Special Use Airspace Information Service	These programs provide information on area and airspace closures to the public during times of military activity.	These closures have been provided since 1999.
21. Notice of Firing	Firing activities are limited to 0600 to 2200 hours. The Public Affairs Office notifies the public of exceptions to this schedule.	These notices have been provided since 1999.
22. Identify Munitions Residues in Soils, Permafrost, Surface Water, and Groundwater	USAG-AK and the Cold Regions Research Engineering Laboratory have teamed to conduct a preliminary investigation of munitions residues of the withdrawal lands. The suggested program will involve a review of existing records, a reconnaissance sampling agenda at one impact area, and the preparation of a detailed protocol and sampling plan for a follow-up comprehensive sampling and analysis program at both Fort Wainwright and Fort Greely. A multi-phase approach will allow for a sampling program to be developed that is tailored to specific site conditions and is phased in as time and resources allow.	Data collection and has been conducted annually since 2000. Preliminary results from this study indicate that the small amounts of explosive residues occurring in the Washington Range Impact Area are not migrating outside of the impact area. Low order detonations were the primary cause of munitions residues detected in the impact areas and high order (complete) detonations of high explosive munitions resulted in almost no explosive residue. Low soil pH and climate were significant factors limiting explosive residue movement away from low order detonation sites. No explosive residues were reported in the surface or ground water and were not being taken up into plants.
23. Develop a Surface Water Quality Sampling Program	Implementation of a surface water quality sampling program is dependent upon the findings of the above mentioned munitions contamination study. Extent and duration of a water quality monitoring program at Fort Wainwright and Fort Greely will not be determined until results are analyzed by the initial study.	Sampling protocols are being developed based in the studies listed above. A continued expansion of the Donnelly Training Area sampling protocols will be undertaken in 2006 to characterize explosive residues on Fort Wainwright within Stuart Creek Impact Area. Finally, based on the detailed surface sampling and analysis program, an assessment of the potential for surface and groundwater contamination will be made and long-term monitoring protocol developed for all training lands within U.S. Army Alaska on Donnelly Training Area, Fort Richardson, and Fort Wainwright.
24. Analyze Existing Groundwater Data to Determine if Future Monitoring Efforts are Necessary	Analysis of existing groundwater data is dependent upon the findings of the above mentioned munitions contamination study.	The U.S. Army Cold Regions Research and Engineering Laboratory has developed and is implementing a surface and groundwater and soil munitions residue monitoring program on the PL106-65 withdrawn lands.
25. Annual Report to Congress	Annual requirement to report to Congress the efforts and amount of expended munitions and the resulting munitions residues from PL106-65 lands.	Impact areas within the Fort Wainwright Yukon Training Area and the Donnelly West Training Area are cleared each year during the summer months by the 354th Explosive Ordnance Disposal Unit located at Eielson Air Force Base, Alaska. U.S. Army Alaska Range Control personnel annually clear military debris in the training areas within the Fort Wainwright Yukon Training Area and the

Project	Description	Status
		Donnelly Training Area East and West Training Areas.
26. Conduct Forest Resources Inventory	Annual requirement to conduct forest resources inventories. It is estimated that 10% of forested lands on each installation will be conducted each year.	USAG-AK began conducting forest resource inventories on Fort Wainwright beginning the summer of 1999 and Donnelly Training Area in 2003. These surveys are not yet complete.
27. Identify Habitat Areas for Neotropical Migrants and Implement Breeding Bird Surveys on Ft. Greely	USAG-AK will coordinate with the U.S. Fish and Wildlife Service to determine Breeding Bird Survey routes at Fort Greely. Monitoring protocol will be developed and assigned as a part of regular duties by current Fort Greely natural resources staff.	The determination of neotropical migrant habitat is currently in the project development stage. A scope of work is being developed to address this issue.
28. Create Stocked Fish Habitat Improvement Plan and Determine Recreational Impacts to Vegetation and Shoreline of Stocked Lakes	Impacts to natural resources, including stocked fish habitat, and subsequent restoration will be addressed.	A Recreational Use Survey is currently being conducted at Fort Wainwright and Fort Greely to determine the type, amount and location of military land used by the public for recreational purposes. USAG-AK intends to use this survey to determine which topics should be addressed in the proposed recreation plan.
29. Conduct Fish Habitat Survey	USAG-AK will coordinate with the Alaska Department of Fish and Game on the development of fish census protocol for Fort Wainwright and Fort Greely to address these areas.	A proposal to conduct fish habitat surveys is currently being developed to include anadromous and non-anadromous rivers and streams whose headwaters originate within or flow through designated Army impact areas.
30. Develop a Public Awareness Program Concerning Public Access	Complete and distribute to the public awareness packet.	A Recreational Use Survey was distributed to the general public during the 2002 update of this Integrated Natural Resources Management Plan. The survey was used to collect initial recreational background data. This information will be used to develop a public awareness packet specifically tailored to local recreational interests on military lands. Public access information will be made available to the public within the next three years.
31. Conduct Study of Noise Impacts to Key Animal Species	Review of existing scientific literature and coordination with the Alaska Department of Fish and Game will assist in the development of management strategies addressing any noise/wildlife conflicts.	Habitat management plans for Fort Wainwright and Donnelly Training Area are included in this update of the Integrated Natural Resources Management Plan. These plans will address such issues as sensitive wildlife habitat and management of wildlife and military interactions, among others. To date, there has been no funding to study noise impacts to key animal species.

A2.9 Command Support

Command support is essential to implementation of this INRMP. Without this support, priority projects for natural resources management will not occur. Failure to execute these projects risks violation of environmental laws, reduced mission readiness, and negative public reaction to a lack of environmental stewardship. The Garrison Commander is responsible for compliance with environmental laws and sets the tone for environmental stewardship. Command emphasis on this INRMP ensures a healthy environment, sustainable resources, and quality future training lands.

A3. Proposed Management

A3.1 Policy

A3.1.1 Fish and Wildlife Cooperative Plan

The Fish and Wildlife Cooperative Plan summarizes specific items of cooperation and agreement between Sikes Act required signatory partners: USAG-AK, the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game. The Fish and Wildlife Cooperative Plan has been revised to clarify fish and wildlife protection (including protections for the endangered CI beluga whale), nuisance control, and off-road vehicle procedures.

A3.1.2 Natural and Cultural Resources Management Memorandum of Agreement

Included in this INRMP is a revised Memorandum of Agreement between the Bureau of Land Management and USAG-AK clarifying natural and cultural resources and authority on withdrawn lands. Authority for vegetation management between the Bureau of Land Management and USAG-AK is not clear. Most of USAG-AK lands are withdrawn from public domain either indefinitely or on a renewable basis. In some cases, vegetation management authority is expressly written in the public law, land order or executive order, but in most cases, it is not. This Memorandum of Agreement (Volume II, Annex A, Appendix AA.3) will resolve any authority issues, improve the management of forest vegetation, and maximize funding returning to these withdrawn lands for forest management.

A3.2 Procedures

Table A3-1. New Natural Resources Program Management Standard Procedures

Category	Standard Practice	Standard Practice Description
Planning	Natural resources technical support	Provide natural resources technical support to include natural resource planning, providing technical recommendations, etc.
Planning	Management plan preparation, review, and update	Prepare, review, and update natural resource management plans, to include the Integrated Natural Resource Management Plan and the Ecosystem Management Plan.
Planning	Agreement preparation, review, and update	Prepare, review, and update natural resource memorandum of understanding, memorandum of agreements, and cooperative agreements.
Planning	Conservation report preparation, review, and update	Prepare, review, and update natural resources and conservation reports, such as Installation Status Report, Environmental Program Requirement Report, and EQR.
Planning	Work plan preparation, review, and update	Prepare natural resources and conservation work plans, obligation plans, and other project and budget forecasting and managing documents. Develop and recommend potential natural resource projects to be included in work plans.
Planning	Natural resource GIS planning	Utilize the Geographic Information System to conduct natural resources planning projects.
Planning	Natural Resource National Environmental Policy Act requirements	Prepare, coordinate, review, and update National Environmental Policy Act documents for natural resources projects, programs, policies, and management plans.
Planning	National Environmental Policy Act project oversight	Conduct oversight of National Environmental Policy Act documents and processes for USAG-AK projects.
Planning	National Environmental Policy Act project review	Conduct National Environmental Policy Act project review for USAG-AK projects.

Outreach	Conservation web site	Prepare, update, and maintain information to be included on the USAG-AK conservation web site.
Outreach	Environmental newsletter	Prepare, update and distribute environmental newsletter.
Outreach	Develop training/education materials	Prepare, update, coordinate, publish, and distribute natural resources training and education materials.
Outreach	Conduct presentations/briefings/training	Prepare, coordinate, and conduct natural resources presentations, briefings, and training.
Project Management	Plan natural resource projects	Conduct project planning by inventory and identification of potential sites, project development which is accomplished using the project development worksheet, and project prioritization.
Project Management	Design natural resource projects	Conduct project design by providing specific project designs. Project designs include site plans, cost estimates, scopes of work, and bill of materials required for each project.
Project Management	Coordinate natural resource activities	Conduct project coordination by coordinating forestry activities by providing project planning and oversight, technical assistance and design; and coordinating National Environmental Policy Act, wetland and cultural activities related to project oversight and management.
Project Management	Provide project oversight	Provide project oversight by monitoring project progress and execution. Report results back to federal project manager and the Contracting Officer's representative.
Geographic Information Systems	Spatial data acquisition and input	Collect spatial field data necessary for analysis and map production. Acquire spatial data from a variety of sources.
		Input spatial data into the Geographic Information System using a variety of methods, to include download, digitizing, and re-projecting data from outside sources to Alaska standards.
Geographic Information Systems	Spatial data management	Spatial data storage involves developing and maintaining data storage, procedures, and standards necessary to protect Geographic Information System data. Spatial data maintenance includes all the actions necessary to update and maintain data and metadata per Army standards.
Geographic Information Systems	Decision support	Spatial data analysis is the heart of the Geographic Information System and sets Geographic Information System apart from being merely a cartographic map making system. Data analysis allows creation of new data layers from existing data layers, enabling a number of powerful tools to support decision-making.
		Spatial data access and distribution involves the actions required to promote access to the Geographic Information System database and distribution of spatial data to the many Geographic Information System users.
		Produce hardcopy and digital spatial data products for garrison, mission, units, other agencies, and higher command.

A3.3 2007-2011 Projects

The Sikes Act and Department of Army policy requires preparation and implementation of this INRMP, and therefore, this is a high funding priority according to Office of Management and Budget Circular A-106 rules. This INRMP is a Federal Facilities Compliance Agreement with action required in a published National Environmental Policy Act document, which also qualifies it for high priority funding. There are programs within this INRMP that are required for compliance with other laws and executive orders, especially involving pollution prevention, restoration, wetlands, etc.

A3.4 Integrated Natural Resources Management Plan Implementation Costs

Specific costs for each program and project are difficult to predict, especially considering that future events affect many programs. The average annual costs below are estimated by types of funding:

Forestry: $507,000
Agricultural Outleasing: $75,000
Fish and Wildlife: $25,000
Environmental: $4,371,781 per year for projects that qualify for environmental funding
Training: $3,767,200 for integrated training area management

Average annual funding to fully implement this Integrated Natural Resources Management Plan will be $8,745,981. The five-year cost will likely be about $43,729,905.

Above costs do not include related organizations such as the Provost Marshal's Office and Outdoor Recreation, nor do they include costs incurred by other agencies such as the Alaska Department of Fish and Game and the Bureau of Land Management. Some funds above, however, are planned to be used to support these programs run by other organizations and agencies. It is also noted that it is difficult to determine which costs are natural resources and which are environmental since the two are so closely related at Fort Wainwright. Pest management costs are not included.

REFERENCES

Army Regulation 37-100, *Account / Code Structures.* 1994. U.S. Army Publication Agency. 10 pp.

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Army Regulation 200-4, *Cultural Resources Management*. 1998. U.S. Army Publication Agency. 18 pp.

Army Regulation 215-1, *Morale, Welfare, and Recreation Activities and Nonappropriated Fund Instrumentalities*. 2005. U.S. Army Publication Agency. 255 pp.

Army Regulation 385-63, *Range Safety*. 2003. U.S. Army Publication Agency. 23 pp.

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Department of the Army Pamphlet 385-63. Range Safety. 2003. U.S. Army Publication Agency. 219 pp.

Fairbanks North Star Borough Regional Comprehensive Plan. 2005. Fairbanks North Star Borough Community Planning Department, Fairbanks, Alaska. 34 pp.

Appendix AA. Cooperative Agreements

Appendix AA.1 Memorandum of Agreement between United States Army Garrison Alaska and United States Department of Interior, U.S. Fish and Wildlife Service and Alaska Department of Fish and Game

Appendix AA.2 Memorandum of Understanding among the U.S. Department of Defense and the U.S. Fish and Wildlife Service and the International Association of Fish and Wildlife Agencies for a Cooperative Integrated Natural Resource Management Program on Military Installations

Appendix AA.3 Memorandum of Agreement between the Bureau of Land Management and U.S. Army Garrison Alaska for Management of All Public Domain Lands Withdrawn for Military Use by the Army in Alaska

Appendix AA.4 Cooperative Agreement between the Alaska District, Corps of Engineers and the Bureau of Land Management, Alaska Authorizations on Withdrawn Lands

Appendix AA.1 Memorandum of Agreement between United States Army Garrison Alaska and United States Department of Interior, U.S. Fish and Wildlife Service and Alaska Department of Fish and Game

Subject: Fish and Wildlife Cooperative Plan for U.S. Army Garrison Alaska Lands

1. References

a. Department of Defense Instruction 4000.19, Interservice and Intragovernmental Support, dated 9 August 1995.

b. Public Law 86-797 (Sikes Act), dated 15 September 1960, as amended through 2003 by Public Law 108-136.

c. Army Regulation 200-3.

2. Purpose

The purpose of this Fish and Wildlife Cooperative Plan is to list specific items of agreement between the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, and U.S. Army Garrison Alaska (USAG-AK) for cooperative implementation of the USAG-AK Integrated Natural Resources Management Plan. Items not specifically listed will generally be the responsibility of USAG-AK unless the other agencies agree to assist with their implementation. The Department of Defense, the Department of Interior and the State of Alaska, through their duly designated representatives whose signatures appear on the USAG-AK Integrated Natural Resources Management Plan, specifically approve the Integrated Natural Resources Management Plan and the below items of cooperation.

In accordance with 16 USC 670a (Sikes Act), the Fish and Wildlife Cooperative Plan is the component of the Integrated Natural Resources Management Plan that describes how the fish and wildlife resources on USAG-AK lands will be cooperatively managed. The Fish and Wildlife Cooperative Plan provides a program of planning for, and the development, maintenance, and coordination of wildlife, fish, and game conservation. The Fish and Wildlife Cooperative Plan provides for fish and wildlife habitat improvements or modifications, wildlife considerations in all range rehabilitation, control of off-road vehicle traffic, use and protection of fish and wildlife resources, to include both consumptive and non-consumptive use, and natural resources law enforcement requirements, and designated responsibilities for the control and disposal of feral animals.

3. Problem

The Sikes Act (Public Law 86-797, dated 15 September 1960, as amended through 2003 by Public Law 108-136) requires U.S. Fish and Wildlife Service signatory approval of the Integrated Natural Resources Management Plan to acknowledge its compliance with the Endangered Species Act, Migratory Bird Treaty Act and other federal fish and wildlife laws. The Sikes Act also requires signatory approval by the Alaska Department of Fish and Game to allow for public recreation, hunting, trapping and fishing. All signatories have a responsibility for the maintenance and protection of fish and wildlife resources and their associated habitats located on USAG-AK lands. The continued well-being of these resources will be

enhanced through a cooperative effort designed to identify and protect areas essential to their life cycle and vulnerable to disturbance.

4. Scope

This agreement applies to Fort Wainwright, including Fort Wainwright Main Post, Tanana Flats Training Area, Yukon Training Area, Donnelly Training Area, Gerstle River Training Area, and Black Rapids and Whistler Creek Training Area; Fort Richardson; and all other USAG-AK controlled lands in Alaska.

5. Understanding, Agreements, Support and Resource Needs

a. Natural Resource Conservation Program

(1) **All parties agree**:

(a) To work cooperatively to conserve fish and wildlife resources.

(b) To work cooperatively to ensure military preparedness and "no net loss" in the capability of USAG-AK to support the military mission.

(2) **USAG-AK shall**:

(a) Carry out the natural resources conservation program required by the Sikes Act to provide for the conservation and rehabilitation of natural resources on USAG-AK lands consistent with the use of military installations to ensure the preparedness of the Armed Forces; support the sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping, and non-consumptive uses; and subject to safety requirements and military security, allow public access to military installations to facilitate the use.

(b) Establish conservation and management programs for all lands under USAG-AK control. These programs will provide for the conservation and management of fish and wildlife resources and include provisions to conduct the necessary research to answer specific conservation / management problems. These programs will be developed with the assistance and technical advice of the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game. The programs will be consistent with military requirements and to the greatest extent possible, compatible with U.S. Fish and Wildlife Service and Alaska Department of Fish and Game management plans.

(c) Furnish assistance and facilities to Alaska Department of Fish and Game, and/or U.S. Fish and Wildlife Service for mutually agreed upon natural resources research projects.

(d) Determine desired rules of conduct to be followed by authorized participants in the implementation of and participation in these programs.

(e) Admit representatives of Alaska Department of Fish and Game and U.S. Fish and Wildlife Service to the installation at reasonable times, subject to requirements of military necessity and security. Such personnel may use U.S. Army transportation on a non-reimbursable basis, to include aircraft, for wildlife related functions on USAG-AK lands provided such transportation is available without detriment to the military mission.

(3) **U.S. Fish and Wildlife Service shall**:

(a) Furnish technical assistance for development and implementation of professionally sound natural resources programs on USAG-AK, provided funding for such support is available.

(b) Participate in the joint administration of these programs with all parties in this agreement.

(4) **Alaska Department of Fish and Game shall:**

(a) Furnish technical assistance for development and implementation of professionally sound natural resources programs on USAG-AK, provided funding for such support is available.

(b) Participate in the joint administration of these programs with all parties in this agreement.

b. Integrated Natural Resources Management Plan

(1) **All parties agree**:

(a) The Integrated Natural Resources Management Plan is the planning and implementation document required by the Sikes Act, as amended. The Integrated Natural Resources Management Plan contains those items specifically required by law. In the event the Sikes Act is amended after the Integrated Natural Resources Management Plan is signed, the Plan will be amended to conform with the new requirements within the Sikes Act, if needed.

(b) The Integrated Natural Resources Management Plan is prepared to assist installation commanders in their efforts to conserve and rehabilitate natural resources consistent with the use of military installations to ensure the preparedness of the Armed Forces.

(c) The primary purpose of the Integrated Natural Resources Management Plan is to establish natural resources goals, objectives, and policies that USAG-AK will use to manage Army lands in Alaska. It is the intent of Department of Defense to clearly and openly express these goals, objectives and policies to the public through the Integrated Natural Resources Management Plan. The secondary purpose of the Integrated Natural Resources Management Plan is to guide USAG-AK natural resources managers and personnel in their decision-making regarding management of military land in Alaska and the implementation of proposed natural resource projects. Implementing the Integrated Natural Resources Management Plan would provide a land management program that conserves land as an essential asset for training, provides excellent stewardship, complies with environmental laws, and provides recreational opportunities that contributes to the quality of life. A further purpose of the Integrated Natural Resources Management Plan is to serve as a funding identification document for the management of natural resources on military lands.

(d) Implementation of the Integrated Natural Resources Management Plan measures, maintains, protects, and enhances the ecological integrity of the training lands and the biological communities inhabiting them. The Integrated Natural Resources Management Plan is considered to be “implemented” if USAG-AK actively requests, receives, and uses funds for “must fund” projects and activities; ensures that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the Integrated Natural Resources Management Plan; coordinates annually with all internal and external cooperating offices; and documents specific Integrated Natural Resources Management Plan action accomplishments undertaken each year.

(e) The Integrated Natural Resources Management Plan will be reviewed by USAG-AK, Alaska Department of Fish and Game, and U.S. Fish and Wildlife Service annually and revised not less often than every 5 years.

(f) This Integrated Natural Resources Management Plan is a Federal Facilities Compliance Agreement.

(2) **USAG-AK shall**:

(a) Prepare revisions to the Integrated Natural Resources Management Plan not less often than every five years and coordinate review of these revisions with U.S. Fish and Wildlife Service and Alaska Department of Fish and Game.

(b) Coordinate annual reviews of the Integrated Natural Resources Management Plan with U.S. Fish and Wildlife Service and Alaska Department of Fish and Game.

(c) Actively request, receive, and use funds for "must fund" projects and activities.

(d) Ensure that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the Integrated Natural Resources Management Plan

(e) Document specific Integrated Natural Resources Management Plan action accomplishments undertaken each year and provide those accomplishments to U.S. Fish and Wildlife Service and Alaska Department of Fish and Game.

(f) Develop Fish and Wildlife, Forestry, Wildland Fire, and Threatened and Endangered Species Management Plans (components of the Integrated Natural Resources Management Plan) as well as individual burn plans that include provisions designed to improve wildlife habitat and/or meet specific watershed management objectives.

(3) **U.S. Fish and Wildlife Service shall**:

(a) Review the Integrated Natural Resources Management Plan annually and provide comments.

(b) Participate in the revision of the Integrated Natural Resources Management Plan not less often than every five years.

(4) **Alaska Department of Fish and Game shall**:

(a) Review the Integrated Natural Resources Management Plan annually and provide comments.

(b) Participate in the revision of the Integrated Natural Resources Management Plan not less often than every five years.

c. Inventory and Monitoring of Fish and Wildlife Resources on USAG-AK Controlled Lands

(1) **All parties agree**:

(a) On priorities for monitoring and inventory of fish and game resources on USAG-AK lands.

(2) **USAG-AK shall**:

(a) In cooperation with the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game, conduct annual monitoring of fish and wildlife resources on USAG-AK controlled Army lands according to the priorities identified in the Ecosystem Management Component of the Integrated Natural Resources Management Plan (Volume III, Section SA). The inventory will include, but is not limited to, the following areas: location and description of the principal fish and wildlife resources; identification of the principal wildlife species actually or potentially present or migratory within the boundaries of USAG-AK lands, the condition of their habitat, and information on population numbers; identification of endangered and threatened species of fish and wildlife and habitat essential to their existence, identification of general population assessments of the principal fish species known to be present or migrating through or within USAG-AK lands, observations regarding the quality of the aquatic habitat, definition and description of the land and water areas suitable and available for public entry and their potential to support outdoor recreation.

(b) Share inventory and monitoring data with U.S. Fish and Wildlife Service and Alaska Department of Fish and Game.

(c) Allow representatives of Alaska Department of Fish and Game and U.S. Fish and Wildlife Service access to training lands to the installation at reasonable times, subject to requirements of military necessity and security, to conduct fish and wildlife monitoring.

(d) Allow representatives of Alaska Department of Fish and Game and U.S. Fish and Wildlife Service access to restricted airspace above the installation at reasonable times, subject to requirements of military necessity and security, to conduct fish and wildlife monitoring.

(3) **U.S. Fish and Wildlife Service**:

(a) Provide technical advice and assistance, to the greatest extent possible, to USAG-AK for the conduct of an annual fish and wildlife monitoring.

(b) Share inventory and monitoring data with USAG-AK and Alaska Department of Fish and Game.

(4) **Alaska Department of Fish and Game:**

(a) Provide technical advice and assistance, to the greatest extent possible, to USAG-AK for the conduct of an annual fish and wildlife inventory.

(b) Share inventory and monitoring data with U.S. Fish and Wildlife Service and USAG-AK.

d. Enhancement of Fish and Wildlife Habitat Resources on USAG-AK Controlled Lands.

(1) **All parties agree**:

(a) To manage habitat on a landscape scale utilizing ecosystem management principles.

(b) That, like fish and wildlife resources, military training has its own habitat requirements, and the two will not be managed exclusively, except where by law (e.g. critical habitat designation under the Endangered Species Act) management of natural species habitat takes precedence. Habitat enhancement areas will be available for use by military training just as military firing ranges will continue to provide habitat to wildlife.

(2) **USAG-AK shall**:

(a) Develop or improve habitat for optimum conditions consistent with the objectives established in the Integrated Natural Resources Management Plan.

(b) Maintain a minimum of 50 acres of bison food plots on Donnelly Training Area. Over time the location of these food plots may move depending on military requirements and the location of bison.

(c) Avoid, when possible, vegetation clearing activities during 1 May through 15 July for non-military readiness activities to protect migratory bird nesting habitat.

(3) **U.S. Fish and Wildlife Service shall**:

(a) Provide technical advice and assistance, to the greatest extent possible, to USAG-AK for the conduct of habitat enhancement.

(4) **Alaska Department of Fish and Game shall**:

(a) Provide technical advice and assistance, to the greatest extent possible, to USAG-AK for the conduct of habitat enhancement.

e. Harvesting of Fish and Wildlife Resources on USAG-AK Controlled Lands.

(1) **All parties agree**:

(a) All hunting, fishing, and trapping on USAG-AK lands will be in accordance with federal and state fish and game laws.

(b) A federal waterfowl stamp is required for hunting waterfowl on USAG-AK lands as prescribed by federal laws.

(c) Persons hunting or fishing the lands or waters of USAG-AK shall be required to obtain special USAG-AK Recreation Access Permit unless exempt by USAG-AK regulations. At present, there is no cost for these permits, but USAG-AK reserves the right to charge for these permits in the future. Any funds derived from the sale of these licenses would be used exclusively for the implementation of the Integrated Natural Resources Management Plan in accordance with Army regulations and the Sikes Act. Fees charged would be established by the installation in accordance with Army regulations. Persons guilty of violating the requirement for these special licenses may be prosecuted under 10 USC 2671(c).

(d) Persons hunting, trapping, or fishing the lands of USAG-AK must purchase state licenses, tags, and stamps as required by Alaska Department of Fish and Game, unless exempt by Alaska Department of Fish and Game regulations. Military personnel on active duty and

permanently stationed in Alaska may purchase special fishing and small game licenses at resident prices. Active duty military personnel, not including dependents, may hunt big game without licenses or tags on military lands open to hunting providing they follow Alaska Department of Fish and Game hunting regulations. A harvest ticket is required. Nonresident military hunters (lived in Alaska less than 12 months) stationed in Alaska must purchase nonresident hunting licenses and appropriate big game tags to hunt big game, but the tags will only cost one-half the normal nonresident price.

(e) Public access for hunting, trapping, and fishing is approved under a system of controls established by USAG-AK in cooperation with Alaska Department of Fish and Game. Civilians will be considered on an equal basis with military and Army civilian employees for permits and access to USAG-AK lands. Hunting, trapping, and fishing will be allowed only on those areas where there is no conflict with military training activities and no unreasonable safety hazard to participants, military personnel and dependents, or Army civilian employees. Certain areas will be closed to hunting and fishing, including, but not limited to impact areas containing unexploded ordnance and training areas with sensitive electronic equipment. Such areas will be marked as closed on installation hunting maps.

(f) Appropriate Migratory Bird Hunting Stamp(s) is/are required of all individuals 16 years of age or older hunting waterfowl on USAG-AK controlled Army lands. The possession of a special permit for hunting migratory game birds will not relieve the permittees of the requirements of the Migratory Bird Stamp Act, as amended.

(2) **USAG-AK shall**:

(a) Provide all military personnel, their dependents, and civilians every opportunity to harvest fish and wildlife on USARAK controlled Army lands. Hunting, trapping, and fishing on USAG-AK controlled Army lands in Alaska will be open to all military personnel, their dependents, and civilians during appropriate legally established seasons, consistent with military requirements and public safety; all personnel utilizing Army lands will comply with applicable provisions of federal, state, and military fish and game laws and regulations.

(b) Hunting, trapping, and fishing on USAG-AK lands will be authorized and controlled by the Installation Commander in accordance with locally published installation regulations promulgated in compliance with applicable federal and state laws, Army regulations, military requirements, and the Integrated Natural Resources Management Plan.

(c) Provide Army Conservation Officers for hunting, trapping, and fishing law enforcement, as outlined in U.S. Army Regulation 190-13.

(3) **U.S. Fish and Wildlife Service shall**:

(a) Provide enforcement personnel if requested.

(b) Establish season and bag limits for harvest of migratory bird species.

(4) **Alaska Department of Fish and Game shall:**

(a) Provide enforcement personnel if requested.

(b) Establish season and bag limits for harvest of game species.

f. Stocking or Transplanting Fish and Wildlife Resources on USAG-AK Controlled Lands

(1) **All parties agree**:

(a) All proposed introduction or reintroduction of wildlife species will be thoroughly assessed in accordance with the National Environmental Policy Act and associated U.S. Fish & Wildlife Service requirements to determine the impact on existing fauna and the installation mission.

(2) **USAG-AK shall**:

(a) Provide access to the Alaska Department of Fish and Game for the stocking of fish in designated lakes and streams.

(3) **U.S. Fish and Wildlife Service shall**:

(a) Review all requests for stocking or transplanting to ensure there are no impacts to migratory, threatened or endangered species.

(4) **Alaska Department of Fish and Game shall**:

(a) Continue to stock USAG-AK lakes.

(b) Determine the number and species of fish to be stocked based on angler use trends and fish availability.

(c) Prioritize the lakes and streams designated for stocking.

g. Protection of Fish and Wildlife Resources on USAG-AK Controlled Lands

(1) **All parties agree**:

(a) That the military mission supersedes natural resources management and such activities must in all instances be compatible with the military mission. However, where there is conflict between the military mission and provisions of the Endangered Species Act, Migratory Bird Treaty Act, State of Alaska fish and game laws, Eagle Protection Act or any other law associated with natural resources conservation, such conflicts will be resolved according to statutory requirements.

(b) That military operations and the presence of fish and wildlife resources are not mutually exclusive. Military operations and fish and wildlife resources can occupy the same area (i.e., training area) without a negative effect on either. However, certain species (rare, threatened or endangered), during seasons when certain fish and wildlife are most sensitive (calving, nesting, spawning) and in sensitive habitats (high function wetlands), additional protections are warranted for the conservation of fish and wildlife resources.

(c) To work cooperatively to avoid conflicts between the military mission and fish and wildlife in such a way that effectively provides conservation for fish and wildlife resources and enables the military mission.

(2) **<u>USAG-AK shall</u>**:

(a) Conduct activities or operations in a way that would not directly adversely impact fish and wildlife resources. Soldiers shall not intentionally target wildlife when conducting firing activities and shall not intentionally harass fish and wildlife (defined here as intentionally driving or flying at fish and wildlife with the intent to move or change their movement).

(b) Minimize the unintentional take of migratory birds during military readiness activities. Migratory Bird Treaty Act prohibits "take" of migratory birds. However, the Department of Defense has been granted an exemption for military readiness activities that allows "unintentional take". This rule authorizes the Department of Defense to take migratory birds associated with military readiness activities, subject to certain limitations. The 2003 National Defense Authorization Act (Public Law 107-314, 116 Stat. 2458, Dec. 2, 2002, 16 U.S.C. 703 note) required the Secretary of Defense, in consultation with the Secretary of the Interior, to identify ways to minimize, mitigate, and monitor take of migratory birds during military readiness activities and required the Secretary to prescribe, with the concurrence of the Secretary of Defense, a regulation that exempts such activities from the Migratory Bird Treaty Act's prohibitions against take of migratory birds. This agreement further clarifies military readiness activities to include (1) air and ground maneuver training, (2) live-fire demolition, direct and indirect fire activities, (3) range construction, range upgrade and range maintenance activities which are required for military operational readiness, and (4) those vegetation management activities which directly support readiness activities and Soldier safety such as prescribed burning and mechanical or hand thinning to reduce fire danger in range training areas.

(c) Will minimize activities or operations directly negatively impacting fish and wildlife during sensitive time periods or seasons. USAG-AK will notify the Alaska Department of Fish and Game or the USFWS as appropriate, when USAG-AK concludes that the presence of fish and wildlife during these time periods is too low for there to be significant effects from activities or operations.

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-USAG-AK will minimize disturbance to bison calving areas on Donnelly Training Area during 15 April – 31 May if bison are present. USAG-AK will minimize disturbance to bison pre-migration areas 1 July -31 August (Figure A1) if bison are present. USAG-AK will not conduct indirect fire operations within 2000 meters of bison in the impact area during any time of the year. USAG-AK will not conduct activities or operations within 500 meters of any bison during any time of year to minimize the impacts on bison.

-USAG-AK will minimize activities or operations in Oklahoma Impact Area or Delta Creek Impact Area from 1-31 May for caribou pre-calving, calving, and post calving if caribou are present in significant numbers. USAG-AK will not conduct indirect fire or bombing operations within 8000 meters of caribou from 1-31 May.

(d) Enact the following protective measures to minimize harm to the endangered Cook Inlet beluga whale during live-fire exercises into the ERF Impact Area

-- USARAK units will not intentionally fire into Eagle River at any time or within specified habitat protection buffers around Eagle River when belugas are present in the river. The habitat protection buffers are defined for each weapon system and munitions type.

- USARAK units will not fire into a specified habitat protection buffer along the Eagle Bay shoreline in ERF Impact Area, the size of which is based on habitat protection goals.

- USAG FRA will place new targets outside of the defined habitat protection buffers and will cease using any old targets within these areas.

- In the event that firing into ERF during unfrozen conditions is approved, USARAK units will cease firing HE munitions into ERF Impact Area during the peak waterfowl migration periods in the spring and fall. While this prohibition is primarily enacted to protect migratory birds, the timing of the migratory period coincides with peak beluga activity in Eagle River.

-USAG-AK will ensure that Eagle River will remain unobstructed to normal passage of beluga whales and potential prey items, throughout the entirety of ERF. Army activities will not cause any impedance to either ingress or egress of beluga whales or their potential prey items along the stretch of Eagle River from Bravo Bridge downstream to the mouth at Eagle Bay.

-USARAK will continue to ban the use of any munitions containing white phosphorus in wetlands.

-USARAK will never intentionally target wildlife.

- Harassment of fish and wildlife is prohibited. Any action that disturbs fish and wildlife is considered harassment by federal and Alaska State law. Harassment includes such things as pursuit with vehicles or aircraft, feeding, and shooting of wildlife. Vehicles, watercraft and aircraft, including helicopters, may not be used to herd/chase wildlife off the ranges or training areas. Individuals who harass fish and wildlife are subject to prosecution.

-USARAK units will not fire munitions outside military reservation boundaries.

-Dedicated impact areas (i.e. ERF Impact Area) will remain permanently off limits to maneuver training and to all recreation.

-USARAK will continue to implement range training and safety regulations.

-USAG-AK will permanently make the ERF impact area off limits to recreational users and will restrict rafting access to this area by designating the take out point for rafters to a point 4 kilometers upstream from the mouth of Eagle River, approximately 100 meters upstream of Route Bravo Bridge.

- USAG-AK will not provide recreational access to Knik Arm and Eagle Bay from Fort Richardson.

-USAG-AK will have trained observers present prior to and during training exercises to ensure that marine mammals are not present where they could be harassed or harmed due to training activities.

-No tracked or wheeled maneuvering is permitted within a 50-meter buffer around all streams, lakes, and any open, flowing water during the summer unless crossing at a 90-degree angle to the stream. Fish spawning streams will not be crossed during summer. All appropriate state and federal permits will be obtained prior to any in-water activities occurring in anadromous waterways.

-USAG-AK will continue water quality monitoring in Eagle River and Eagle Bay.

-USAG-AK will continue to monitor beluga whales in Eagle River and Eagle Bay and maintain a cooperative working relationship with NMFS.

-USAG-AK will conduct weekly monitoring during the summer to identify the presence and abundance of beluga whales in Eagle River.

-USAG-AK will continue to implement the most current INRMP. The INRMP contains specific actions to protect, inventory, maintain, and improve wildlife habitat and fisheries resources and protect water quality

-USAG-AKwill continue to implement its natural resources conservation programs and ecosystem management. These programs improve the management of wildlife and fisheries resources and protect water quality.

-USAGAK will continue to comply with federal and state laws and regulations relating to fish and wildlife conservation and management.

-USAG-AK will continue to enforce existing range regulations requiring the use of burn pans during burning of excess propellant charges.

-Long term monitoring of white phosphorus will continue as outlined under the CERCLA process.

-USAG-AK will continue implementation of existing environmental programs such as ITAM, RTLA, and LRAM.

-Stream bank restoration and erosion control projects will be conducted on North and South Post Fort Richardson as detailed in the 2007-2011 INRMP.

-USAG-AK will control, to the best of its ability, the spread of invasive northern pike from Otter Lake into the Eagle River watershed

(e) Will limit activities or operations in or near unique or sensitive habitats (high function wetlands, Eagle River Flats) during time periods or seasons (spring migration, nesting) that are likely to have a significant adverse effect on fish and wildlife.

-USAGAK will limit military operations and outdoor recreational activities in high function wetlands from 1 May – 15 July for migratory bird protection during nesting seasons.

-USAG-AK will limit indirect fire activities and operations into Eagle River Flats during spring and fall migratory periods.

(f) Conduct military activities or operations in such a manner that will not adversely affect the characteristics of unique or sensitive habitats. Designate important or fragile natural areas with special protection status ands manage such areas as "special interest areas" for their unique features.

-*Wood River and Clear Creek Buttes*. Buttes near Blair Lakes and along the Wood River have cultural and ecological significance. Many of these buttes have cleared helicopter pads for military training, especially since they are on high, relatively dry ground. These buttes will be placed off-limits to ground and vegetation-disturbing activities with exception of existing helicopter pads.

-*Tanana Flats Migratory Bird Special Interest Area*. The area between Crooked Creek and Willow Creek in the Tanana Flats Training Area harbors undisturbed fen wetlands and significant migratory bird nesting areas. No recreational activities are permitted in this area during 1 May through 15 July. This area presently has no trails and no new trails may be developed in this area.

-*Delta Bison Area*. USAG-AK has imposed restrictions to limit disturbance to bison calving areas from 1 April – 31 May, if bison are present. The Army can conduct military activities in these areas if they first consult with Alaska Department of Fish and Game.

-*Sandhill Crane Roosting Area*. USAG-AK has imposed restrictions to limit disturbance in sandhill crane areas each year from 25 April through 15 May, and 1 September through 30 September when sandhill cranes are present. The Army can conduct military activities in these areas if they first consult with Alaska Department of Fish and Game.

-*Delta Caribou Calving and Post-Calving Areas*. USAG-AK has agreed with Alaska Department of Fish and Game to suspend activities or operations that would adversely affect these areas during 15 May through 31 May without consultation. Restrictions in these areas are in effect only when caribou are present. In addition, to the extent practicable development and military actions in the caribou calving grounds will be conducted under winter conditions when there is sufficient snow cover and the ground is adequately frozen to minimize the damage to vegetation and soils.

-*Ship Creek Riparian Area*. Further development, beyond that already approved for the golf course expansion and Elmendorf Family housing, will not occur in the riparian area. Tree cutting will be prohibited. Troops and other authorized users will continue to have "pass through" access.

-*Eagle River Flats*. Access to Eagle River Flats is prohibited, except for authorized military personnel and remediation crews. Firing is restricted to upland, dryer areas. Live-fire activities may not target wildlife, especially beluga whales when they are present in the Eagle River.

(3) **U.S. Fish and Wildlife Service shall**:

(a) Identify and describe additional unique or sensitive habitats within USAG-AK lands. USAG-AK must provide concurrence before any additional areas could be established.

(b) Identify the types of activities of operation that may be harmful or have significant, adverse effect on unique or sensitive habitats for species for which they have been designated.

(c) Identify the time periods or seasons when activities or operations should be restricted in order to protect wildlife species.

(4) **Alaska Department of Fish and Game shall**:

(a) Identify and describe additional unique or sensitive habitats within USAG-AK lands. USAG-AK must provide concurrence before any additional areas could be established.

(b) Identify the types of activities of operation that may be harmful or have significant, adverse effect on unique or sensitive habitats for species for which they have been designated.

(c) Identify the time periods or seasons when activities or operations should be restricted in order to protect wildlife species.

(d) Coordinates with Range Control regarding areas used by caribou and bison.

h. Control of Invasive, Nuisance and Feral Fish and Wildlife Resources on USAG-AK Controlled Lands.

(1) **All parties agree**:

(a) To work cooperatively to prevent the introduction of invasive species, to provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species may cause.

(b) No exotic species of fish or wildlife will be introduced on USAG-AK lands without prior written approval of the USAG-AK, Alaska Department of Fish and Game, and the U.S. Fish and Wildlife Service.

(c) The Installation Pest Management Plan and the Integrated Natural Resources Management Plan serve as nuisance species (i.e., mew gull) management plans for the purpose of obtaining depredation permits.

(d) Make recommendations and develop procedures, as necessary, for joint management of nuisance or problem wildlife.

(e) Dispatch of nuisance or problem animals may only be done with the concurrence of Alaska Department of Fish and Game. Dispatch of nuisance animals is a last resort situation. Other possible alternatives include aversive conditioning and relocation. Dispatch should be considered for animals which are aggressive with people or for animals with an extensive history of garbage or nuisance behavior. Decisions concerning relocation or dispatch of nuisance animals should be made on a case-by-case basis considering the individual animal's past history.

(2) **USAG-AK shall**:

(a) Monitor invasive species populations, and track the presence and status of invasive species over time to determine when control measures are necessary and to evaluate the effectiveness of prevention, control/eradication, and restoration measures.

(b) Give priority to invasive species management actions, including actions to restore native species habitat conditions in ecosystems that have been invaded that support the installation's primary military mission.

(c) Plan actions to address invasive species that are consistent with management objectives in this Integrated Natural Resources Management Plan and undertaken only after appropriate review under National Environmental Policy Act as implemented by 32 CFR 561.

(d) Obtain a depredation permit from the U.S. Fish and Wildlife Service before any intentional take of migratory birds protected by the Migratory Bird Treaty Act. Under the Migratory Bird Treaty Act it is unlawful "by any means or manner, to purse, hunt, take, capture or kill" any migratory bird except as permitted by regulation (16 U.S.C. 703-704). Regulation (50 CFR 21.11) prohibits the take, possession, import, export, transport, sale, purchase, barter, or offering of these activities, except under a valid permit or as permitted in the implementing regulations. Where the purpose of an installation action is to intentionally and directly take any migratory bird species (e.g., eradicate nuisance birds; clear nesting, adding eggs), the installation must apply for and obtain a depredation, special purpose, or scientific collection and education permit or other regulatory authorization form the U.S. Fish and Wildlife Service prior to taking action(s) and record any birds purposefully and intentionally taken under the permit and provide an annual report to the U.S. Fish and Wildlife Service.

(e) Minimize the need to intentionally take nuisance wildlife (mammals, birds, insects) by implementing best management practices (as listed in Installation Pest Management Plan and Volume III, Integrated Natural Resource Management Plan and) that deter presence in human conflict areas.

(f) Obtain depredation permits from Alaska Department of Fish and Game before removing any nuisance mammals.

(3) **U.S. Fish and Wildlife Service shall**:

(a) Evaluate depredation permit applications and issue depredation permits for migratory birds in accordance with the Migratory Bird Treaty Act.

(b) Provide technical assistance and support to USAG-AK to minimize the need to intentionally take nuisance wildlife through the application of best management practices.

(4) **Alaska Department of Fish and Game shall**:

(a) Evaluate depredation permit applications and issue depredation permits for animals in accordance with the State of Alaska law. Approve/disapprove requests for relocation or dispatch of problem animals.

(b) Provide technical assistance and support to USAG-AK to minimize the need to intentionally take nuisance wildlife through the application of best management practices.

(c) Ensure animal safety and protection of public safety.

i. Protection of Public Access on USAG-AK Controlled Lands

(1) **All parties agree**:

(a) Consistent with the use of military installations to ensure the preparedness of the Armed Forces, the Integrated Natural Resources Management Plan provides for sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources, subject to requirements necessary to ensure safety and military security.

(b) USAG-AK lands shall be made available to the public for educational or recreational use of natural and cultural resources when such access is compatible with military mission activities, ecosystem sustainability, and with other considerations such as security, safety, and fiscal soundness. Opportunities for such access shall be equitably and impartially allocated.

(c) Access by recreational users will be within manageable quotas, subject to safety, military security, threatened or endangered species restrictions, and the capability of the natural resources to support such use; and at such times as such access can be granted without bona fide impairment of the military mission, as determined by the USAG-AK commander.

(2) **USAG-AK shall**:

(a) Determination of the extent of equitable military and non-military access to be authorized for purposes of participation in the harvest and enjoyment of fish and wildlife resources on USAG-AK controlled Army lands subject to the limitations and considerations of military security, safety, and mission objectives.

(b) Issue Recreation Access Permits to ensure accountability, safety and continued access to recreational users on USAG-AK lands.

(c) Manage recreational access through use of the USARTRAK check-in-check out system.

(d) In order to insure continued public use and to prevent unnecessary damage to fish and wildlife habitats, USAG-AK will neither expand existing contaminated areas nor create new ones. This provision may be waived in the event of compelling needs and upon completion of environmental documentation. Contaminants are defined as dud-producing explosives, toxic substances, and other materials which would preclude public access to those lands, but do not include non-dud producing small arms ordnances.

(3) **U.S. Fish and Wildlife Service shall**:

(a) Provide technical advice and assistance, to the greatest extent possible, to USAG-AK for the protection of public access and fish and wildlife resources on USAG-AK lands.

(4) **Alaska Department of Fish and Game shall**:

(a) Provide technical advice and assistance, to the greatest extent possible, to USAG-AK for the protection of public access and fish and wildlife resources on USAG-AK lands.

j. Control of Off-Road Traffic on USAG-AK Controlled Lands

(1) **All parties agree**:

(a) Army is a trustee of public lands and has a responsibility to protect and enhance environmental quality, conserve natural resources, and provide opportunities for outdoor recreation. However, it must be recognized that land under Army control was acquired solely for national defense purposes. Other uses are, therefore, secondary to mission needs.

(b) Off-road recreational vehicles are used in association with many activities in the Alaskan Interior. These vehicles are used to access hunting, fishing, and trapping areas, for recreational riding and for other activities.

(c) All land and water areas will be closed to off-road recreational use by motorized off-road recreational vehicles and watercraft except those areas and trails which are determined suitable and specifically designated for such under the procedures established in the Integrated Natural Resources Management Plan.

(d) Areas not available for off-road recreational use include areas restricted for security or safety purposes, such as explosive ordnance impact areas, areas containing geological and soil conditions, flora or fauna, or other natural characteristics of fragile or unique nature, which would be subject to excessive or irreversible damage by use of off-road recreational vehicles, areas where the use by a type or types of off-road recreational vehicles would cause unequivocal and irreversible damage or destruction as a result of such use, areas that are key fish and wildlife habitats, as identified under environmental consideration, areas that contain archeological sites, historic sites, petroglyphs, pictographs, or areas set aside for their scenic value, and areas in which noise would adversely affect other uses or wildlife resources.

(e) Off-road traffic includes both off-road recreational vehicles and motorized watercraft. Off-road recreational vehicles include snowmachines, dirt bikes, four-wheelers, swamp buggies, civilian use small unit support vehicles and four-wheel drive vehicles. The use of three-wheeled off-road recreational vehicles is not allowed anywhere on USAG-AK lands. Motorized watercraft include all boats with some type of motor attached, which includes jetboats, riverboats, and airboats.

(2) **USAG-AK shall**:

(a) Manage for a number of different types of public recreational use, including off-road traffic. All areas that are determined open for recreational use may be closed temporarily during periods of military use. All users must daily check in through USARTRAK to determine if areas are open to recreational use. USAG-AK uses the following classification system to describe recreation areas on the installation.

***-Open Use Area*:** Open to all types of off-road recreational vehicles. Open to all other recreational activities year-round During frozen conditions (6+ inches of snowcover) there are no restrictions for any off-road recreational vehicles. During unfrozen summer conditions, off-road recreational vehicles over 1500 lbs (road vehicles, dune buggies, Argo's, small unit support vehicles etc.) must stay on existing roads and trails. No

restrictions for off-road recreational vehicles under 1500 lbs (all-terrain vehicles, snowmachines, dirt bikes etc.). Motorized watercraft must stay within existing open water channels.

-***Modified Use Area***: Open to all types of off-road recreational vehicles. No restrictions for any off-road recreational vehicles when soil is frozen. All off-road recreational vehicles must stay on existing roads and trails during the summer. Motorized watercraft must stay within existing open water channels. Open to all other recreational activities year-round.

-***Limited Use Area***: Open to all non-motorized recreation (hunting, fishing, trapping, hiking, skiing, and berry picking) year-round but are not open to any type of off-road recreational vehicle at any time. Motorized watercraft must stay within existing open water channels.

-***Special Use Management Area***: An area managed for recreational use under specific rules that apply only to that area (i.e., Tanana Flats Training Area Airboat Special Use Management Area).

Closed Area: Closed to all recreational activities year-round. Airfields, Tank Farm, Landfill, Small Arms Ranges, Impact Areas, Ammunition Storage Point.

(b) USAG-AK will manage Tanana Flats Training Area as an "open use area" except for the impact areas, which are always "closed use areas." In addition, the INRMP proposes to apply specifically tailored rules to newly created Tanana Flats Training Areas 202 and 203 (bordered by Salchaket Slough, Willow Creek, Tanana River and Bonnifield Trail). These training areas would be open to airboats and other motorized watercraft with no restrictions between 15 August and 1 April each year. Between 1 April and 15 July, training areas 202, 203 and 204 would be off limits to all off-road recreational vehicles, including airboats and other motorized watercraft. Between 15 July and 15 August, access into the lower fen (Training Area 202) and upper fen (Training Area 203) would be managed separately based on water levels. Access into Training Area 204 would remain closed to all motorized vehicles from 1 April – 30 October. Access into all other training areas during this time would remain open. This proposed policy does not affect rules and regulations for hunting, trapping or fishing. This proposed policy would apply to all recreational users, but does not apply to military training or other official use.

(c) Monitor recreational use to evaluate recreational impacts to ensure recreational use is not negatively affecting sensitive natural or cultural resources.

(3) **U.S. Fish and Wildlife Service shall**:

(a) Provide technical support for the management of off-road traffic.

(4) **Alaska Department of Fish and Game shall**:

(a) Provide technical support for the management of off-road traffic.

k. Natural Resources Law Enforcement on USAG-AK Controlled Lands

(1) **All parties agree**:

(a) USAG-AK has primary law enforcement responsibility on USAG-AK lands.

(b) Many aspects of natural resources management require effective enforcement if they are to be successful. Such features as harvest controls, protection of sensitive areas, pollution prevention, hunting and fishing recreation, non-game protection, and others are dependent upon effective law enforcement.

(c) Enforcement of laws primarily aimed at protecting natural resources and outdoor recreation activities are an integral part of the installation's natural resources management program. Game laws must be implemented in accordance with Alaska and federal laws and as approved by the USAG-AK Commander in the Integrated Natural Resources Management Plan.

(d) Effective law enforcement is critical to natural resources conservation and the continuance of hunting, trapping, and fishing programs on a sustained basis.

(e) USAG-AK conservation officers have concurrent jurisdiction.

(2) **USAG-AK shall**:

(a) Provide sufficient and qualified Army conservation officers for hunting, trapping, and fishing law enforcement, as outlined in the Integrated Natural Resources Management Plan and U.S. Army Regulation 190-13.

(3) **U.S. Fish and Wildlife Service shall**:

(a) Provide enforcement personnel if requested.

(4) **Alaska Department of Fish and Game shall**:

(a) Provide enforcement personnel if requested.

6. Financial Provisions

a. Services provided by the USAG-AK, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game, insofar as possible, will be provided on a non-reimbursable basis. Any expected reimbursement is to be specifically approved and funded prior to the service being provided.

b. Reimbursement will be provided through a mutually agreed upon funding document.

c. This Memorandum of Agreement can be used as a sole source justification in the development of a funding document. The Sikes Act outlines priorities for contracting natural resource management projects that can be separated from management, planning, or enforcement. When entering into contracts for services that implement natural resource management objectives or enforce natural resources laws (that is, wildlife management and endangered species plans and surveys), priority will be given to contracts with federal, state, and local agencies with responsibility for natural resources conservation. Natural resources support services may be obtained non-competitively through contracts with federal and state agencies.

7. Effective Date

a. This agreement becomes effective upon the date of last signature. It will remain in effect until revised/superseded or terminated in writing.

b. This agreement will be reviewed every five years or sooner if changing conditions or circumstances warrant ensuring that its terms, provisions, and intent are current.

c. This agreement may be modified or terminated at anytime with the consent of all parties, or unilaterally terminated when the initiator provides 180 days written notice to the other parties.

8. Supersession: This agreement supersedes AK-MOU-155 between U.S. Army Alaska, U.S. Fish and Wildlife Service and Alaska Department of Fish and Game. This agreement also supersedes the 2002-2006 Integrated Natural Resources Management Plan Fish and Wildlife Cooperative Plan.

Appendix AA.2 Memorandum of Understanding among the U.S. Department of Defense and the U.S. Fish and Wildlife Service and the International Association of Fish and Wildlife Agencies for a Cooperative Integrated Natural Resource Management Program on Military Installations

A. PURPOSE

The purpose of this Memorandum of Understanding is to establish a cooperative relationship between the U.S. Department of Defense, the U.S. Department of the Interior, Fish and Wildlife Service, and the state fish and wildlife agencies as represented by the International Association of Fish and Wildlife Agencies in preparing, reviewing, and implementing integrated natural resource management plans on military installations.

B. BACKGROUND

In recognition that military lands have significant natural resources, Congress enacted the Sikes Act in 1960 to address wildlife conservation and public access on military installations. The 1997 amendments to the Sikes Act require the Department of Defense to develop and implement an Integrated Natural Resources Management Plan for each military installation with significant natural resources. The Integrated Natural Resources Management Plan must be prepared in cooperation with the U.S. Fish and Wildlife Service and the state fish and wildlife agency and reflect the mutual agreement of the parties concerning conservation, protection, and management of fish and wildlife resources on military lands.

Integrated Natural Resources Management Plans provide (or the management of natural resources, including fish, wildlife, and plants. They incorporate to the maximum extent practicable ecosystem management principles and provide the landscape necessary (for the sustainment of military land uses. Integrated Natural Resources Management Plans allow for multipurpose uses of resources, including public access necessary and appropriate for those uses provided such access does not conflict with military land use requirements. Effective partnering among the Department of Defense, the U.S. Fish and Wildlife Service and the states, initiated early in the planning process at national, regional, and the military installation levels, is essential to the development and implementation of comprehensive Integrated Natural Resources Management Plans. When such partnering involves the participation of all parties and synchronization of Integrated Natural Resources Management Plans with existing U.S. Fish and Wildlife Service and state natural resource management plans, the mutual agreement of all parties is achieved more easily. Consistent with the use of military installations to ensure the readiness of the Armed Forces, the purpose of Integrated Natural Resources Management Plans is to provide for the conservation and rehabilitation of natural resources on military lands. Thus, a clear understanding of land use objectives for military lands should enable Department of Defense, the U.S. Fish and Wildlife Service, and the states to share a common understanding of land management requirements while preparing and reviewing the Integrated Natural Resources Management Plans.

This Memorandum of Understanding addresses the responsibilities of the parties to facilitate optimum management of natural resources on military installations. It replaces a Department of Defense-U.S. Fish and Wildlife Service Memorandum of Understanding on Ecosystem-based Management of Fish and Wildlife and Plant Resources on Military Lands which expired May 17, 2004.

C. AUTHORITIES

This Memorandum of Understanding is established under the authority of the Sikes Act, as amended, 16 CS.C. 670a-670f. which requires the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on military installations in cooperation with the U.S. Fish and Wildlife Service and the state fish and wildlife agencies. The Department of Defense's primary mission is national defense. Department of Defense manages approximately 30 million acres of land and waters under the Sikes Act to conserve and protect biological resources while supporting sustained military land use.

The U.S. Fish and Wildlife Service manages approximately 96 million acres of the National Wildlife Refuge System, and administers numerous fish and wildlife conservation and management statutes and authorities, including: the Fish and Wildlife Coordination Act, the Migratory Bird Treaty Act of 1918, the Endangered Species Act, the Marine Mammal Protection Act, the Bald and Golden Eagle Protection Act, the Anadromous Fish Conservation Act, the Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990, the Federal Noxious Weed Act, the Alien Species Prevention Enforcement Act of l992, the North American Wetland Conservation Act, and the Coastal Barrier Resources Act.

The states in general possess broad trustee and police powers over fish and wildlife within their borders including – absent a clear expression of Congress' intent to the contrary – fish and wildlife on federal lands within their borders. Where Congress has given federal agencies certain conservation responsibilities, such as for migratory birds or species listed as threatened or endangered under the Endangered Species Act, the states, in most cases, have cooperative management jurisdiction.

The Sikes Act (16 U.S.C. 671c-1) allows the secretary of a military department to enter into cooperative agreements with states, local governments, nongovernmental organizations, and individuals to provide for the maintenance and improvement of natural resources, or to benefit natural and cultural resources research, on Department of Defense installations.

The Sikes Act (16 U.S.C. 6701(b)) also encourages the Secretary of Defense, to the greatest extent practicable, to enter into agreements to use the services, personnel, equipment, and facilities with or without reimbursement, of the Secretary of the Interior in carrying out the provisions of this section.

The Economy Act (31 U.S.C. 1535 and 1536) allows a federal agency to enter into all agreement with another federal agency for services, when those services can be rendered in a more convenient and cost effective manner by another federal agency.

The Intergovernmental Cooperation Act of 1968(PL. 90-577 (82 Stat. 1098)) allows the "improvement of the administration of grants-in-aid to the states, to permit provision of reimbursable technical services to state and local government.

D. RESPONSIBILITIES

The parties to this agreement hereby enter into a cooperative program of Integrated Natural Resources Management Plan development and implementation with mutually agreed-upon fish and wildlife conservation objectives to satisfy the goals of the Sikes Act.

1. The Department of Defense, the U.S. Fish and Wildlife Service and International Association of Fish and Wildlife Agencies (the parties) mutually agree, in accordance with all applicable federal, state and local laws and regulations:

a. To meet at least annually to discuss implementation of this Memorandum of Understanding. The Department of Defense will coordinate the annual meeting and any other meetings related to this

Memorandum of Understanding. Proposed amendments to the Memorandum of Understanding should be presented in writing to the parties at least 15 days prior to the annual meeting. The terms of this Memorandum of Understanding and any proposed amendments may be reviewed at the annual meeting. The meeting may also review mutual Sikes Act accomplishments, research and technology needs, and oilier emerging issues.

b To establish a Sikes Act Tripartite Working Group consisting of representatives from the parties. This Working Group will meet at least quarterly to discuss and develop projects and documents to assist in the preparation and implementation of Integrated Natural Resources Management Plans and to discuss Sikes Act issues of national importance.

c. The Sikes Act Tripartite Working Group will encourage the establishment of Integrated Natural Resources Management Plan Development and Implementation Teams to facilitate early communication during preparation, review, revision or implementation of an Integrated Natural Resources Management Plan and to ensure that such Integrated Natural Resources Management Plans are comprehensive and implemented as mutually agreed

d. Supplemental Sikes Act Memorandum of Understandings or other agreements may he developed at the regional and or state level.

e. To recognize the current Department of Defense and U.S. Fish and Wildlife Service Sikes Act Guidelines on http://www.lkvs.gov and http://www.denix.osd.mil as the guidance for communication and cooperation of the parties represented by this Memorandum of Understanding,

f. That none of the parties to the Memorandum of Understanding is relinquishing any authority, responsibility, or duty as required by law, regulation, policy, or directive.

g. To engage in sound management practices for natural resource protection and management pursuant to this Memorandum of Understanding with due regard for military readiness, the welfare of the public, native fish and wildlife, threatened and endangered species, and the environment.

h. Consistent with Department of Defense's primary military mission and to the extent reasonably practicable, to promote the sustainable multipurpose use of natural resources on military installations, to include hunting, fishing, trapping, and non-consumptive uses such as wildlife viewing, boating, and camping.

i. To designate the individuals listed below as the national representative from each signatory to participate in the activities pursuant to this Memorandum of Understanding. Representatives may also be designated at the regional and local levels to participate in similar Sikes Act planning or coordination activities.

i. Department of Defense Conservation Team Leader, ODUSD (I&E) EM, 1225 Clark Street Suite 1500, Arlington, VA 22202-43 36
ii. U.S. Fish and Wildlife Service: National Sikes Act Coordinator, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, Room 400, Arlington, VA 22203.
iii. International Association of Fish and Wildlife Agencies; Executive Vice-President, International Association of Fish and Wildlife Agencies. 444 North Capitol Street, NW. Suite 544. Washington, DC 20001.

2. Department of Defense agrees to

a. Communicate the establishment of this Memorandum of Understanding to all Department of Defense Components.

b. Take the lead in the development of policies related to Integrated Natural Resources Management Plan development and implementation and seek the cooperation of the U.S. Fish and Wildlife Service and the state fish and wildlife agencies during development, review, and implementation.
c. Ensure distribution of the Department of Defense and revised U.S. Fish and Wildlife Service Sikes Act Guidelines to all appropriate Department of Defense offices at every level of command.

d. Encourage military installations to invite appropriate U.S. Fish and Wildlife Service and state fish and wildlife agency offices to participate in developing and updating the Integrated Natural Resources Management Plans. All such invitations should be extended well in advance of the needed date for the product or work in order to facilitate meaningful participation by all three parties.

c. Encourage military installations to take advantage of U.S. Fish and Wildlife Service and state fish and wildlife agency natural resources expertise through the use of Economy Act transfers and cooperative agreements. Priority should be given to projects that:

> i. Sustain the military mission.
> ii. Consider the strategic planning priorities of the U.S. Fish and Wildlife Service and the state fish and wildlife agency.
> iii. Effectively apply the principles of ecosystem management.

f. Encourage military installation to identify Integrated Natural Resources Management Plan project requirements and give priorities to those that:

> i. Ensure conservation of natural resources while sustaining military mission activities.
> ii. Achieve compliance with federal, state, and local laws.
> iii. Provide adequate staffing for the development and implementation of the Integrated Natural Resources Management Plan.

g. Discuss with the U.S. Fish and Wildlife Service and the state fish and wildlife agencies all issues or mutual interest related to the protection, conservation, and management of fish and wildlife resources on Department of Defense installations, and obtain the mutual agreement of the U.S. Fish and Wildlife Service and the states regarding all Integrated Natural Resources Management Plan provisions related to activities within their legal jurisdiction.

h. Subject to mission, safety and security requirements, provide public access to military installations to facilitate the sustainable multipurpose use of its natural resources.

i. Identify Department of Defense natural resource research needs, and develop research proposals with input from U.S. Fish and Wildlife Service and/or the International Association of Fish and Wildlife Agencies.

j. Encourage the Military Services to establish natural resources management liaisons to facilitate:

> i. Coordination and mutual agreement of Integrated Natural Resources Management Plans.
> ii. Development and implementation of cooperative regional and local natural resource conservation partnerships and conservation initiatives with U.S. Fish and Wildlife Service and state fish and wildlife agency offices.

iii. Natural resources conservation technology transfer and training initiatives between the Military Services, federal land management agencies, and state fish and wildlife agencies.

3. U.S. Fish and Wildlife Service agrees to:

a. Communicate the establishment of this Memorandum of Understanding to each U.S. Fish and Wildlife Service Regional Office and appropriate field stations in close proximity to military installations.

b. Distribute the Department of Defense and revised U.S. Fish and Wildlife Service Sikes Act Guidelines to each U.S. Fish and Wildlife Service Regional Office and appropriate field station in close proximity to military installations.

c. Designate regional and field station U.S. Fish and Wildlife Service liaisons to develop partnerships and assist the Department of Defense in implementing joint management of ecosystem-based natural resource management programs.

d. Identify U.S. Fish and Wildlife Service personnel needs for the development, review, updating, and implementation of Integrated Natural Resources Management Plans and expedite the fulfillment of those needs, as appropriate, based on funding and U.S. Fish and Wildlife Service priorities.

e. Provide technical assistance to the Department of Defense in managing federal trust resources such as endangered species, migratory birds, inter-jurisdictional fisheries, invasive species, contaminants, wetlands, coastal resources, law enforcement, or other natural resource issues within the scope of U.S. Fish and Wildlife Service responsibilities, funding constraints and expertise

f. Work with the Department of Defense to coordinate military natural resource research efforts and the creation of a consolidated source of information, with a particular emphasis on research on listed species and species al-risk.

g. Disseminate upcoming proposed listing and critical habitat designations to Department of Defense headquarters offices arid potentially affected installations ax part of outreach efforts before the Federal Register publication of such proposed designations.

h. Provide law enforcement support to protect fish, wildlife and plant resources on military installations within the jurisdiction of the U.S. Fish and Wildlife Service.

4. International Association of Fish and Wildlife Agencies agrees to:

a. Communicate the establishment of this Memorandum of Understanding to each state fish and wildlife agency director and appropriate field offices.

b. Distribute the Department of Defense and revised U.S. Fish and Wildlife Service Sikes Act Guidelines to each state fish and wildlife agency director and appropriate field offices.

c. Facilitate and coordinate with the states to encourage them to:

i. Participate in the development, review, updating and implementation of Integrated Natural Resources Management Plans upon request of military installations.
ii. Designate state liaisons to assist in developing partnerships and to assist the Department of Defense in implementing natural resource conservation and management programs.

iii. Identify state wildlife management areas in close proximity to military installations and, where appropriate, participate in the joint management of ecosystem-based natural resource in management projects.

iv. Provide technical assistance to the Department of Defense in managing natural resource issues such as endangered species, migratory birds, inter-jurisdictional fisheries, invasive species, contaminants, wetlands, coastal resources, law enforcement, outdoor recreation, or other natural resource issues within the scope of state responsibility and expertise.

v. Identify state personnel needs for the development, review and implementation of Integrated Natural Resources Management Plans and expedite the fulfillment of these needs as appropriate based on available funding and state priorities.

vi. Coordinate current and proposed state natural resource research efforts with those that may relate to Department of Defense installations.

vii. Coordinate with Department of Defense installations in development of comprehensive state wildlife conservation plans.

E. STATEMENT OF NO FINANCIAL OBLIGATION

This Memorandum of Understanding does not impose any financial obligation on the part of any signatory.

F. ESTABLISHMENTOF COOPERATIVE AGREEMENTS

The parties are encouraged to enter into cooperative agreements to coordinate and implement natural resource management on military installations if fiscal resources are to be transferred in support of this Memorandum of Understanding. The parties must develop a separately funded cooperative agreement. Such cooperative agreements may be entered into under the authorities of the Sikes Act (16 U.S.C. 670a-670f, as amended) and the Economy Act (31 U.S.C. 1535 and 1536). Each funded cooperative agreement shall include a work plan and a financial plan that identify goals, objectives, and a budget and payment schedule. A cooperative agreement to accomplish a study or research also will include a study design and methodology in the work plan. It is understood and agreed that any monies allocated via these cooperative agreements shall be expended in accordance with its terms and in the manner prescribed by the fiscal regulations and/or administrative policies of the party making the funds available.

G. AMENDMENTS

This Memorandum of Understanding may be amended at any time by mutual agreement of the parties in writing.

H. TERMINATION

Any party of this agreement may remove itself from this Memorandum of Understanding upon sixty (60) days written notice to the other parties.

EFFECTIVE DATE AND DURATION

This Memorandum of Understanding will be in effect upon date of final signature and will continue for five years from date of final signature. The parties will meet six months prior to the expiration of this Memorandum of Understanding to discuss potential modifications and renewal terms.

Appendix AA.3 Cooperative Agreement between Alaska District, Corps of Engineers and Bureau of Land Management, Alaska Authorizations on Withdrawn Lands

I. Purpose

This agreement between the Department of the Army, Alaska District, Corps of Engineers (Corps) and the Department of the Interior, Bureau of Land Management, Alaska State Office defines the responsibilities for authorizing use (rights-of-way, leases, licenses, permits) by others of public lands in Alaska withdrawn for the Department of the Army and the Department of the Air Force.

II. Authority

A. Bureau of Land Management

1. Federal Land Policy and Management Act (43 U.S.C. 1701).
2. Recreation and Public Purposes Act (43 U.S.C. 869).
3. Mineral Leasing Act (30 U.S.C. 181).

B. Corps of Engineers

1. 40 U.S.C., Section 51
2. 10 U.S.C., Sections 2667, 2668, and 2669.

C. Unless the order of withdrawal specifically indicates otherwise, lands withdrawn for military purposes are under the control of the military and the military has the authority to authorize use of the lands.

III. Procedures

A. The Corps will process applications for rights-of-way, leases, licenses, and permits on public lands in Alaska withdrawn for the Army and the Air Force with the following exceptions:

1. Where the order of withdrawal specifically reserves this authority to the Department of the Interior or Bureau of Land Management.

2. Applications pursuant to the Recreation and Public Purposes Act.

3. Applications pursuant to the Mineral Leasing Act.

If the order of withdrawal has a specific termination date, the Corps shall not issue use authorizations for a period longer than the term of the withdrawal without the concurrence of Bureau of Land Management.

B. Bureau of Land Management will process applications for rights-of-way, leases, licenses, and permits noted as exceptions in (A) above, but only with the concurrence of the Corps.

IV. Implementation

A. This agreement becomes effective upon signature by both parties.

B. This agreement may be terminated by mutual agreement of the parties or upon 30 days written notice by either party.

C. This agreement supersedes Bureau of Land Management Agreement No. AG-50910-127 between the District Engineer and the Bureau of Land Management dated October 12, 1973.

Appendix AB. 2007-2011 Natural Resources Work Plan

(The work plan is kept in the Natural Resources office.)

U.S. Army
Garrison
Alaska

2007-2011
Integrated
Natural
Resources
Management
Plan

VOLUME II, Annex B
Watershed and Wetlands Management

Final March 30, 2007
Updated September 25, 2009

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B1. Introduction

In previous versions of the Army's natural resource management planning, the first component of natural resources plans was referred to as "land management." This section of the plan dealt with programs and policies relating to the management of soils and vegetation. In this Integrated Natural Resources Management Plan (INRMP), the first primary component is termed "watershed and wetlands" management to emphasize the interrelationship between soil and vegetation and the water resources that bind them together and help to define them. Therefore, this watershed and wetlands component plan to the INRMP will attempt to integrate soil, vegetation and water resources management, a foundation for the following forestry and wildfire, fish and wildlife, outdoor recreation, and rare, threatened and endangered species component plans.

Watershed and wetlands management operations must be consistent with the latest conservation and land management principles, which are continuously applied in an orderly and timely manner. Carrying out national land use and conservation policies is required on all federal lands to the extent practicable and in concert with the assigned mission. Commanders within the continental United States will actively cooperate with local, state, and federal organizations in the carrying out of national land use and conservation policies in accordance with accepted scientific and professional standards and practices. Appropriate decision-makers and commanders at all levels shall be kept informed of the condition of natural resources; the objective of natural resources management plans; and potential or actual conflicts between Army activities and management plans; federal, state, or local laws or regulations; or the policies and procedures herein.

The Garrison Commander will plan land utilization with an awareness of the potential environmental effects of proposed actions. Mission requirements for the land will avoid or minimize adverse effects and restore or enhance environmental quality. Actions will be carried out in accordance with the provisions of Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*; AR 200-2, *Environmental Analysis of Army Actions (32 CFR Part 651)*, AR 200-3, *Natural Resources – Land, Forest and Wildlife Management*; AR 210-21, *Army Ranges and Training Land Program*; and applicable federal, state, and local laws and regulations.

The natural resources management professional will be an active participant in all planning and decision-making activities regarding uses of the land to ensure that current and planned mission activities (i.e., master planning, construction requests, site approval requests, and training exercise plans) are conducted in a manner which is compatible with natural resources and other environmental requirements. The inventory process, the Range Training Land Assessment, will identify and evaluate the condition and potential trends of wetland, marine, and estuarine land, grasslands, soils, scenic and natural areas, aesthetics, threatened and endangered species habitats, and other sensitive natural resources.

The initial step to be taken in the development of a multiple use natural resources management program requires a survey, inventory, and classification of the resources present and their status. The inventory will identify and evaluate the condition and potential trends of wetland, marine, and estuarine areas, fresh water, forest land, grasslands, soils, threatened and endangered species habitat, scenic and natural areas, aesthetics, and any other significant environmental elements. Surveys and inventories, at a minimum, will also identify endangered and threatened species of flora and fauna, federal candidate and state listed species, critical habitat, native ecosystems, and archeological and historic sites. When in-house capability is not adequate to accomplish this task, maximum use should be made of assistance from the Installation Management Agency, Corps of Engineers, and cooperating federal, state, and local agencies.

B1.1 Watershed and Wetlands Management Goals and Objectives

Watershed and wetland management goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. AR 200-1 and AR 200-3 establish the following objectives for soil, vegetation, and water resources on Army lands:

- Conserve all soil, vegetation, and water resources.
- No net loss of wetlands.
- Ensure that USAG-AK is in compliance with all applicable federal and state laws and regulations regarding wetlands.
- Provide wetland areas for realistic military training, while maintaining ecosystem integrity and minimizing impacts to wetlands.
- Distribute wetland management prescriptions to all user groups: military, recreationalists, Directorate of Public Works, and Alaska Fire Service.
- Promote early coordination between installation staff and the Environmental Resources Department to prevent adverse impacts to wetlands.
- Control or eliminate sources of pollution to surface water or groundwater through conventional or innovative treatment systems.
- Demonstrate leadership in attaining the national goal of zero discharge of water pollutants.
- Provide drinking water that meets applicable standards.
- Cooperate with federal, state, and local regulatory authorities in forming and implementing water pollution control plans.
- Control or eliminate runoff and erosion through sound vegetative and land management practices.

Attainment of some of the above objectives is not the responsibility of Army natural resources programs, but some of them, especially the first and last two, are clearly natural resources management concerns. Erosion has not been identified as a significant threat to water quality on USAG-AK lands. Munitions explosions and associated wildfires cause soil disturbance, which increases the risk of erosion.

B1.2 Watershed and Wetlands Management Responsibilities

Watershed and wetlands management is the responsibility of USAG-AK Directorate of Public Works. Within Directorate of Public Works, the Environmental Department has primary responsibility to conduct watershed and wetlands management. U.S. Army Alaska Deputy Chief of Staff, G3 also shares responsibilities to implement soil and water quality management through the Land Rehabilitation and Maintenance program and through best management practices of the impact areas. U.S. Army Corps of Engineers, under the Clean Water Act, is the primary regulator. The Environmental Protection Agency also has regulatory responsibility under the Safe Drinking Water Act. Alaska Department of Environmental Conservation also has responsibility for regulating soil and water quality.

USAG-AK recognizes that the release of munitions residues into the environment and response actions to clean up those contaminants may result in adverse impacts to natural resources addressed in this Integrated Natural Resources Management Plan (INRMP). The Installation Restoration Program is responsible for identifying such releases, considering risks and assessing impacts to the environment (including impacts to endangered species, migratory birds and biotic communities), and developing and selecting response actions when unacceptable risk to ecological receptors from the release is likely. The installation's natural resources management staff, in coordination with the U.S. Fish and Wildlife Service and Alaska Department of Environmental Conservation, will identify the potential impacts to natural resources caused by the release of residues and communicate those impacts to the Installation Restoration

Program. Installation natural resources staff will also participate, as appropriate, in the Installation Restoration Program decision-making process to communicate natural resources issues, review and comment on documents (e.g., Remedial Investigation, Ecological Risk Assessment), and ensure that response actions are undertaken in a manner consistent with goals and objectives set forth in the INRMP to the maximum extent practicable.

B2. Watershed and Wetlands Management

Watershed and wetlands management consists of survey, monitoring and management of soil, vegetation, wetlands, and water resources. USAG-AK utilizes the ecosystem management process to integrate the management and protection of these basic resources. The first portion of this INRMP component plan is dedicated to managing these primary resources, with one exception. This plan concentrates on maintaining ecosystem quality and health. Sites that have already been contaminated through past activities are managed through USAG-AK's clean-up program and are included in the Installation Restoration Plan. Therefore, this INRMP focuses on surface water resources, while the Installation Restoration Program primarily focuses on restoring groundwater resources. Groundwater management consists of restoration projects to resolve individual sources of pollution, generally associated with the Comprehensive Environmental Response, Compensation, and Liability Act "Superfund" designation. The second half of this plan describes programs that manage and have a profound effect upon these resources, such as pest management, invasive species management, agriculture outlease management, minerals management, integrated training area management, and grounds management.

B2.1 Soil Resources Management

Soil resources management on USAG-AK lands entails the conservation of soils as the foundation of other natural resources. USAG-AK contributes to soil conservation through surveys, monitoring, rehabilitation, and effective management strategies. These components of soil resources management are described in the sections below.

- Repair a minimum of 20 acres of erosion sites per year.
- Maintain or increase water quality.
- Land management operations are consistent with best management practices and ecosystem management.
- Wetland inventories/planning level surveys are used during the planning phase of all ground-disturbing projects.
- Complete, maintain, and update a soils planning level survey.
- Identify the requirement for a soils planning level survey in the budget.
- Complete, maintain, and update a topography planning level survey.
- Identify the requirement for a topography planning level survey in the budget.

B2.1.1 Soil Resources Survey and Monitoring

USAG-AK conducts both planning level soil surveys and soil resource monitoring. The first program, planning level surveys, surveys the soil and topography resources present across the entire installation. The Integrated Training Area Management program conducts annual monitoring of soils and vegetation through the Range and Training Land Assessment program.

B2.1.1.1 Soil Resources Planning Level Survey

The initial step to be taken in the development of a multiple use natural resources management program requires a survey, inventory, and classification of the resources present and their status. The draft Natural Resources Guidance from Army Chief of Staff for Installation Management (2005) indicates that in addition to other surveys, the installation must identify and evaluate the condition of soil resources.

Conduct a baseline planning level soil survey on all USAG-AK lands. Identify and map soils, correlate soils to permafrost areas, and establish relationships among terrain components. Soil surveys are essential to establishing a database for planning effective management of withdrawn public lands. Soils data are required for input into the military training and scheduling process. The soils planning level survey is required by AR 200-3, supports compliance with the Clean Water Act, and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

B2.1.1.2 Topographical Planning Level Survey

Conduct ten-year update of topographical planning level survey. An accurate topographical planning level survey is required by AR 200-3 and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

B2.1.1.3 Soil Monitoring

The U.S. Army's Range and Training Land Assessment program is the monitoring component of the Integrated Training Area Management program, which seeks to maintain a balance between the use of training lands to maximize military preparedness and the conservation of biologically diverse and functioning ecosystems. These two aspects of land use are not always mutually exclusive, however, as combat training can require the use of non-degraded lands to provide realistic combat situations.

The Range and Training Land Assessment collects information on the condition of soils. Soil disturbance monitoring takes place annually focusing in areas impacted by military training. To this end, the Range and Training Land Assessment program in Alaska is designed to provide data to military trainers on the condition of their training lands with respect to both the ecological condition of the land and the condition of the land in terms of its potential to support training. This information is necessary for decisions to be made regarding the location and timing of training events, and also to provide information necessary to prioritize which sites are in need of restoration through the Land Rehabilitation and Maintenance program. In short, the Range and Training Land Assessment data serve as the primary tool used in land management decisions with respect to military training. These data also provide general botanical information about the post and are the focal point of a long-term monitoring program to evaluate the ecological health of the training areas.

The Range and Training Land Assessment program is discussed in detail in the U.S. Army Alaska Integrated Training Area Management Five Year Management Plan (U.S. Army Alaska 2005) and is discussed in relation to the other components of integrated training area management in Section B2.9.

B2.1.2 Soil Resources Rehabilitation and Management

Soil resources management consists primarily of prevention activities and actual restoration of disturbed areas. The Integrated Training Area Management Five Year Management Plan contains best management practices, which are in concert with installation storm water prevention techniques. Restoration of disturbed areas is conducted by both installation management erosion control and streambank stabilization programs as well as the mission related Land Rehabilitation and Maintenance program.

B2.1.2.1 Erosion Control and Streambank Stabilization

Installation sources of dust, runoff, silt, and erosion debris will be controlled to prevent damage to land, water resources, equipment, and facilities, including adjacent properties. A protective vegetative cover will be maintained over all compatible areas. Other materials that may be used as appropriate for erosion control include gravel, fabrics, mulch, riprap, and recycled concrete and pavement that are environmentally safe and compatible with the site. When bare ground is required for accomplishing mission objectives, other soil conservation measures (for example, check dams, wind breaks, diversions, and so on) will be used to control dust, erosion and sedimentation. In order to minimize land maintenance expenditures and help ensure environmental compliance, physically intensive land-disturbing activities should be sited on the least erodible lands (those requiring the least cover for erosion control). The potential erodibility of a site (as diagnosed from existing soil types, slopes and vegetative cover), and the location of adjacent wetlands should be identified and analyzed in all prepared plans for development, training, as well as other land uses. Assistance in proper site selection can be provided by the U.S. Department of Agriculture, Natural Resources Conservation Service.

This program controls erosion and stabilize streambanks. This project will correct active erosion sites near sensitive areas such as streams and wetlands. Projects are intended to complement the land rehabilitation and maintenance component of integrated training area management, not duplicate training area repair. A Fish Habitat Permit from Alaska Department of Natural Resources Office of Habitat Management and Permitting may be required for work conducted in or along streams and streambanks. Erosion control is required to comply with the Clean Water Act and the Sikes Act, which requires “no net loss” in the capability to support the military mission of Fort Wainwright. Conducting erosion control and streambank stabilization is required by Public Law 106-65 (Military Land Withdrawal Act) as mitigation for the Land Withdrawal Legislative Environmental Impact Statement and Public Law 86-797 (Sikes Act Improvement Act) to implement the INRMP.

Erosion control is included within the land rehabilitation and maintenance section to the degree that it is associated with the maintenance and rehabilitation of training lands. However, erosion control is also associated with water pollution (environmental compliance) and road maintenance. Most erosion control not associated with land rehabilitation and maintenance involves road drainage correction or maintenance. Road drainage maintenance is important for controlling sedimentation. Road maintenance on training lands is generally a responsibility of Directorate of Public Works. However, the 864th Engineers, Special Troops Battalion also provide considerable road maintenance. In addition, the U.S. Air Force maintains roads due to its need for access to its equipment on Army lands.

B2.1.2.2 Land Rehabilitation and Maintenance

Land rehabilitation and maintenance consists of strategies and resource allocations for resting and repairing the soils on training lands on a rotational basis as well as repairing other problem erosion areas as the need arises. Land rehabilitation and maintenance includes programming, planning, designing, and executing land rehabilitation and maintenance projects based on requirements and priorities identified by the Training Requirements Integration and Range and Training Land Assessment components of integrated training area management.

The land rehabilitation and maintenance decision-making process involves identifying sites that are most in need of repair. Sites with erosion problems, steep slopes, or easy accessibility by the public are given priority. The sensitivity of nearby areas to siltation is also given consideration, since eroding soil will be deposited at some point down-slope. A list can be compiled from this data and used by range managers to

help prioritize land rehabilitation and maintenance projects. In some cases, this can identify sites that may have been overlooked or not considered critical.

The Land Rehabilitation and Maintenance program is discussed in detail in the U.S. Army Alaska Integrated Training Area Management Five Year Management Plan (U.S. Army Alaska 2005) and is discussed in relation to the other components of integrated training area management below in Section B2.9.

B2.1.2.3 Agriculture/Grazing Outlease

Leasing of land for uses that are compatible with mission requirements can reduce installation maintenance efforts, provide opportunities for accomplishing land maintenance by the lessee at no cost to the installation, provide funds which the Army can use to support leasing efforts and other natural resources requirements, and support community relations and the local economy. While there currently are no outleases on USAG-AK lands, USAG-AK will continue to search for opportunities that could contribute to soil resources management. The program and policy for the Agriculture/Grazing Outlease Program is detailed in Section B2.7.

B2.2 Water Resources Management

Water resource management goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and program integration. AR 200-1 establishes the following goals for water resources on Army lands:

- Conserve all water resources.
- Complete, maintain, and update a surface water planning level survey.
- Identify the requirement for a surface water planning level survey in the budget.
- Provide drinking water that meets applicable standards.
- Annually monitor surface water as it enters and leaves USAG-AK lands to identify potential contaminants or potential contaminant migration.
- Monitor soils and sediments in streambeds annually where they cross the boundary to identify potential contaminants or potential contaminant migration.
- Provide appropriate agencies results of sampling studies.
- Control or eliminate runoff and erosion through sound vegetative and land management practices.
- Consider non-point source pollution abatement in all construction, installation operations, and land management plans and activities.

B2.2.1 Water Resources Inventory and Monitoring

USAG-AK conducts planning level surface water surveys as well as annual surface water and groundwater monitoring. The first program, planning level surveys, delineates the extent of surface water across all of USAG-AK's lands. Surface water monitoring focuses on monitoring water surrounding impact areas. The responsibility for groundwater monitoring does not fall within the natural resources program within the Department of Defense system of environmental management. However, a brief summary of groundwater monitoring is provided to show its importance as an environmental compliance activity.

B2.2.1.1 Surface Water Planning Level Survey

USAG-AK conducts surface water planning level surveys to delineate the extent of surface water across all 1.6 million acres of USAG-AK lands. Shifting waterlines caused from glacially fed riverine systems results in constantly changing surface water boundaries. Conduct ten-year update of surface water planning level survey on all USAG-AK lands. An accurate baseline surface water planning level survey is required by AR 200-3 and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

B2.2.1.2 Surface Water Monitoring

Surface water monitoring will be conducted to evaluate the presence of munitions residues from the impact area. Monitoring water quality is important for measuring ecosystem health. Management areas for soil and water quality monitoring focus on impact areas and ranges. Surface water sampling locations will be concentrated where rivers and creeks enter and leave the installation. Soil sampling will occur in rivers and creeks at the edge of the impact areas. Soil and water quality monitoring evaluates water quality coming onto and leaving USAG-AK lands and identifies any potential residues leaving the impact area. Water quality monitoring is required to comply with the Clean Water Act and other environmental laws and regulations, as well as to formulate options for managing those species particularly dependent upon high water quality, as required by the Sikes Act and AR 200-3. Soil and water quality monitoring is required by Public Law 106-65 (Military Land Withdrawal Act) as mitigation for the Land Withdrawal Legislative Environmental Impact Statement and Public Law 86-797 (Sikes Act) every five years to implement the INRMP and are a class 1 requirement.

B2.2.1.3 Groundwater Monitoring

Groundwater monitoring is not a natural resources program within Army environmental management, but is included in this INRMP to show the program is conducted on USAG-AK lands. Groundwater monitoring will continue as part of programs implemented by the Environmental Resources Department. What little contamination that has been detected is at very low levels and is of no threat to human health. Groundwater levels in the wells are monitored each month, and extensive chemical testing is conducted on a quarterly basis. Monitoring groundwater was emphasized after Fort Wainwright and Fort Richardson were placed on the National Priorities List in 1994. The resulting Federal Facilities Agreement has commitments from U.S. Army Alaska to monitor this critical resource. As a result, U.S. Army Alaska has installed about 100 monitoring wells over the years. This program is important to natural resources management, but is not considered a natural resources function. Rather, it is a responsibility of the compliance and/or restoration program, and therefore, details of this program are not included within this INRMP.

B2.2.2 Water Resources Management

Water resources management actions in USAG-AK are centered around storm water planning and management, erosion control, best management practices, and impact area management.

B2.2.2.1 Storm Water Pollution Prevention Plan

USAG-AK currently has a storm water pollution prevention plan. The storm water plan sets the framework for which all construction projects must follow in terms of storm water management (USAG-AK 2003).

B2.2.2.2 Erosion Control Best Management Practices

USAG-AK employs a set of best management practices. These best management practices help to ensure sediment and other runoff does not end up in wetlands or other waters of the United States. These best management practices are all listed in the Integrated Training Area Management Five Year Management Plan (U.S. Army Alaska 2005).

B2.2.2.3 Impact Area Management

Managing water quality consists of developing best management practices designed to reduce potential release from expended munitions in the impact areas. Activities such as placing new targets away from open water and ceasing to use existing targets if stream channels move to within 100 meters of those existing targets reduce the likelihood that potential releases may occur. Water quality management is required to comply with the Clean Water Act and the Sikes Act, which requires “no net loss” in the capability to support U.S. Army Alaska’s military mission. Conducting water quality management is required by Public Law 106-65 (Military Land Withdrawal Act) as mitigation for the land withdrawal Land Withdrawal Legislative Environmental Impact Statement and Public Law 86-797 (Sikes Act) to implement the INRMP.

The primary management areas for water resources management focus on impact areas and ranges. Surface water sampling locations will be concentrated on areas where rivers and creeks enter the installation and leave the installation. Sediment and soil sampling will also occur in these rivers and creeks at the edge of the impact areas.

The clean-up of Eagle River Flats Impact Area on Fort Richardson has been ongoing since the 1980s. Once white phosphorus was identified as the cause of significant waterfowl mortality, measures were implemented to improve water and sediment quality in the Eagle River Flats Impact Area. The primary method has been to drain ponds to expose sediments to the air. The white phosphorus is then oxidized (combusted) and removed from the soil.

USAG-AK recognizes that the release of contaminants into the environment and response actions to clean up those contaminants may result in adverse impacts to natural resources addressed in this INRMP. The Installation Restoration Program is responsible for identifying such releases, considering risks and assessing impacts to the environment (including impacts to endangered species, migratory birds and biotic communities), and developing and selecting response actions when unacceptable risk to ecological receptors from the release is likely. The installation's natural resources management staff, in coordination with the U.S. Fish and Wildlife Service and the Alaska Department of Environmental Conservation, will identify, when required, the potential impacts to natural resources caused by the release of contaminants and communicate those impacts to the Installation Restoration Program. Installation natural resources staff will also participate, as appropriate, in the Installation Restoration Program decision-making process to communicate natural resources issues, review and comment on documents (e.g., Remedial Investigation, Ecological Risk Assessment), and ensure that response actions are undertaken in a manner consistent with goals and objectives set forth in the INRMP to the maximum extent practicable.

The Installation Restoration Program will notify installation natural resources management staff of contaminant releases into the environment and invite such staff to participate in the decision-making process to ensure that impacts to natural resources are identified, considered and addressed in the response process.

B2.3 Vegetation Management

Vegetation management on USAG-AK lands entails the conservation of vegetation for military cover and concealment, wildlife habitat, timber, and erosion control. USAG-AK contributes to vegetation conservation through surveys, monitoring, rehabilitation, and effective management strategies. These components of vegetation management are described in the sections below.

- Complete, maintain and update a flora planning level survey.
- Complete, maintain, and update a threatened and endangered flora species survey.
- Identify the requirement for a floristic planning level survey in the budget
- Complete, maintain, and update a vegetation communities planning level survey.
- Identify the requirement for a vegetative communities planning level survey in the budget.
- Identify, locate, and map any rare or sensitive vegetation communities.
- Characterize physical and thermal properties of permafrost, analyze relationships of permafrost with other terrain components, model permafrost distribution, and assess the response of permafrost to disturbance.
- Analyze USAG-AK lands for habitat use by passerines and small mammals, and rank them to diversity of wildlife species by relative value.

B2.3.1 Vegetation Inventory and Monitoring

USAG-AK conducts planning level vegetation community and floristic surveys as well as annual vegetation monitoring. The first program, planning level surveys, surveys the species that occur across the installation as well as their make-up into vegetation communities. The Integrated Training Area Management program conducts annual monitoring of vegetation through the Range and Training Land Assessment program.

B2.3.1.1 Flora Planning Level Survey

USAG-AK conducts a baseline floristic survey to identify all vegetative species that occur on all USAG-AK lands. This survey is updated at least once every ten years to determine trends in floristic biodiversity and improve the quality of the floristic database. Floristic inventory activities set the foundation on which many decisions regarding land management are based. An accurate floristic planning level survey is required by AR 200-3, supports compliance with the Endangered Species Act, and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

B2.3.1.2 Vegetation Communities Planning Level Survey

USAG-AK also conducts a vegetation communities survey for all of its lands. This survey is also updated at least once every ten years. Vegetation survey is conducted as part of an ecological land classification that synthesizes results from integrated resources studies to map ecologically sensitive portions of the landscape to facilitate land management and minimize impacts to ecosystems. The project is designed to emphasize three aspects of ecosystem management: the sensitivity and recovery of ecosystems to disturbance, permafrost distribution and relative stability, and the value of wildlife habitats. The identification of ecologically sensitive areas and threats to these areas are critical to management of the entire installation. This project will directly support the military mission by identifying locations where special precautions should be taken during training, and thus, by default, also identifying areas where special precautions need not necessarily be taken. An accurate vegetation communities planning level survey is required by AR 200-3, supports compliance with the Endangered Species Act, and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

All USAG-AK lands are mapped into categories of ecotypes (mapped at a 1:50,000 scale), ecosections (1:100,000) and ecodistricts (1:500,000). Ecotypes delineate areas with homogeneous topography, terrain, soil, surface-form, hydrology, and vegetation. Ecosections have homogeneous geomorphic features, and recurring patterns of water, soils and vegetation. More than one vegetation type can be represented, but they are usually related as a successional sequence. Ecodistricts are broader areas with similar geology, geomorphology, and hydrology and are similar to physiographic units. Fort Wainwright has 47 ecotypes, Donnelly Training Area has 48, and Fort Richardson has 46 (Jorgenson et al. 1999; Jorgenson et al. 2001; Jorgenson et al. 2003)

B2.3.1.3 Range and Training Land Assessment

The Range and Training Land Assessment program is the monitoring component of the Integrated Training Area Management program, which seeks to maintain a balance between the use of training lands to maximize military preparedness and the conservation of biologically diverse and functioning ecosystems. These two aspects of land use are not always mutually exclusive, however, as combat training can require the use of non-degraded lands to provide realistic combat situations.

Range and training land assessment collects information on the condition of vegetation. Vegetation condition monitoring takes place annually, focusing in areas impacted by military training. To this end, the Range and Training Land Assessment program in Alaska is designed to provide data to military trainers on the condition of their training lands with respect to both the ecological condition of the land and the condition of the land in terms of its potential to support training. This information is necessary for decisions regarding the location and timing of training events, and also to provide information necessary to prioritize which sites need restoration through the Land Rehabilitation and Maintenance program. In short, the range and training land assessment data serve as the primary tool used in land management decisions with respect to military training. These data also provide general botanical information about the post and are the focal point of a long-term monitoring program to evaluate the ecological health of the training areas.

The Range and Training Land Assessment program is discussed in detail in the U.S. Army Alaska Integrated Training Area Management Five Year Management Plan (U.S. Army Alaska 2005) and is discussed in relation to the other components of integrated training area management in Section B2.9.

B2.3.2 Vegetation Management

Vegetation management on USAG-AK lands occurs primarily through forest management, habitat management, land rehabilitation and maintenance, and grounds management programs.

B2.3.2.1 Forest Management

Forest management is the primary natural resource tool to manage and improve vegetation. Forest management focuses on managing woody vegetation and includes forest land improvement activities such as timber stand improvement, forest fuel reduction, commercial timber production, firewood production, and forest pest control. Forest management is required to support and enhance the immediate and long-term military mission while meeting natural resource stewardship requirements set forth in federal laws and the Army's Environmental Strategy. Army forest management goals include biodiversity; wildlife habitat, including habitat for threatened and endangered species of plants and animals; soil conservation and watershed protection; sustained forest health; capturing the residual forest product value; and, most importantly, the sustainment of viable and diversified training lands to meet the military mission. Forest management is discussed in greater detail in Volume II, Annex C of this 2007-2011 INRMP.

B2.3.2.2 Habitat Management

Habitat management is a natural resource tool to manipulate vegetation to improve habitat for desired species. Habitat management efforts will be accomplished in a manner to conserve and enhance existing flora and fauna consistent with the Army goal to conserve, protect, and sustain biological diversity while supporting the accomplishment of the military mission. Activities will be directed towards management to maintain healthy ecosystems, and to restore degraded ecosystems to their historic functions and values. Primary management consideration will be given to the management of indigenous listed, proposed, and candidate species habitats. Also, consideration of other environmentally sensitive areas and other areas of special concern (for example, riparian zones, wetlands, highly erodible areas) should be identified and addressed. Habitat management is discussed in detail in Volume II, Annex D of this 2007-2011 INRMP.

B2.3.2.3 Land Rehabilitation and Maintenance

Land rehabilitation and maintenance is another primary source of vegetation management in the training areas. Land rehabilitation and maintenance consists of strategies and resource allocations for revegetation of disturbed training lands as well as reseeding other problem erosion areas as the need arises. Land rehabilitation and maintenance includes programming, planning, designing, and executing land rehabilitation and maintenance projects based on requirements and priorities identified by the Training Requirements Integration and Range and Training Land Assessment components of the Integrated Training Area Management program.

The land rehabilitation and maintenance decision-making process involves identifying sites that are most in need of repair. Sites with erosion problems, steep slopes, or easy accessibility by the public are given priority. The sensitivity of nearby areas to siltation is also given consideration, since eroding soil will be deposited at some point down slope. A list can be compiled from this data and used by range managers to help prioritize land rehabilitation and maintenance projects. In some cases, this can identify sites that may have been overlooked or not considered critical.

The Land Rehabilitation and Maintenance program is discussed in detail in the U.S. Army Alaska Integrated Training Area Management Five Year Management Plan (U.S. Army Alaska 2005) and is discussed in relation to the other components of integrated training area management in Section B2.9.

B2.3.2.4 Grounds Maintenance

Unimproved grounds vegetation maintenance consists primarily of removing or cutting woody vegetation that grows along roadways, on rights-of-way, on firing ranges, in fuel breaks, and on other range facilities such as drop zones where woody vegetation is not desired. The methods used to accomplish this type of unimproved grounds maintenance is primarily mechanical, often a brush hog or hydro-axe. Grounds maintenance also includes landscape plantings in urban areas, done primarily for aesthetic purposes.

B2.4 Wetlands Management

Wetlands are of critical importance to the protection and maintenance of living resources, including a significant number of endangered and threatened species, as they provide essential breeding, spawning, nesting, and wintering habitats for a major portion of the nation's fish and wildlife species. Wetlands also protect the quality of surface waters through impeding the erosive forces of moving water and trapping waterborne sediment and associated pollutants, protecting regional water supplies by assisting the purification of surface and groundwater resources, maintaining base flow to surface waters through the

gradual release of stored flood waters and groundwater, and providing a natural means of flood control and storm damage protection through the absorption and storage of water during high runoff periods.

Executive Order 11990 requires that federal agencies minimize any significant action that contributes to the loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agencies responsibilities. It is Department of Army policy to avoid adverse impacts to existing aquatic resources and to offset those adverse impacts that are unavoidable. Additionally, the Army will strive to achieve a goal of no net loss of values and functions to existing wetlands, and permit no overall net loss of wetlands on Army controlled lands. Furthermore, the Department of Army will take a progressive approach toward protecting existing wetlands, rehabilitating degraded wetlands, restoring former wetlands, and creating wetlands in an effort to increase the quality and quantity of the nation's wetlands resource base. To meet this requirement, installations will identify and maintain a current inventory of their wetlands resources. Installations should contribute to and reference the National Wetlands Inventory.

Action affecting wetlands will require an environmental analysis in accordance with AR 200-1, 32 CFR 560, and applicable federal and state laws and regulations. U.S. Army Corps of Engineers permits are required under Section 10 of the Rivers and Harbors Act of 1899 prior to commencing any work or structures built in a navigable water of the United States. Such work includes dredging, bulkheads, piers and docks, and bank protection. Corps permits are required under Section 404 of the Clean Water Act for the discharge or dredged of fill material into a water of the United States, including wetlands. The Corps of Engineers regulations in 33 CFR Parts 320-330 prescribe the statutory authorities and general and special policies and procedures applicable to the review of applications for Corps of Engineers permits. Before commencing any work in a water of the United States, a district engineer must be contacted and a permit obtained, as appropriate.

The wetlands section guides the implementation of a wetland management program. The program outlined in this section helps to maintain quality training lands for use by U.S. Army Alaska to accomplish its military mission while conserving wetlands and complying with all applicable environmental laws, regulations, and Army policy. In addition to military wetland use, this section manages recreational, facilities maintenance, and fire suppression activities while maintaining natural wetland functions. Proposed actions described in this plan will reduce and mitigate any resulting wetland damage.

B2.4.1 Introduction

Wetlands are an integral part of the ecosystem, providing a variety of functions that support ecosystem health including moderating extremes in waterflow, aiding natural purification of water, and maintaining and recharging ground water. Wetlands are periodically or permanently inundated by surface or ground water and support vegetation adapted for life in saturated soil. Wetlands are nursery areas for many wildlife and aquatic species. Additionally, wetlands are unique ecological areas, high in aesthetic value, and support a variety of recreational activities such as fishing, hunting, and bird watching.

B2.4.1.1 Policy

USAG-AK is responsible for managing wetlands on approximately 1.5 million acres in accordance with applicable federal laws, regulations, and guidelines. The wetlands management program is in compliance with these laws. Army Regulation 200-3 (*Natural Resources - Land, Forest, and Wildlife Management*) outlines responsibilities for installations, Major Commands, and supporting organizations with respect to these laws. In addition, various state and borough laws and regulations must be considered and complied with.

Management of wetlands is an ongoing process. It is the responsibility of anyone who may initiate or undertake a project or activity that could affect a wetland. It is the responsibility of the Environmental Resources Division staff to coordinate compliance with wetland laws on behalf of USAG-AK. The Environmental Resources Department staff will administer the wetlands management program and oversee compliance with wetland laws and regulations.

Wetlands must be managed according to the existing body of laws, regulations, directives, and guidelines as listed below.

AR 200-1 (*Environmental Protection and Enhancement*) and AR 200-2 (*Environmental Analysis of Army Actions*). Any action affecting wetlands will require an environmental analysis in accordance with AR 200-1 and AR 200-2.

AR 200-3 (*Natural Resources - Land, Forest, and Wildlife Management*). According to AR 200-3, "it is Department of Army policy to avoid adverse impacts to existing aquatic resources and offset those adverse impacts which are unavoidable. Additionally, Army will strive to achieve a goal of no net loss of values and functions to existing wetlands, and permit no overall net loss of wetlands on Army controlled lands. Furthermore, the Department of Army will take a progressive approach towards protecting existing wetlands, rehabilitating degraded wetlands, restoring former wetlands, and creating wetlands in an effort to increase the quality and quantity of the nation's wetlands resource base."

DOD Directive 4700.1 (Natural Resources Management Program), Instruction 4715.3. This instruction states that "Department of Defense operations and activities shall avoid the net loss of size, function, or value of wetlands. Additionally, the Department of Defense will preserve the natural and beneficial values of wetlands in carrying out its activities."

Executive Order 11990 (Protection of Wetlands). This order mandates that "federal agencies shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities." Executive Order 11990 and the Sikes Act require wetland management to be consistent with ecosystem management principles and included in the Integrated Natural Resources Management Plan.

Executive Order 11988 (Floodplain Management). This order requires federal agencies to take action to reduce the risk of flood loss; to minimize the impacts of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains in carrying out their responsibilities for managing federal lands. Before taking an action, U.S. Army Alaska must determine whether the proposed action will occur in a floodplain and, if so, alternatives to avoid adverse effects. Incompatible developments in floodplains must also be considered. Most floodplain areas are classified as wetland throughout Fort Wainwright and Donnelly Training Area.

Rivers and Harbors Act of 1899; as amended. Under Section 10 of this Act, U.S. Army Corps of Engineers permits are required for any structure or activity in navigable waters. This includes dredging, bank protection efforts, and any construction of bulkheads, piers and docks.

Federal Water Pollution Control Act of 1972; as amended (also known as Clean Water Act). Section 404 of this Act requires that persons wanting to dispose of dredged or fill material in waters of the United States obtain a permit from the U.S. Army Corps of Engineers. The U.S. Army Corps of Engineers may issue permits on an individual basis or may issue general permits on a state, regional, or national basis. Some actions are prohibited if they would have an unacceptable adverse impact on municipal water

supplies, fishery areas, and wildlife or recreational areas. Other activities, such as discharge of dredged or fill material resulting from ordinary farming and ranching activities, do not require a permit. Before commencing any work in waters of the United States, U.S. Army Corps of Engineers Regulatory Branch must be contacted to determine if a permit is needed.

National Environmental Policy Act (NEPA). The National Environmental Policy Act was created to disclose environmental concerns with human activities and resolve them to the extent possible. USAG-AK requires all new projects involving wetlands to be reviewed through the NEPA process.

Sikes Act (PL 105-85). This Act authorizes the Secretary of Defense to develop cooperative plans for the development, maintenance, and coordination of wildlife, fish and game conservation and rehabilitation. Each plan shall provide for fish and wildlife habitat improvements; range rehabilitation where necessary to support wildlife; control of off-road vehicle traffic; specific habitat improvement; and adequate protection for species of fish, wildlife, and plants considered threatened or endangered. These requirements will apply directly to wetland areas because they are a highly important part of fish and wildlife habitat.

State of Alaska Departmental Permits. Several state permits are needed for specific actions. These include 18 AAC 70 Alaska Water Quality Standards (Certificate of Reasonable Assurance) issued by the State of Alaska, Department of Environmental Conservation. The Alaska Department of Environmental Conservation issues this permit with the assurance that the proposed activity, as well as any discharge that might result, will comply with applicable provisions of Section 401 of the Clean Water Act and with the Alaska Water Quality Standards. The Alaska Department of Natural Resources, Division of Land requires a land use permit when any activity occurs near or on state lands or stream beds as specified under Alaska Statute (AS) 38.05.850. Additionally, the Alaska Department of Natural Resources regulates stream crossings. During winter months, if a designated ice bridge site is unavailable for crossing, written approval in the form of a Title 41 Fish Habitat Permit (AS 41.14.840 for streams with resident fish and AS 41.14.870 for streams with anadromous fish) from the Alaska Department of Natural Resources, Office of Habitat Management and Permitting is required. During summer months, all crossings of anadromous fish streams require a Title 41 Fish Habitat Permit from the Alaska Department of Natural Resources, Office of Habitat Management and Permitting. Resident fish streams can be crossed during summer months without a permit.

B2.4.1.2 Program Goals

The following general goals reflect USAG-AK's commitment to manage wetland resources.

- Implement an effective wetland management plan that will maintain and enhance the health, productivity and biological diversity of wetland ecosystems.
- Attain goals by applying management prescriptions.
- Ensure that USAG-AK is in compliance with all applicable federal and state laws and regulations regarding wetlands.
- Provide wetland areas for realistic military training, while maintaining ecosystem integrity and minimizing impacts to wetlands.
- Apply management prescriptions to all user groups: military, recreationalists, Directorate of Public Works, and the Alaska Fire Service.
- Promote early coordination between installation staff and the Environmental Resources Department to prevent adverse impacts to wetlands.
- Provide a customer-friendly process to initiate wetland permits for military exercises or construction.

B2.4.2 Wetlands Inventory and Monitoring

Inventory and monitoring of wetland resources provide an indicator of ecosystem integrity, status of sensitive plant species and communities, and provide data required to comply with wetland-related laws, executive orders, directives, and regulations. In addition, inventory and monitoring help to determine areas where improvements or rehabilitation are needed to maintain ecosystem integrity and to support military training activities.

B2.4.2.1 Wetlands Planning Level Survey

Conduct wetland planning level surveys on all USAG-AK lands. The wetland survey includes a wetland classification system based on hydro-geomorphic characteristics of vegetative communities. The project includes a description of values and functions of wetlands along with management recommendations. The National Wetlands Inventory failed to detect many of the smaller wetlands, rendering it inadequate for installation natural resources management programs. Wetland surveys are required for management of withdrawn public lands. An accurate wetland planning level surveys is required by Army Regulation 200-3 and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

- Complete, maintain, and update wetland planning level survey.
- Identify the requirement for a wetland planning level survey.

Two wetland inventories have been completed on Fort Wainwright and Donnelly Training Area: the National Wetlands Inventory by the U.S. Fish and Wildlife Service and the Waterways Experiment Station inventory by the U.S. Army Corps of Engineers. The National Wetlands Inventory covering all of the Fort Wainwright area was done in 1992 and 1993 (updated in 2000), and it identified wetlands using steroscopic analysis of high altitude aerial photographs. Wetlands were identified based on vegetation, visible hydrology, and geography in accordance with the Classification of Wetlands and Deepwater Habitats of the United States (Cowardian et al. 1979). However, some small wetlands and those obscured by dense forest cover were not included in this inventory. The Cowardian classification system categorizes ecologically similar habitats based on dominant plants or substrates. Under this system, wetlands have one or more of the following attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

Since the National Wetland Inventory was not conducted at a scale appropriate for detecting many of the smaller wetlands, the U.S. Army Corps of Engineers Waterways Experiment Station and Cold Region Research and Engineering Laboratory delineated wetlands on Fort Wainwright (Waterways Experiment Station 1998) and Donnelly Training Area (Cold Regions Research Engineering Laboratories 2000). All wetland boundaries were digitized and a classification system was developed based on hydrogeomorphic characteristics of vegetative communities. Five categories were developed for the survey: areas that are wetlands, uplands, wetland/upland complexes of variable status, open water, and burned areas of variable wetland status. Areas mapped as wetland or upland exist on the ground predominantly as mapped. A clear decision on the status of wetland/upland complexes and burned areas could not be made because site visits to each area in question were not possible. As a result, on-site investigations are required prior to making management decisions on these questionable areas.

The National Wetlands Inventory maps for Donnelly Training Area were published in 1993 and 1994, but covered only about 45% of the training area. These maps covered the northeastern part of Donnelly West

Training Area and all of Donnelly East Training Area, (approximately 306,000 acres). In 2001, the Waterways Experiment Station completed a wetlands planning level inventory for Donnelly Training Area that covered the entire East and West Training Areas.

When making management decisions concerning wetlands, both inventories, along with the soil surveys, where available, are utilized. In instances where a Clean Water Act Section 404 Individual or Nationwide Wetland Permit is required, the Environmental Resources Division staff will utilize both inventories prior to making initial site visits. If the proposed project area is within a wetland area, as confirmed by the inventories and a site visit, Environmental Resources Division staff will request a Jurisdictional Determination by the U.S. Army Corps of Engineers. Ultimately, the U.S. Army Corps of Engineers may conduct a site visit and complete a wetland delineation for the project area or require that one be conducted by USAG-AK, either contracted or in-house. The U.S. Army Corps of Engineers will recommend the type of wetland permit application to submit.

B2.4.2.2 Wetlands Monitoring

The Range and Training Land Assessment program is utilized to monitor military and non-military use of wetlands. Range and training land assessment is a component of the Integrated Training Area Management program. Through range and training land assessment, information is gathered on training lands based on land use polygons (i.e., bivouac, cantonment, drop zone, airstrip/assault strip, ranges, firing point, road corridor, rights-of-way, habitat management, excavation/ gravel pit, vehicle maneuver, and foot maneuver). Field technicians look for type of use and physical damage to the landscape.

Range and training land assessment is also used to gather information on disturbance to help quantify recent and historical use of wetlands. This information shows that, overall, training lands have received little permanent disturbance and are in good condition. Future wetland status, including disturbance, will continue to be monitored using range and training land assessment methodology.

In addition to targeted monitoring for individual permit requirements, Environmental Resources Department staff continues to monitor large military training field exercises. This effort prevents undue wetland damage and ensures speedy and proper wetland reclamation, where necessary.

B2.4.3 Wetlands Management

Wetlands management supports the military mission by protecting and enhancing valuable training lands. The primary military training goal is to produce a force trained to mobilize, deploy, fight, and win anywhere in the world. Military training conditions must match or closely resemble all possible environments throughout the world, including arctic and subarctic conditions. Training in wetlands during all seasons enables the military to meet its diverse training requirements. This plan, in combination with other supporting documents, guides the management of military training in wetlands while maintaining natural wetland functions.

Historical wetlands management on military lands involved field inspections of military exercises and processing of wetland permits on a project-by-project basis. These actions have been reactive rather than proactive due to staffing constraints and limited overall wetland knowledge. Installation-wide wetland damage is minimal, in part due to past management efforts, but mainly because the majority of field access is limited to winter months and persistent inundation of wetland areas complicates military training activities.

Various courses of action in support of the wetlands management are described in Volume IV, Prescriptions, of this Integrated Natural Resources Management Plan (INRMP). These actions assist

USAG-AK in accomplishing wetland management goals while maintaining compliance with applicable wetland requirements. These actions set specific procedures for management of military training, recreational use, facilities management, and fire prevention and suppression activities in wetlands.

B2.4.3.1 Wetlands Protection and Damage Prevention

Preventing environmental damage is easier and far less costly than trying to restore degraded ecosystems. However, the most effective prevention measure – prohibition of any destructive use of the land – is generally not an option on military installations. Thus, a compromise between total protection and unrestricted military training must be reached.

Wetland management is implemented on the primacy of the military mission and the belief that effective training can be accomplished with minimal long-term environmental damage while complying with applicable laws and regulations. Effective training and environmental stewardship are compatible and necessary for the maintenance of a quality military training environment and protection of sensitive wetland areas.

B2.4.3.1.1 Military Use Management

In 2000, USAG-AK received a five-year Clean Water Act, Section 404 permit that allowed limited maneuver or other military activities to occur in low function wetlands while protecting high function wetlands. This was a change from the past, where no activity was permitted at all unless by individual permit. The permit allowed up to 40 acres of disturbance, including fill, in low function wetlands in exchange for restrictions to maneuver training in high function wetlands. Restoration of all damage was mandatory, and other permit conditions applied. The permit expired in March 2005 and was not renewed due to changes in the mission (transformation to a Stryker Brigade Combat Team). An entirely new application for Fort Wainwright and Donnelly Training Area will be submitted some time in 2006 or 2007.

To protect certain wetland areas and to prevent un-permitted damage, USAG-AK developed environmental pre-approval overlays to be used with the five-year wetland permit. Use of these overlays will continue under any new permits. The overlay clarifies where certain activities may be conducted, and are to be used by military units preparing for training exercises. Approved/restricted activities are classified as three color-coded categories based on the presence of wetlands. Each overlay is available in a summer and winter version and is available through Range Control.

To reduce damage to wetlands within training lands from maneuver or other training activities, USAG-AK has implemented an environmental awareness program called Sustainable Range Awareness. The Sustainable Range Awareness program is a component of the Integrated Training Area Management program and its goal is to foster a conservation ethic in military personnel.

A variety of materials and methods are used to educate the military on a wide range of environmental issues. For example, educational briefings on environmental issues, including wetland identification, are held throughout the year and environmental awareness materials are presented at Range Control briefings, pre-command briefings and before all major field exercises.

Training requirements integration is another component of the Integrated Training Area Management program and is implemented to minimize damage to natural resources by integrating military training requirements with land condition trends (derived from range and training land assessment). In the case of wetland management, training requirements integration has been accomplished by range scheduling procedures and the use of environmental pre-approval overlays.

Environmental Resource Department staff monitors large military training field exercises. Following the exercise, Environmental Resource Department staff composes an After Action Report that details any significant occurrences during the exercise and distributes it to all participating units. This reports serves as an educational document for the units to consider during their next large field exercise. Issues typically addressed in the report include wetland damage, petroleum, lubricant and oil spills, trash and debris clean-up, snowplowing, refilling and recontouring of areas used for digging, etc.

B2.4.3.1.2 Recreational Use Management

Outdoor recreation does impact wetlands and wetland related species (Racine et al. 1998; Racine 1998). However, these issues are addressed in the outdoor recreation management and action plan. At this time, recreational use of wetlands is monitored through the Range and Training Land Assessment program and through observation by the Environmental Resources Department staff.

B2.4.3.1.3 Facilities Use Management

The presence of wetlands has shaped the existing development on USAG-AK urban areas and will continue to affect future development. Wetland areas have required and will continue to require special consideration for development. Specific goals and objectives for the future development in USAG-AK are based on considerations of the installation mission and findings of significant on-post and off-post conditions. Future land use requirements such as construction of buildings, parking areas, recreation facilities and future mission needs may require the filling-in of wetland areas to accommodate increased demands on existing land use areas.

If the proposed project area is within a wetland area, as confirmed by existing wetland inventories and a site visit, wetland permits may be required. The permitting process is described above in Section B2.4.2.1.

B2.4.2.3.4 Fire Management

Interior Alaska ecosystems require fire for continued functionality. However, wildfires are a concern to USAG-AK due to their impact on human activities and structures, and military operations. Each post's fire department has primary responsibility for fire suppression on Main Post, and the Bureau of Land Management's Alaska Fire Service has primary responsibility on Yukon Training Area, Tanana Flats Training Area and Donnelly Training Area. A fire management plan has been written for Fort Wainwright and Donnelly Training Area.

The Bureau of Land Management, Alaska Fire Service has primary fire suppression responsibilities for wildfires on lands in central and northern Alaska, which includes Fort Wainwright and Donnelly Training Area. The objective of fire suppression activities is not to protect the land from fire but to protect human structures and the military mission. Both prevention and suppression of undesirable wildfires are planned. Cutting fuel breaks specifically for fire control occurs minimally on Fort Wainwright. Major highways, smaller roads, waterways, and wet areas (including wetlands) act as firebreaks on most of the installation. The likelihood of a fire crossing these obstructions is low. Some fuel break projects have been implemented on Donnelly Training Area because high winds common to the area make it more likely that a fire could cross naturally occurring firebreaks.

During fire suppression activities, the Alaska Fire Service evaluates each fire and helps determine suppression procedures. With fires on USAG-AK managed properties, the Alaska Fire Service relies and follows USAG-AK's priorities and policies for management of wetlands during a fire. These issues and policies are addressed in the fire management plan. Additional wildfire prevention and suppression management actions are discussed in Volume III, Supplements, of this Integrated Natural Resources Management Plan.

Prescribed burning is used on USAG-AK to manage natural resources and reduce wildfire losses. Burning also can open areas for additional military training, particularly maneuvers that are hampered by dense cover. The prescribed burning "window" is very narrow in interior Alaska. It is difficult to project long-range prescribed burns due to weather variability, military training events, and the availability of resources. Individual prescribed burns require a burn plan, appropriate National Environmental Policy Act documentation, and coordination between local, state, and federal entities. This coordination effort will evaluate and minimize risks associated with prescribed burning.

B2.4.3.2 Wetland Regulations and Compliance

Permits for dredge and fill of wetlands are required under Section 404 of the Clean Water Act and Army Regulation 200-3. The permitting process allows USAG-AK to mitigate unavoidable damage to wetlands during military, recreational, maintenance, and fire suppression activities.

Range Control, a component of the Deputy Chief of Staff , G3, is the primary authority for regulating military land use and various stipulations of the permits. Range Control's authority to schedule training facilities and conduct range inspections initiates from the Installation Commander and is explained in the U.S. Army Alaska Range Regulation 350-2, which details acceptable conduct during training exercises in the field to reduce negative environmental impacts.

U.S. Army Corps of Engineers is the authority for insuring compliance with the requirements of Section 404 of the Clean Water Act, which regulates use of wetland areas. As such, U.S. Army Corps of Engineers will conduct random follow-up inspections on a representative sample of disturbed wetlands to insure compliance with any permits that are issued.

B2.4.3.3 Wetlands Reclamation

Wetland reclamation projects will be coordinated through the Land Rehabilitation and Maintenance component of the Integrated Training Area Management program. The Land Rehabilitation and Maintenance program strives to sustain long-term training by enhancing and increasing training opportunities, repairing damaged training lands, and implementing procedures and technology to decrease future damage and long-term rehabilitation costs. Land rehabilitation and maintenance incorporates professionally accepted best management practices for all projects designed to repair, rehabilitate, and maintain wetlands in training areas. Land rehabilitation and maintenance projects focus on soil erosion control, river/stream bank stabilization, and revegetation to promote proper wetland function.

B2.4.3.3.1 Military Activities

Military activities, such as cross-country maneuvers, digging of defensive fighting positions, snowplowing in winter, and bivouacs, can disturb wetland soil and vegetation. This disturbance increases the potential for soil erosion and transport. U.S. Army Alaska Range Regulation 350-2 and educational efforts help to minimize wetland disturbance. However, some damage may still occur. Techniques for repairing damage include installing waterbars, re-contouring areas to match surrounding area, rolling back the vegetative mat, and revegetation. Specific procedures for the rehabilitation of military training activity areas are outlined in the Supplements in Volume III of the Integrated Natural Resources Management Plan.

B2.4.3.3.2 Recreational Activities

The Land Rehabilitation and Maintenance program is also used to identify and prioritize reclamation activities in areas heavily impacted by recreational use. Impacts resulting from recreational use are similar to those resulting from military activities. Thus, similar rehabilitation measures can also be applied to

these areas. Current reclamation management of recreational sites involves the maintenance of newly developed sites and the upgrade of locations to be developed for future recreational use.

B2.4.3.3.3 Facilities Activities

Road drainage maintenance is important for controlling sedimentation. Road maintenance on training lands is generally a responsibility of the Directorate of Public Works. However, the Engineer Units provide some road maintenance. In addition, the U.S. Air Force maintains roads in Yukon Training Area due to its need for access to and use of the Army's Stuart Creek Impact Area. Some maintenance work on roads and trails in USAG-AK is done through the Land Rehabilitation and Maintenance program.

B2.4.3.3.4 Fire Activities

Land rehabilitation activities will commence immediately upon initiation of wildfire suppression activities. Minimum impact fire suppression tactics to meet suppression objectives will be utilized to reduce adverse impacts to forest resources and extent of rehabilitation requirements. Environmental Resources Department staff will monitor and document quality of rehabilitation efforts.

B2.5 Pest Management

Pest management goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. Pest management goals and objectives are:

- Meet requirements defined by the Army pest management program Measures of Merit.
- Use alternative strategies (sanitation, trapping, biological control, mechanical control, etc.).
- Select the least toxic pesticides.
- Select precision application techniques that target specific pests and habitats.
- Emphasize education, communication, monitoring, inspection, and record keeping.

Pest management is the responsibility of the Directorate of Public Works, specifically a certified pest controller. Other organizations involved include Provost Marshal’s Office game wardens and Directorate of Public Works Environmental Resources. The Pest Management Coordinator for USAG-AK is within Environmental Resources Department, Directorate of Public Works. He is not involved in routine pest management operations, but serves as a technical advisor to the program.

Noxious animal control responsibility is shared. In general, Pest Control Branch, Directorate of Public Works, and the Provost Marshal’s Office work within the cantonment area. The Provost Marshal’s Office, assisted by the Alaska Department of Fish and Game and the Alaska State Troopers, handles problems with game animals. Animal Damage Control, U.S. Department of Agriculture, has skills that may be useful in controlling noxious animals.

B2.5.1 Installation Pest Management Plan

The Environmental Resources Department is responsible for maintaining and updating the Installation Pest Management Plan. The goal of the Installation Pest Management Plan is to minimize the adverse environmental impacts of using pesticides while achieving an acceptable level of control and cost effectiveness. Completion and updates of the plan are required to meet U.S. Army Pacific (Installation Management Agency-Pacific Area Regional Office) pest management Measures of Merit. This plan discusses specific actions necessary to accomplish pest management. Pest management planning is a requirement of AR 200-5. The Installation Pest Management Plan must be reviewed annually and updated at least once every five years.

B2.5.2 Pest Management Inventory and Monitoring

Pest management inventory and monitoring is accomplished by surveillance surveys by pest control personnel. Other natural resources monitoring efforts also contribute to pest management monitoring. The Range and Training Land Assessment program, in particular, monitors vegetation annually and identifies invasive and exotic plant species in the training areas.

B2.5.3 Pest Management

B2.5.3.1 Measures of Merit

In 1994, the Department of Defense developed a Measures of Merit Program for all military installations, which requires a pest management plan to be prepared, signed, and implemented. Other requirements include the reduction of pesticide use on all installations by 50% over a seven-year period (1994–2000) and certified training of all pest control personnel.

Installation Pest Management Plan: USAG-AK installations first completed and approved pest management plans in 1996. Reduction in pesticide usage on Alaskan installations is being closely coordinated with Installation Management Agency- Pacific Area Regional Office. All Alaskan Army pest control personnel are in compliance with the basic training certification required by Measures of Merit.

Chemical Use: All chemicals used on USAG-AK are Environmental Protection Agency-approved. Pesticide use on USAG-AK has fallen dramatically since 1994. Remodeling and new construction have also helped reduce the volume of pesticides used since these buildings are more pest resistant and new construction usually has fewer pest problems.

Reducing chemical use is a major goal of the pest management program. Installation personnel understand both immediate and long-term threats to humans and ecosystem functions from chemical abuses. The pest management program emphasizes careful evaluation before chemicals are applied. More efficient equipment and techniques allow the reductions in the volumes and toxicity of chemicals used.

The most difficult objective for USAG-AK is the reduction of herbicides. In general, the acreage of improved grounds has not been reduced enough to allow for a 50% reduction in herbicides without changing the appearance of the post. Reduced grounds maintenance has eliminated about 1/8th of improved grounds since 1993, but significant future reductions are unlikely. Dandelion (an exotic species) control is especially difficult to achieve if herbicide reduction objectives are implemented.

Pesticide Certification: Provide refresher training for pest control personnel certified for pesticide handling. Certification and maintenance of that certification for pest control personnel are required to meet Installation Management Agency-PARO pest management Measures of Merit. USAG-AK has the option to use a combined Army, Navy, and Air Force pesticide training facility in Hawaii or the Army school at Fort Sam Houston in Texas.

Invasive and Exotic Plant Control: In USAG-AK, vegetation control is required on the airfield, shoulders of main roads, storage areas, and in pavement cracks. Weeds such as dandelions, knotweed, crabgrass, etc. are treated when requested on a service or work order (Lassek 1996). Chemical control is a last resort option. Contact herbicides approved for total vegetation control are – Roundup (EPA #s 71995-8 & 524-308-AA), Roundup PRO (EPA #524-475) and Rodeo (EPA #524-343). Approved broadleaf weed herbicides are – Lawn Weed Killer (EPA #478-121-9688), and Scotts Pro Turf (EPA #538-168).

Presently the only approved soil sterilant used in areas where bare ground is required, such as the industrial portion of posts and POL points, is Oust, EPA #352-401. Any plant control activities associated with withdrawn lands will consider the Bureau of Land Management strategic noxious weed control plan.

Pest Animal Control: Pests must be controlled for a variety of reasons, including human health, protection of property and foodstuffs, protection of desired vegetation, safety, and general quality of life.

Domestic Pets. Stray cats and dogs generally are the responsibility of road patrol personnel of the Provost Marshal's Office. Neither road units nor game wardens with the Military Police have access to tranquilizer guns, so slip nooses are generally used to capture animals. Captured animals are taken to the veterinarian.

Household and Nuisance Pests. Pest Control handles household pests. An integrated approach is used to control pests, including education, sanitation, and, as a last resort, chemical control. Rodents such as shrews, voles, and lemmings are controlled by using sticky traps or bait (Lassek 1996).

Undesirable Fish. Many lakes on USAG-AK lands are stocked by the Alaska Department of Fish and Game. Otter Lake at Fort Richardson is known to contain the undesirable species, Northern pike. Some stocked lakes on Donnelly Training Area contain northern longnose suckers, a native species that out-competes desired stocked fish.

Road-killed Moose. Military Police or the Alaska State Troopers are called to handle road-killed moose, depending on the location of the incident. If carcasses are still safe for human consumption, they are donated, using a charity list.

Birds (except Bird Aircraft Strike Hazard). Cliff swallows may build nests under eaves of buildings, including residences, creating a nuisance and health concern. Droppings are unsightly and are a growth medium for a fungus that causes a respiratory infection (histoplasmosis). Swallows also are infested with mites. Exclusion from nesting sites is the preferred means for controlling cliff swallows. Sometimes it is necessary to destroy nests, which may include eggs or young.

USAG-AK personnel conduct such nest destruction only under a depredation permit from U.S. Fish and Wildlife Service, which is obtained annually. A permit from the Alaska Department of Fish and Game is also required. Detection and action early in the breeding season will avoid destruction of nests with young or eggs. The fire department is sometimes called upon to wash out nests in places difficult to reach, such as in the aircraft hangar. Swallow problems have significantly decreased in recent years.

There are numerous ways to deal with pigeon problems, depending on location. Each case is evaluated individually and appropriate action is taken. In general, screening is the preferred method to keep pigeons from hangers. However, in 1995 it was necessary to trap pigeons, with 287 being captured.

All actions are performed in accordance with the Migratory Bird Treaty Act which prohibits the taking, killing, or possession of migratory birds.

Ornamental and Tree Pests. Scale insects, aphids, and other pests of trees and ornamentals are seldom a problem. Use of insect-resistant trees and ornamentals, and proper care of trees, including watering, pruning, and fertilization, minimize outbreaks (Lassek 1996).

Real Property and Stored Product Pests. Real property pests include carpenter ants and decay fungi. Control is conducted on an as-needed basis. Veterinary personnel at United States Army Medical Department Activity- Alaska (MEDDAC) inspect for pests in stored products except in Housing, which is

the Pest Controller's responsibility. The two most common pests of stored products are the sawtooth grain beetle (*Oryzaephilus surinamensis*) and the confused flour beetle (*Tribolium confusum*). Infestations are controlled by the Directorate of Public Works, generally through destruction of the product, followed by application of a residual insecticide (Lassek 1996).

Disease Vectors. Mosquitoes, biting gnats, and flies are serious pests during warm months. The Alaska Preventative Medicine Branch, MEDDAC and the Pest Controller are responsible for monitoring mosquitoes and determining if they need to be controlled. Control is the responsibility of the Directorate of Public Works and includes elimination of mosquito breeding areas and use of pesticides when needed. Ultra low volume insecticide treatment of *Pyrenone* is recommended. Flies normally are treated using sanitation practices.

Predator Control. Control of wolf populations on military lands in Alaska is prohibited. Any predator control must be approved by USAG-AK and evaluated through the National Environmental Policy Act process.

Other Animals. Pest Control handles most other animal problems. Each problem is evaluated individually. Bear problems usually require assistance from the Alaska Department of Fish and Game, although Military Police game wardens have first-response responsibility. Wardens occasionally chase moose from housing areas.

Bird Aircraft Strike Hazard Management: The Bird Aircraft Strike Hazard program will develop ways of reducing the air strike hazard by manipulating habitat to decrease the number of birds near the runway. The role of the Natural Resources Branch is to provide technical expertise and make recommendations to Public Works, U.S. Army Alaska Aviation Safety, Airfield Operations, and the Pest Control Branch to reduce bird use of critical areas. The Bird Aircraft Strike Hazard program includes the following features:

- Continue depredation of key nuisance species with depredation permit to be renewed annually. The pest management program will place wire on hangers where swallows and pigeons are roosting or nesting.
- Produce education materials for Bird Aircraft Strike Hazard, including videos, posters, handouts, training, bird books.
- Attend Post Bird Aircraft Strike Hazard team meetings: Fort Wainwright and Fort Richardson each have their own Bird Aircraft Strike Hazard team, which try to meet at least once in the spring and fall.
- Ensure that Public Works, the Fire Department, and the Alaska Fire Service all work together to keep birds off the airfields.

B2.5.3.2 Pest Vegetation Management

Objectionable plant growth will be controlled through an Integrated Pest Management program under the approved Pest Management and Natural Resources Management Plans. It will include techniques, which take into consideration land use plans, long-term cost effectiveness, threatened and endangered species protection, and other environmental impacts. Standards and techniques such as mowing heights, turf selection, plant growth regulators, grazing, and Environmental Protection Agency registered and approved herbicides are among the approaches available. Special precautions will be taken in the application of pesticides to safeguard personnel from contact and prevent contamination of livestock feeding areas, agricultural crops, non-target water sources, ornamental plants, inhabited areas, and environmentally sensitive sites and habitats. The Installation Management Agency and the installation natural resources and pest management professionals are responsible for the technical supervision and

monitoring of the weed control program. The procedures for storage, handling, applying, recording, and reporting pesticides contained in AR 200-5, *Pest Management*, apply also to herbicides.

Use of chemical pesticides for the protection and control of vegetation is permitted when other methods of control are not prudent. Pesticide application and handling will be in accordance with the Installation Management Agency or National Guard Bureau approved installation pest management plan and applicable guidance given in AR 200-1, AR 420-76, TM 5-629 *Weed Control and Plant Growth Regulation*, TM 5-630 *Natural Resources – Land Management*, and TM 5-632 *Military Entomology Operational Handbook*. Aerial application will also conform to guidance in AR 40-574, *Aerial Dispersal of Pesticides*. All uses of pesticides will be in strict compliance with *Federal Insecticide, Fungicide, and Rodenticide Act*, and a currently approved EPA or State label, unless approved otherwise by the applicable federal regulations. Herbicides are not permitted for use in outdoor children's play areas at child development centers (refer to AR 608-10, *Child Development Services*). Technical provisions of all proposed contracts for pesticide applications used in vegetative and wildlife management will be reviewed and approved, as appropriate, in writing, by the Installation Management Agency or National Guard Bureau natural resources management professional. All pesticide applicators must be licensed (if a private commercial applicator) and certified by the applicable State or DOD agency. Quality assurance evaluators must be properly trained to ensure that professional standards, technical requirements, and correct application techniques are adhered to. All pesticides must be stored in a secure area to prevent possible environmental damage. Specific construction and storage requirements are set forth in Military Handbook MIL-HDB-1028-8A (1 Nov 91).

Poisonous plants will be controlled only where they present a health hazard to personnel or possess potential for spreading to adjacent landowners' property adversely affecting safety and operations. Many plants contain poisonous parts or are poisonous during certain stages of growth. Education of personnel to become aware of potential hazards should be accomplished in place of widespread destruction programs. Control of plants designated as noxious by federal or state agencies will be in accordance with environmental policies and in harmony with local community programs and adjacent property owners.

B2.6 Invasive Species

Executive Order 13112 requires all federal agencies to prevent the introduction of invasive species, to provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species may cause. Invasive species can be a threat to natural resources, impact local economies, and adversely affect the military mission. Invasive species are defined as an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Alien species are further defined as any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem.

B2.6.1 Introduction

Invasions by introduced (invasive) species, particularly vascular plant species, are becoming commonplace and are widely recognized as one of the most serious threats to biodiversity and to economics (Pimental et al. 2000; Muller-Scharer et al. 2004). In the United States, invasions of non-native species are responsible for a 42% decline of native species now listed as threatened or endangered. Over 50,000 species (plant, animal and microbe) have been introduced in the past 100 years. The spread of invasive plant species has caused an estimated 137 billion dollars in damages and control per year (Pimental 2002). Edward O. Wilson, Harvard entomologist, stated that invasive species are second only to habitat loss in depleting biodiversity, and invasive species are the main cause of habitat loss. When the National Park Service examined 101 conservation issues that afflict park lands, they found invasive

species were the most widespread problem (Devine 1998). With increased world trade, greater habitat fragmentation, migratory birds and easy mobility, risks of invasions by non-native species are accelerating (Cohen and Carlton 1998).

Invasive species can be detrimental to an ecosystem because they typically have aggressive characteristics, out-compete native species, hybridize with native species and cause environmental degradation by changing native ecosystem characteristics. Invasive plant species can negatively impact fire frequency and intensity, cause sedimentation into creeks and rivers, create erosion and poor water quality, and degrade streambanks. Aquatic invasive plants can highly impact wetland and aquatic systems by altering water pH, turbidity and light availability that can destroy fish habitat and impede or inhibit fish migration (Hebert 2001). Additionally, they can choke waterways, restrict transportation corridors for military vehicular movement and cause accelerated erosion and sedimentation (Joley et al. 2000).

Although the impact of invasive species is obvious, only a small fraction of these invaders are responsible for widespread ecosystem devastation (Perrings et al. 2000). Most non-native plant populations in Alaska are small and largely restricted to areas of anthropogenic disturbance (Carlson et al. 2004). Invasive species occur on all three posts in Alaska; however, relative to military installations and federal lands in the lower 48 states, the invasive problem is currently minimal in nature. USAG-AK is committed to taking a proactive approach to managing invasive species.

USAG-AK is in a unique position to prevent a severe problem with invasive plants. Early identification of invasive species outbreaks combined with immediate eradication efforts can reduce management costs. As the impact of noxious plants affects surrounding agencies, organization and private citizens USAG-AK is committed to ensuring maneuver training does not spread invasive species onto other lands.

B2.6.1.1 Goals and Objectives

The purpose of the USAG-AK invasive species plan is to create a framework for the development of the USAG-AK invasive species monitoring program. The goals of this program are to detect and manage invasive species in order to inhibit negative impacts to the environment and military training operations. Invasive species are a universal management concern for land managers. Invasive species compromise military training lands by negatively impacting native species, decreasing biodiversity, degrading ranges, endangering ecosystems and subsequently costing the military thousands of dollars in eradication efforts.

Objectives:

- Conduct annual surveys for invasive species including vegetation, fish, birds and mammals.
- Determine the location and extent of invasive species on USAG-AK lands.
- Determine an index of noxious weed abundance relative to native vegetation.
- Map all invasive locations and maintain a current Geographic Information System database for proactive management.
- Develop and implement protocol to inhibit movement of invasive species among posts from military convoys and exercises.

Although invasive species can have detrimental effects on ecosystems, USAG-AK lands in Alaska probably have a low number of these species relative to other installations in the United States. A comprehensive invasive species program within the Environmental Resources Department should be developed to address specific action needs mentioned throughout this plan. More thorough surveys are needed to determine what invasive species (mainly plants) exist, where they are located, and their distribution and abundance. Invasive species should be mapped and monitoring protocols developed for effective future land management.

B2.6.1.2 Regulations and Other Invasive Species Definitions

Noxious, invasive, alien, exotic, weed, non-native and introduced are all terms used to describe invading species. The terms introduced, alien, exotic and non-native refer to species brought into an area that do not typically occur in that region. Invasive, noxious and weed terms refer to the character of the invasive species which are typically introduced into an area but may occur naturally.

USAG-AK has developed the following definition for invasive species:

Invasive species include mammals, birds, fish or vegetation that are not native and cause or have potential to cause negative impacts to USAG-AK land management goals.

The Committee for Noxious and Invasive Plant Management in Alaska defines an invasive species as: (1) non-native to the ecosystem under consideration, and (2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. (Executive Order 13112).

Title 11 Chapter 34 of the Alaska Administrative Code defines noxious weeds as "…any species of plants, either annual, biennial, or perennial, reproduced by seed, root, underground stem, or bulblet, which when established is or may become destructive and difficult to control by ordinary means of cultivation or other farm practices." This definition is oriented to the agriculture industry.

Regulation and control of plant pests by the Division of Agriculture is authorized under Title 3 of the Alaska Statutes. The Division of Agriculture is charged with the protection of the agricultural industry and the public interest through preventing the importation and spread of these pests. The Animal and Plant Health Inspection Service has authority to prohibit or restrict the importation, exportation, and interstate movement of plants through the Plant Protection Act (Comeau and Vandre 1997).

B2.6.1.3 Responsibilities

Garrison Commanders will do the following in the management of invasive species:

- Monitor invasive species populations and track the presence and status of invasive species over time to determine when control measures are necessary and to evaluate the effectiveness of prevention, control/eradication, and restoration measures.
- Give priority to invasive species management actions, including actions to restore native species habitat conditions in ecosystems that have been invaded, that support the installation's primary military mission and contribute to the protection of federally listed threatened and endangered species and critical habitat. Installations should ensure that invasive species do not detract from the usefulness of military training and testing lands and will ensure that invasive species management and control practices do not result in non-permitted take or jeopardize the existence of threatened and endangered species.
- Use flora and fauna planning level surveys and range and training land assessment to detect and identify invasive species.
- As existing planning level surveys are updated, they should include invasive species information if it is not currently included.
- Plan actions to address invasive species that are consistent with management objectives in updated INRMPs and undertaken only after appropriate review under National Environmental Policy Act as implemented by 32 CFR 651. Actions should also be reviewed under provisions of the Endangered Species Act where federally listed species or their habitats are present.

- Actions that are likely to cause or promote the introduction or spread of invasive species will not be funded.
- Invasive species will not be used in installation landscaping. In addition, landscaping practices should incorporate management practices that control invasive species wherever necessary.
- Installation are encourage to enter into partnerships with other federal agencies, state agencies, and local agencies, tribes, and non-government organizations to share information and address invasive species issues impacting critical missions on installations.
- Provide public education on invasive species management.
- Achieve local goals for controlling invasive species both on and off the installation.
- Comply with AR 200-1 when using pesticide to control invasive species.

Reduction of pesticides use must be considered in invasive species control strategies. However, pesticide reduction should not be the sole consideration in choosing a method to control invasive species. Informed decisions should be made based on the most effective and environmentally sound approach for controlling invasive species, including the use of pesticides. Installations are encouraged to cooperate with state programs for controlling invasive species and will allow access to the installations for this purpose. Such access must be consistent with installation safety and security considerations. Control measures must be fully coordinated with installation stakeholders and acceptable for use on the installation. Integrated training area management funding will be used for invasive species management only when identified as validated projects in an approved integrated training area management annual work plan and is consistent with the goals and objectives of the installation's approved INRMP. These projects must have a direct tie to military training and testing activities.

Garrison and Unit Commanders are required to follow federal laws enforced by the U.S. Department of Agriculture Animal Plant and Health Inspection Service. The Department of Defense accomplishes this through Department of Defense 4500.9-R, Part V (reference 3f). This regulation provides direction for the routine maintenance and washing of vehicles and equipment after field operations to remove mud/particulate matter, which prevents introduction of invasive or exotic species. The regulation requires conformance to customs requirements for international transport. Environmental funds will not be used to comply with Department of Defense 4500.9-R, Part V, January 2001, Defense Transportation Regulation - DOD Customs and Border Clearance Policies and Procedures.

Alternatives for control of invasive species will be reviewed in accordance with National Environmental Policy Act as implemented by 32 CFR 651. If the alterative includes biological control of invasive species, the species used for biological control will not be introduced into any natural ecosystem unless there is prior consultation with local, state and federal agencies to determine that such introduction will not have an adverse effect on those ecosystems or protected species. Section 6.3.2.4 shall be followed when species listed or proposed for listing under the Endangered Species Act are present in the area where biological control is being considered.

Army Chief of Staff for Installation Management, through the Office of the Director for Environmental Programs is the proponent and Army program manager for all environmental aspects of invasive species management. The Installation Management Agency and Director of the Army National Guard shall:

- Provide command and technical supervision of invasive species management at installations under their command or jurisdiction.
- Assist installations to develop and implement programs to include planning, surveys, monitoring, management (control/eradication), and restoration.
- Review technical adequacy of the installation invasive species management efforts.

- Assure that installations request funds, identify requirements, and allocate funds provided by the program proponent.
- Assure integration of environmental, operations, and logistics missions.

Garrison Commanders and the Adjutants General shall:

- Implement this policy to minimize adverse impacts to the environment and to accomplish the installation's military mission.
- Develop internal partnerships that will ensure that all land users and other installation organizations that may influence the introduction and spread of invasive species are aware of and comply with this policy and incorporate it into their procedures.

B2.6.1.4 Management History

Invasive species monitoring has occurred informally through the Range and Training Land Assessment program and natural resources program. The Range and Training Land Assessment program has quantitatively documented invasive vegetation on training lands at plot locations and pest management manages invasive plant species in cantonment areas. New methodologies are needed for surveying invasive species that specifically focus on these species. USAG-AK lands have few faunal invasive species and the primary invasive species, numerically speaking, are vascular plants.

B2.6.1.4.1 Fort Richardson

Fish: In 2001, northern pike were illegally introduced into Otter and Clunie lakes on Fort Richardson. Natural resources staff began a preliminary study in 2004 to assess pike numbers, age and size distribution in these lakes. Pike are extremely difficult to eradicate, short of poisoning a system, and this option does not guarantee the prevention of future illegal introductions. Netting operations were started as an alternative to test the feasibility of controlling pike numbers and will continue annually.

Mammals: The introduced house mouse was captured in Fort Richardson's small mammal survey in 2001. The specimen was captured on South Post many miles from any Anchorage neighborhood, which raised questions concerning their viability to live in the wild. House mice are known to occur commonly in Anchorage area resident homes, but the capture of this specimen so far from any houses suggests the potential to coexist with native small mammal populations. Norway and black rats are also known to persist in Anchorage and the valley, although none have been seen on post (Carlson, personal communication 2006). Future small mammal monitoring will continue to document unusual occurrences such as this one.

Feral cats are effective predators, directly compete with native mammals, are considered invasive species and exist in small numbers on Fort Richardson. Efforts are taken through the pest management program to eliminate feral cats. Stray dogs also exist and are controlled through pest management and the post veterinarian clinic.

Birds: Pigeons and European starlings exist in the Anchorage area and on Fort Richardson. They have not been documented on training lands by Range and Training Land Assessment field staff but do occur in the cantonment area. Pest management personnel are responsible for their control.

Plants: In 2000, USAG-AK Range and Training Land Assessment coordinators met with other Alaska land managers (National Park Service, U.S. Forestry Service, Bureau of Land Management, and University of Alaska Fairbanks) to discuss Alaska's weed management concerns. This was the first meeting among Alaska's plant scientists to assess invasive weed concerns. Area agencies decided a cooperative and coordinated effort within the state was needed to monitor and manage invasive plants,

and the Committee for Noxious and Invasive Weeds Management was formed. The main goal of Committee for Noxious and Invasive Weeds Management is to heighten the awareness of the problems associated with non-native invasive plants and to bring about greater statewide coordination, cooperation and action to halt the introduction and spread of undesirable plants. The committee holds monthly teleconference meetings and an annual conference. USAG-AK is a regular participant in these conferences and has presented its invasive plant monitoring efforts via poster and oral presentations.

B2.6.1.4.2 Donnelly Training Area

Fish: Some stocked lakes on Donnelly Training Area have had excessive biomass of undesirable fish, principally northern longnose suckers. They affect the growth and survival of game species. Donnelly Training Area and the Alaska Department of Fish and Game personnel cooperatively used Rotenone to remove most of this biomass and then restocked these lakes with game fish. Future surveys will determine the success of this project. Because undesirable species can move back into these lakes during periods of high water, a gabion dam was constructed in 1999.

Mammals: Known invasive mammals include the house mouse and possibly rats.

Birds: Pigeons are an invasive bird species and occur in the cantonment area of Fort Greely, but have not been documented on Donnelly Training Area.

Plants: Several invasive plant species exist, but no control efforts are currently being taken.

B2.6.1.4.3 Fort Wainwright

Fish: Five lakes on Fort Wainwright are stocked by the Alaska Department of Fish and Game. At this time they are not known to contain any species of undesirable fish.

Mammals: Stray cats and dogs exist on post. Pest management and military police personnel are responsible for controlling and taking animals to the Fort Wainwright veterinarian.

Birds: Pigeons are invasive species which are carriers of disease to native species. They primarily occur in the cantonment area and are controlled through the pest management program.

Plants: Control of invasive plant species has been concentrated in the cantonment areas (airfield, shoulders of main roads, storage areas, and in pavement cracks). Weeds such as dandelions, knotweed, and crabgrass are primarily targeted for control efforts. Efforts to quantify invasive plant species in training areas have been ongoing since the inception of the Range and Training Land Assessment program in 1996. Any plant control activities associated with withdrawn lands will consider the Bureau of Land Management's strategic noxious weed control plan.

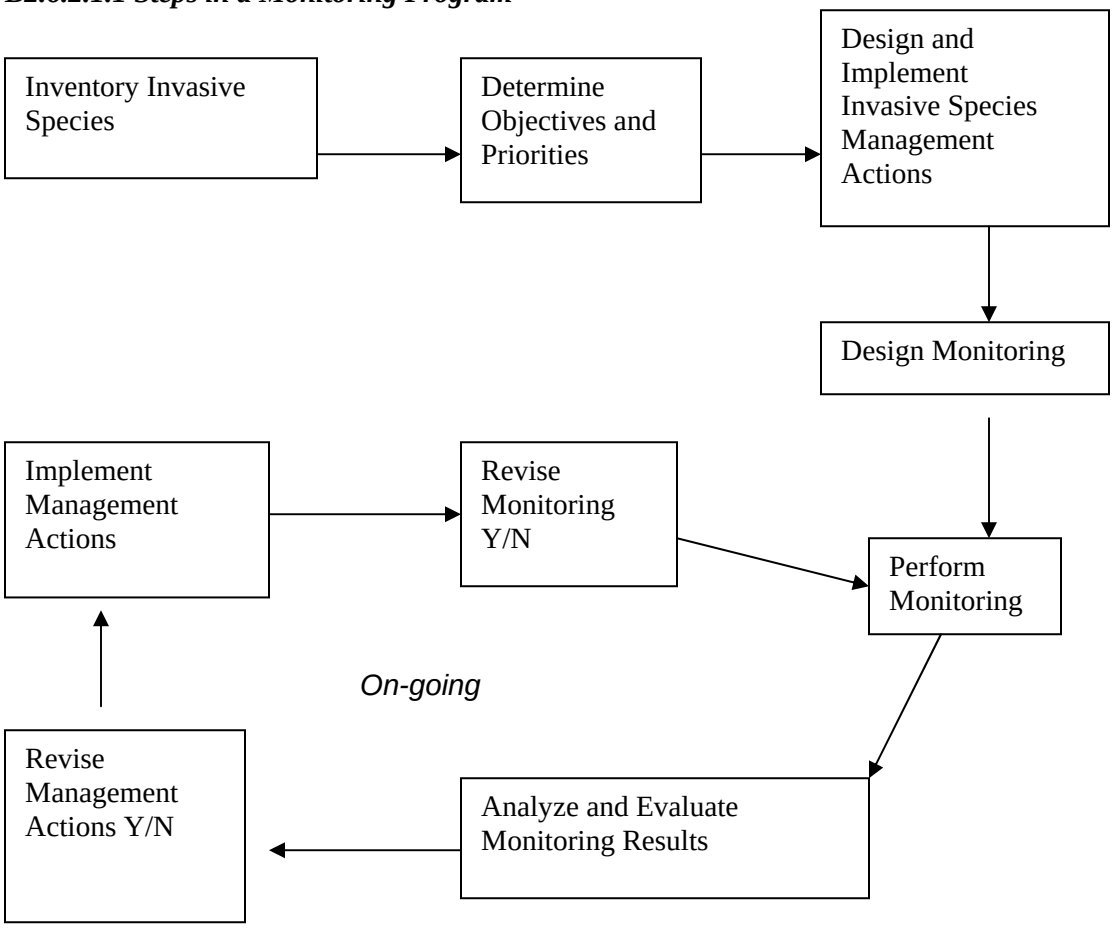
B2.6.2 Invasive Species Survey and Monitoring

B2.6.2.1 Natural Resources, Avian and Wildlife Monitoring Surveys

Various natural resources studies are continually occurring within the installation. These projects span fisheries management, small mammal inventories, flora and fauna planning level surveys and a multitude of avian surveys. These surveys document invasive species present. If certain species are discovered (e.g., northern pike in Otter Lake on Fort Richardson), the ecosystem management team discusses management options, and appropriate actions are taken to minimize potential damages to the environment and military training opportunities. This has been done opportunistically to date.

Monitoring invasive species is essential for effective land management. Monitoring involves the repeated collection and analysis of data to evaluate progress in meeting management objectives (Elzinga et al. 1998).

B2.6.2.1.1 Steps in a Monitoring Program



B2.6.2.1.2 Set Monitoring Priorities
Once species are identified and ranked, determine which species and infestations to monitor. This should be based on the number of species, infestations and resources available.

B2.6.2.1.3 Design Monitoring Actions
Methods used to monitor high priority invasive species and infestations depend on management objectives. For example, one management objective for Fort Richardson might be to reduce the infestation of dandelions at Otter Lake adjacent to the pond to no more than fifteen patches, with no patches being bigger than ten feet in diameter within five years. The monitoring action would be to walk around the lake once each August and count and document the number of dandelion patches. A management action would then be to schedule a treatment (example: pulling dandelions). Information is recorded using photographs and data sheets and entered into a Geographic Information System, which allows graphical tracking of results over time.

B2.6.2.1.4 Estimate Invasive Species Abundances
Determining abundances of specific invasive species will depend on the species. Develop a sampling design that will provide this information with relative ease. For example, on Fort Richardson, staff set nets in Otter Lake to evaluate abundances of illegally introduced northern pike. Nets were set for several

weeks and ages, lengths and total number of fish captured were recorded. The information was easy to collect, took minimal time and effort, and provided staff with an invaluable baseline on pike at the lake. To determine abundances of invasive plant species, plant density or plant cover measures could be used. Refer to Lane (2000) for specific protocols.

B2.6.2.1.5 Test Monitoring Actions

When developing monitoring actions, evaluate the actions prior to entering the field to ensure they will work. This sounds obvious but what can sometimes sound great on paper in the office does not always work well in the field, given resource constraints. The following are several suggested questions to ask to ensure the actions are appropriate: Will the data collection methods work in the field? Is the cost and time of performing monitoring acceptable? Will your observations allow you to detect changes?

B2.6.2.1.6 Implement Monitoring

The most critical step in monitoring is to begin doing it. If you don't monitor, you won't be able to evaluate changes in invasive species abundances, distributions and potential impacts to the land. Monitoring can save money by insuring control efforts are as effective as possible. Use the above flow chart to guide monitoring operations.

B2.6.2.2 Range and Training Land Assessment Surveys

The Range and Training Land Assessment program conducts annual natural resources monitoring on training lands and documents vegetation and invasive species during surveys. The Range and Training Land Assessment program conducts three types of invasive plant surveys: Range and training land assessment plots, incidental, and target areas.

1. Range and training land assessment plot surveys document all plant species contained within a half square meter Daubenmire frame. Invasive species, if present, are recorded. Range and training land assessment data analysis calculates percentage of native to non-native species and an index is created for invasive plant species by training area. Data are recorded in the Range and Training Land Assessment and Geographic Information System databases.

2. Incidental surveys document invasive locations found incidentally throughout the field season. Field crews spend a considerable amount of time driving, walking and traversing training areas to reach plot locations. Several invasive plant species have been recorded in this manor. A Global Positioning System location is obtained of the plant, the general surrounding area is surveyed to determine extent of infestation and data are recorded for future monitoring and management efforts.

3. Target area surveys are conducted in areas of known infestation and typically occur in highly disturbed areas and along roadsides. Continued monitoring efforts record invasive species types, locations, degree of infestation and distribution. This type of monitoring has not been implemented consistently to date.

B2.6.2.3 Inventorying USAG-AK Lands for Invasive Species

Formal comprehensive inventories have not been conducted. Invasive species that occur, their locations, infestations and distributions need to be identified and a formal monitoring program implemented. Evaluating non-native plants for their impact on biodiversity should also be assessed (Morse et al. 2004). The following guidelines shall be utilized on USAG-AK lands:

- Determine sites to inventory – the range and training land assessment database is an excellent starting point to determine suitable sites for invasive plant species inventories. Database queries can yield invasive species locations and pinpoint ideal locations to begin inventory efforts.

- Develop a monitoring protocol – the Range and Training Land Assessment program monitors vegetation and land disturbance on USAG-AK training lands. A new methodology should be developed specific to targeting invasive species locations and distribution. Range and training land assessment surveys have been useful for incidentally identifying infestations, but the sampling design of these surveys is not intended to focus on invasive species. Refer to the section on monitoring programs for more information.
- Mapping – once sampling areas are determined, conduct field inventories to collect data on species locations and distributions via the Global Positioning System. Input this information into the Geographic Information System and create a shape layer in Arc View. This information can be used to track the short and long-term spread of invasive species on a temporal and spatial level.

B2.6.3 Invasive Species Management

B2.6.3.1 Priorities for Invasive Species Management

Prioritizing invasive species focuses management efforts on those species that have the greatest impact on the resource base and those that become more difficult to control if action is delayed (Lane 2000). In general, only a small proportion of the overall number of invasive species in management areas creates serious problems. For example, in Great Smoky Mountains National Park there are 1,100 native plant species and 400 invasive plant species, of which only 10 pose threats to park resources (Hiebert et al.1993). USAG-AK invasive species management should include an objective to prioritize invasive species.

When ranking and prioritizing invasive species, three main management concerns are addressed:

1. Significance of threat or impact
2. Innate ability of the species to be a pest
3. Difficulty of control

Under these three concerns are additional variables used in ranking that include: degree of infestation, economic impact, rate at which the species spreads, biological impact or potential, effects on management goals, hybridization with native species, mode of reproduction, frequency of sexual reproduction, competitive ability, ecological effects. This system was developed by the Park Service, has been employed successfully throughout the United States and can be applied to many types of land management. Alaska has recently completed this ranking system for invasive plant species and this information can be found at http://akweeds.uaa.alaska.edu/. Once invasive plant species are determined on USAG-AK lands, the information contained at this site could be used to determine priority species to manage.

B2.6.3.2 The Spread of Invasive Species

Invasive weed species are often spread through the purchase, transportation and utilization of contaminated seed, forages, topsoil, gravel and plant materials. Vehicles (including railroads) and water are the most common agents for spreading invasive plant species.

Land transformation enhances invasion potential, and disturbance gives species an opportunity to colonize and expand their populations. The transformation of land areas (new ranges, drop zones, etc.) acts to encourage biotic change first by causing system changes that provide the opportunity for invasion and second, by bringing new species from different biogeographic regions into contact with these altered systems (Mooney and Hobbs 2000).

Firing ranges, drop zones, trails, roadsides, ditches and streams are often areas with high disturbance and high numbers of invasive plant species on USAG-AK lands. These areas experience frequent disturbance, which creates favorable habitat for invasive species establishment.

B2.6.3.3 Controlling the Spread of Invasive Species

Control methods for invasive species are determined based on the species, and degree and extent of infestation. For invasive plant species, no one control method or solution usually exists for management. Several methods are used including biological control (using organisms to reduce populations), manually pulling, mowing, and herbicides.

Proactive approaches for all species include early detection, eradication and prevention of new infestations. Educational efforts are placed as a top priority and potentially are the least expensive of remedies (Keever 2001; Joley et al. 2000; McNeil 2002).

The Land Rehabilitation and Maintenance program should ensure any topsoil and gravel brought onto the installation for repairing training lands is noxious-weed free. The construction of any new range will cause soil disturbance which creates an environment ideal for invasive species in Alaska. New ranges and drop zones should be reseeded with a native seed mix only. Non-native seed mixtures are often cheaper in Alaska when compared to native seed mixtures; however, they should be avoided. Land management geared towards short-term thinking will be detrimental, as cost comparisons over the long-term will show clearly the negative economics of trying to save money short-term and then subsequently spending many times over in order to control invasive species.

Disturbed sites and new ranges should be reseeded with native seed mixtures soon after the land is disturbed to prevent erosion and non-native species from spreading into these newly disturbed sites.

The main options available to land managers for control of invasive species are prevention, no action, mechanical, biological and chemical (Comeau and Vandre 1998; Lane 2000; Keever 2001; McNeil 2002).

<u>Prevention</u>

- Use only native seed mixtures to reseed sites that require rehabilitation
- Reseed quickly after areas are disturbed
- Clean all vehicles and military exercise equipment at wash stations prior to moving off-post
- Create and implement an invasive species public awareness program
- Include appropriate stipulations in activity plans and recreation permits

<u>No action</u> – use the following guidelines to determine if this option is viable:

- The problem will disappear on its own
- Policies and laws prohibit action
- The public prohibits action
- The presence of federally listed threatened or endangered species or habitat for these species exists
- Aquatic or other site factors prohibit action

<u>Biological</u> – includes the use of living organisms such as grazing animals, insects and pathogens to control infestations. Biological control is a good option if managers are looking to reduce invasive infestations and stabilize numbers for long-term management. It is usually not employed when total eradication of a species is the management objective. Benefits of biological control include: selective to

species, energy self sufficient, economical and environmentally safe. On the other hand, it is not a method of immediate control, it can be a slow process, and it does not usually completely eradicate target species.

Mechanical and manual control – involves manually catching, pulling, digging or cutting invasive species. Fire is used in some regions but does not typically kill most species of invasive plants and can encourage the spread of certain species, including knapweed. Mowing can reduce seed production of some invasive plant species, but timing and frequency need to be determined to reduce seed production, which varies between species. Pulling or cutting some invasive plant species can actually accelerate their growth; therefore, proper identification of the species being controlled is important.

Canada thistle, which grows near the Muldoon fence on the south post of Fort Richardson, is an example of an invasive species that can be controlled by mowing. It is a perennial, rhizomatous weed that often grows in moist areas. It has been controlled successfully using a combination of mowing several times during the growing season, followed by application of glyphosate herbicide at the end of the growing season (Lane 2002).

Chemical – herbicides or poisons can be used to eradicate invasive species. Potential impacts, equipment availability, economics, objectives, topographic limitations and public support should be evaluated prior to using chemical control. Not all invasive species respond to chemical application.

Management recommendations for high priority infestations include controlling isolated patches of the highest priority of invasive species first. Identify the locations and input into Geographic Information System. Determine control options, if any, set monitoring in place to evaluate invasive species population changes and control effectiveness.

For low priority invasive species infestations, it is recommended that management efforts be focused on controlling the rate of spread into new areas. These infestations are low priority and the species are easy to control even if left unmanaged.

B2.6.3.4 Integrated Invasive Species Management

Invasive species know no boundaries. Management should include collaborative efforts with areas agencies and entities. Much work on invasive species is being conducted by the Alaska Department of Fish and Game, the National Park Service, the University of Alaska Fairbanks, the Bureau of Land Management, and the Committee for Noxious and Invasive Plants Management in Alaska. It would be beneficial to include the recommendations from these efforts and agencies into the development of the USAG-AK invasive species program.

B2.7 Agriculture Outlease Program

Military land will be routinely examined to determine what areas, if any, can be made available for outlease in accordance with AR 405-80, *Management of Title & Granting Use of Real Property*. As a trustee of public land, the Army has the responsibility to utilize those areas which are suitable for producing food and fiber and contributing to world supplies. In accordance with the concept of multiple land use, areas that are required to support the military mission may also be outleased for agricultural purposes. Frequently, areas which are held for future development support the military mission as buffer, security, or safety zones; and areas used for training, ranges, storage, airfields, etc., can be leased for the growing of agricultural crops or livestock grazing and still fulfill the required military use. Leasing of land for uses that are compatible with mission requirements can reduce installation maintenance efforts, provide opportunities for accomplishing land maintenance by the lessee at no cost to the installation,

provide funds which the Army can use to support leasing efforts and other natural resources requirements, and support community relations and the local economy.

Agriculture/grazing outleasing shall be conducted in such a manner to support mission operations, support conservation compliance, and execute natural resources stewardship, maintain healthy ecosystems, sustain biodiversity. Installation mission operations personnel shall determine optimum mission landscape requirements in consultation with conservation personnel. Conservation personnel shall determine technical feasibility of achieving landscape requirements and integrate environmental compliance and stewardship requirements. Agriculture/grazing outleasing activities shall then contribute to achieving those integrated requirements.

Installations that lease land for agriculture/grazing purposes must identify how specific outleasing activities directly support mission landscape requirements and environmental stewardship in the conservation management plan, Integrated Natural Resources Management Plan or other appropriate planning document where Integrated Natural Resources Management Plans are not required. Outleasing activities that obstruct these requirements are not eligible for automatic reimbursement authority.

Costs for maintaining installation grounds will be minimized by providing the least amount of mowed area and landscape plantings necessary to accomplish management objectives and by the use of low maintenance species, agricultural leases, reforestation, natural areas, and wildlife habitat.

All revenues from agriculture and grazing outleases will be deposited to the Army account established for that purpose and will be available through established budget procedures (section 2667, title 10, United States Code (10 USC 2667), Outleasing for Grazing and Agriculture on Military Lands) for:

- Administrative and operational expenses of agricultural leases.
- Initiation, improvement, and perpetuation of agricultural leases.
- Preparation, revisions, and requirements of Integrated Natural Resources Management Plans (INRMPs).
- Implementation of INRMPs.

The Director of Environmental Programs for the Army Chief of Staff for Installation Management, provides program execution oversight via the issuance of programmatic guidance and instructions, program reviews, staff visits, resourcing, inter-service and interagency coordination, analysis of program performance based on feedback tools, and review of selected management plans. The U.S. Army Environmental Center provides program management support to the Director of Environmental Programs in all capacities of oversight and provides technical expertise to Headquarters, Department of the Army, Army Materiel Command, Base Realignment and Closure Office, Installation Management Agency, National Guard Bureau and installations as requested. At the installation level, the proponent activity is the first point of contact for programmatic and technical support.

B2.7.1 Leases

Leasing of land for uses which are compatible with mission requirements can reduce installation maintenance efforts, provide opportunities for accomplishing land maintenance by the lessee at no cost to the installation, provide funds which the Army can use to support leasing efforts and other natural resources requirements, and support community relations and local economy. For outside the continental United States, all policy and review decisions relative to outleasing will be the responsibility of the Installation Management Agency. A Preliminary Assessment Screening (Environmental Baseline Survey) within applicable National Environmental Policy Act (NEPA) documentation will be accomplished prior to performing any real estate actions. Current Environmental Baseline Survey documentation, including

required forms, should be maintained to meet or supplement NEPA requirements under land use changes. This will help reduce future installation liabilities, which could be attributed to environmental hazards on leased property.

B2.7.2 Reimbursable Agricultural/Grazing

B2.7.2.1 Leases (Agricultural and Grazing Outlease) 10 U.S.C. 2667(d)(4)

Environmental stewardship is paramount when considering the option of agriculture/grazing outlease as a land use option. Technical provisions and conservation practices are to be developed to ensure their compliance with best management practices for agriculture and ecosystem management. The technical provisions and conservation practices will be contained within the installation Conservation Management Plan and a Natural Resources Conservation Service Soil and Water Conservation Plan (or equivalent) for each agricultural/grazing lease on the installation. Technical provisions and conservation practices shall be developed in cooperation with the Natural Resources Conservation Service, or other technical agency, where possible, and in coordination with the District Engineer, Army Materiel Command, Installation Management Agency, Base Realignment and Closure Office, National Guard Bureau, and U.S. Army Environmental Center. Changes and amendments to existing leases that affect these provisions and practices are also to be coordinated with all appropriate personnel (may include installation, Natural Resources Conservation Service, District Engineer, Army Materiel Command, Installation Management Agency, Base Realignment and Closure Office, National Guard Bureau, and U.S. Army Environmental Center) prior to implementation.

Installations shall ensure that maintenance, protection, repair and restoration performed by the lessee are provided for in the lease agreement/contract. Also include any other technical provisions outlining conservation measures and practices to be performed by the lessee on the area to be leased that will assure compliance with the installation's INRMP, maintenance and/or improvement of water quality, soil stability, and biodiversity.

Installation mission operations personnel (e.g., installation G-3, Directorate of Plans Training and Mobilization staff or equivalent, and testing counterparts) shall determine optimum mission landscape requirements (i.e., ecosystem characteristics) in consultation with installation conservation personnel. Installation conservation personnel shall determine technical feasibility of achieving landscape requirements and integrate environmental compliance (e.g. endangered species protection) and stewardship requirements. Forestry and outleasing activities shall then contribute to achieving those integrated requirements.

Installations required to have an INRMP may not outlease land for agricultural and grazing unless the effects of the sale or leasing are compatible with the purposes of the INRMP.

Installation outleased land for agricultural and grazing must meet the following criteria.

- Must support the mission. Must not encumber land that is needed for conducting mission operations. While pursuing and planning reimbursable activities, natural resource managers must coordinate with mission operators to identify opportunities to improve long-term mission access to land, increase training realism, and improve training flexibility. Mission use of land includes uses as determined by the Installation Commander, e.g., individual/collective training, testing, storage, and production.
- Must comply with applicable laws and have an INRMP developed in accordance with NEPA that addresses the impact, if any, on the composition, structure, and function of natural communities

and biological diversity. Where INRMPs are not required, impacts must be documented in other suitable installation plans that have been prepared in accordance with NEPA.

- Must be a fiscally sound investment and capable of ecosystem sustainability. Army Materiel Command, Base Realignment and Closure Office, Installation Management Agency, National Guard Bureau shall closely evaluate installation budget requests to ensure program expenditures are balanced with receipts (revenue) and benefits. Periodic, negative net receipts can be anticipated and are allowable. Consistent negative net receipts at an installation indicate a reimbursable program that may not be viable and may not be eligible for automatic reimbursement authority, depending on the extent to which the mission is benefited.
- Must be consistent with installation safety and security restrictions.
- Must consider the potential effect on significant archeological resources and historic properties per AR 200-1. Distributing archeological sites or Native American burials without a permit is punishable by fines, imprisonment, or both. Consultations with the appropriate State Historical Preservation Office and federally recognized Native American tribes are required prior to any disturbance of archeological sites or human remains of Native Americans.
- Must develop and execute a proactive agriculture/grazing outlease management plan to clarify short and long-term objectives, and develop sound land management prescriptions to outlease lands for agriculture/grazing (*see appendix 2, Army Agriculture/Grazing Outlease Management Plan Guidance*). This plan will be part of the INRMP if one exists at the installation. Installations will use aerial photography, forest modeling software, Geographic Information System applications, and other appropriate methods to assist in developing forest management plans.
- Agriculture/grazing outleases will be reviewed to assure they are safe for non-military purposes prior to outleasing in accordance with AR 200-1. The environmental condition will be documented in a Finding of Suitability to Lease, Environmental Condition of Property, Environmental Baseline Survey and/or NEPA documentation.
- Installations shall ensure that maintenance, protection, repair and restoration by the lessee of the area leased is provided for in the lease agreement/contract. Also include any other technical provisions outlining conservation measures and practices to be performed by the lessee on the area to be leased which will assure compliance with the installation's INRMP, maintenance and/or improvement of water quality, soil stability, and biodiversity.
- Installations shall ensure that agricultural/grazing leasing is coordinated with the land use restrictions imposed by the presence of hazardous materials or the performance of waste surveys and restoration activities.
- Installations shall assure outleased lands are inspected annually to ensure compliance with maintenance, conservation, and environmental requirements and that noncompliance is reported to the District Engineer and/or Army Materiel Command, Base Realignment and Closure Office, Installation Management Agency, National Guard Bureau for enforcement.
- Agricultural and grazing resources shall not be given away, carelessly destroyed, or abandoned. Agricultural grazing outleasing is to be performed in accordance with Army policy, 32 CFR 651, AR 405-90 *Disposal of Real Property*, and AR 405-80.
- Agricultural and grazing outleasing may continue on land reported as excess or scheduled for closure until title of the land is transferred from the Army. The actions must be included in the INRMP and/or agricultural/grazing conservation management plan.

B2.7.2.2 Conservation Reimbursable Agriculture/Grazing Outlease Account

The Army agriculture/grazing outlease program is a reimbursable program. This means that proceeds from outleases on an installation are first used to cover authorized expenses. Proceeds are allocated to the installations and U.S. Army Corps of Engineers Districts based on the Agricultural/Grazing Outlease Protocol (*see appendix 1 of Protocol*). The Office of the Director for Environmental Programs of

Headquarters, Department of the Army provides annual reimbursement authority, based on submitted annual work plans, to installations and U.S. Army Corps of Engineers Districts. Incurred expenses are reimbursed by the Defense Finance and Accounting Service-Indianapolis.

The use of revenue from agricultural and grazing outleases are restricted by law. Revenue may be used for reimbursement of the administrative costs of outleasing and the financing of multiple land-use management activities through established budget procedures (*See appendix 1, Protocol for Determining Recommended Installation Specific Agriculture/Grazing ARA*).

The purpose of the Conservation Reimbursable Agriculture/Grazing Outlease Account is to assist with the implementation of Army natural resources management. Activities outlined in the installation's agricultural management plan may be supplemented by agricultural/grazing outlease conservation reimbursable account funds. Expenses not directly associated with agriculture/grazing outleases must be funded from appropriated resources. The natural resources program manager will be included in all budget planning and programming activities necessary to ensure all natural resources requirements are considered.

Requirements for Conservation Reimbursable Agriculture/Grazing Outlease Account funds will be identified annually through the proponent organization to U.S. Army Environmental Center to the Office of the Director of Environmental Programs, using the Reimbursable Programs Tracking System. The Director of Environmental Programs will issue automatic reimbursement authority directly to the installation for identified requirements and Army needs (*See appendix 1, Protocol for Determining Recommended Installation Specific Agriculture /Grazing ARA*).

All revenues from agriculture and grazing outleases or sale of equipment procured with agriculture and grazing funds shall be deposited to the Conservation Reimbursable Agriculture/Grazing Outlease Account (10 U.S.C. 2667 and DFAS-IN Manual 37-100-##). The Conservation Reimbursable Agriculture/Grazing Outlease Account is the U.S. Army General Fund Budget Clearing Account, 21F3875.3950 (see Defense Finance and Accounting Service-Indianapolis Manual 37-100-FY, *Financial Management: The Army Management Structure*) managed by the Defense Finance and Accounting Service. The Conservation Reimbursable Agriculture/Grazing Outlease Account is designed to be cleared out at a certain point of its lifecycle as the money gets disbursed to the appropriate payee: to installations and U.S. Army Corps of Engineers districts to cover program costs and to fund natural resources initiatives.

Administrative costs of outleasing and the financing of multiple land-use management activities may be supplemented with Conservation Reimbursable Agriculture/Grazing Outlease Account funds if they incorporate the following principles and requirements:

- Administration of agricultural/grazing outleases.
- Initiation, improvement, and perpetuation of agricultural outleases.
- Natural resources management activities, to include purchase of equipment and materials to support natural resources management.
- Agriculture/grazing outleases program management costs for personnel at all levels (installation, Installation Management Agency, District, Division, Field Operating Activity, Army Staff , United States Property and Fiscal Officers, and auxiliary or contracted staff (e.g., through interagency agreements, Oak Ridge Institute for Science and Education, etc.).
- Army-wide initiatives that improve the management of natural resources.
- Surveys and studies needed to evaluate the status of natural resources as affected by agriculture/grazing outlease activity—water quality, soil erosion, and biodiversity (particularly threatened and endangered species and neotropical migrants).

- Projects to integrate agriculture/grazing outlease with mission activities (e.g., tactical concealment areas).
- Soil erosion control projects to reduce erosion that has been accelerated by agriculture/grazing outlease activities.
- Surveys and studies needed to evaluate the status of cultural resources as affected by agriculture/grazing.

The Conservation Reimbursable Agriculture/Grazing Outlease Account may be used to secure office/storage space and equipment directly supporting agriculture/grazing outlease programs, but it may not be used for major construction, ornamental landscaping, or decorative plants. Organizations may exchange or sell similar items of federal property and may apply the exchange allowance or proceeds of sale in whole or in part-payment for the property being acquired in accordance with Department of Defense 4140.1-R Department of Defense Materiel Management Regulation; note that the exchange/sell procedure excludes firefighting equipment.

Installations must obtain prior approval to exceed the capital expenditure limit for equipment or procure centrally controlled equipment if using automatic reimbursement authority or Department of Defense forestry reserve account for the purchase. Requests for approval are submitted by installations to their proponent organization and from the proponent organization through the U.S. Army Environmental Center to the Office of the Director for Environmental Programs. The detailed procedure is provided in the Protocol for Determining Recommended Installation Specific Agriculture/Grazing ARA.

Agricultural/grazing dollars shall not be used to cover real property services or compliance costs. Conservation Reimbursable Agriculture/Grazing Outlease Account funds may not be used to augment the general operating expenses of the installation as overhead. For example, overhead outside of the agriculture outlease, such as Joint Logistic Support Center or Net Operating Result surcharges, may not be charged to the extent that the adjustments include costs that do not directly benefit the agriculture outleasing program.

B2.7.2.3 Reports of Availability

Availabilities for agriculture and grazing outleasing are approved by the Army Chief of Staff for Installation Management after review by Army Materiel Command, Base Realignment and Closure Office, Installation Management Agency, National Guard Bureau, and U.S. Army Environmental Center. Reports of availability of land for outleasing will be prepared in accordance with AR 405-80. Prerequisites for availability of outlease for agriculture/grazing are, as applicable, documentation in the installation's conservation management plan, INRMP and endangered species management plans; compliance with the Endangered Species Act, compliance with 36 CFR 800, Native American Graves Protection and Repatriation Act, and other applicable statutes as outlined in AR 200-4; coordination with the United States Fish and Wildlife Service; and environmental documentation in accordance with Army Regulation 200-2.

B2.7.2.4 Conservation Guidelines For Agricultural/Grazing Outlease

Technical provisions and conservation practices are to be developed to ensure their compliance with best management practices for agriculture and ecosystem management. The technical provisions and conservation practices will be contained within a Natural Resources Conservation Service (Natural Resources Conservation Service) Soil and Water Conservation Plan (or equivalent) for each agricultural/grazing lease on the installation. Technical provisions and conservation practices shall be developed in cooperation with the Natural Resources Conservation Service, or other technical agency, where possible, and in coordination with the District Engineer and/or Army Materiel Command, Base

Realignment and Closure Office, Installation Management Agency, and the National Guard Bureau. Changes and amendments to existing leases that affect these provisions and practices are also to be coordinated with all appropriate personnel (may include installation, Natural Resources Conservation Service, District Engineer, and Major Army Command) prior to implementation.

Conservation practices include agricultural lease contract stipulations to provide for the following needs:

- soil and water conservation and land management conservation techniques such as terracing of crop fields, strip cropping, crop rotation plans, leaving of crop stubble, soil tests, liming and fertilization.
- vegetation management and protection such as noxious weed control and secession control.
- wildlife food and cover provisions such as leaving grass and weed strips between fields, and leaving 5% of row crops standing.

Installations shall use principles of integrated pest management, integrated crop management, and other management techniques for outleases to help reduce pesticide usage and contribute to the Army's pesticide reduction efforts. Lessees desiring to apply pesticides or conduct animal damage control on installation property, or to contract for such work, must accomplish all tasks according to the approved installation pest management plan and AR 200-5. This applies even to outlease contracts that contain provisions for lessees to assume full responsibility for the application of pesticides and animal damage control on their leased land in accordance with the provisions of applicable federal laws and regulations. All pesticide uses will be reported by the responsible installation in accordance with AR 200-5.

Army Materiel Command, Base Realignment and Closure Office, Installation Management Agency, and the National Guard Bureau will review all technical provisions outlining land use and conservation practices to ensure their compliance with good agricultural and environment concepts.

B2.7.2.5 Conservation Management Plan

Installations will be required to develop and execute a proactive conservation management plan when outleasing Army lands for agricultural and grazing. The purposed of this plan is to clarify short and long-term conservation objectives, develop sound conservation principles, and to qualify for Conservation Reimbursable Agriculture/Grazing Outlease Account funding. Installations should consult with the Natural Resources Conservation Service on the development of the conservation management plan.

Agriculture/grazing outlease management plans will strive to meet the following goals and objectives:

- Manage resources for long-term stewardship to meet the future needs of the mission, maintain productive ecosystems, and promote biodiversity.
- Institute practices to protect natural resources of the installation including soil, water, fish and wildlife, natural vegetation, recreation, and aesthetic resources.
- Balance the ecological, social, and economic values of the outleased parcels.

B2.7.2.5 Memorandum of Understanding

U.S. Army Corps of Engineers Districts are responsible for outleasing Army lands for agriculture or grazing. Each installation assisted by U.S. Army Corps of Engineers with agricultural/grazing outleases will prepare a Memorandum of Understanding with the supporting U.S. Army Corps of Engineers District. The Memorandum of Understanding will identify roles responsibilities of both parties. This includes negotiating, issuing, administering, managing, modifying and enforcing outleases. The

installation and U.S. Army Corps of Engineers District will review the Memorandum of Understanding annually. The Memorandum of Understanding should define the expectations, terms and conditions of forest management and timber disposal between the installation and the district.

B2.7.2.6 Rental Offsets and Abatements

Supplemental agreements to existing leases should be negotiated with lessees to amend them to comply with the provisions of this policy. Outleases shall not offset the total amount of the outlease value. At a minimum, installation revenues will be collected to cover the costs of administration of the installation lease. Lease agreements may contain rental offsets. Rental offsets are cash considerations in lieu of cash payment. Rental offsets should only be included when financially advantageous for the installation. The installation must develop quality control measures to ensure rental offsets are being performed to standard. At a minimum, installation revenues will be collected to cover the installation and U.S. Army Corps of Engineers district's cost of administration of the lease (see appendix 4, AR 405-80). Rental abatements are cash considerations negotiated mid-lease. All rental abatements must be coordinated with the installation's proponent organization and are generally discouraged. Rental offsets and abatements must benefit the agricultural/grazing program, the mission, and the environment.

B2.7.2.7 Required Reports

Headquarters, Department of the Army requires management information and is required to compile and provide information regarding the status of natural resources management activities and programmed requirements on Army installations to the Department of Defense and, at times, to Congress. The following annual reports require input by applicable Army installations and organizations:

- Installation Status Report, Part II (Environment). The Installation Status Report provides information to the Chief of Staff of the Army regarding the status of natural resources and their influence on installation missions. The goal of Part II is to capture macro-level status of installations' environmental program and to improve the justification/prioritization of limited resources. Project objectives are to assess installation environmental compliance, summarize environmental conditions, measure mission impacts, and assess the effectiveness of environmental program performance. Analysis of Installation Status Report data should assist commanders at all levels to improve installation conditions and ultimately the readiness of forces that our installations support. The Assistant Chief of Staff for Installation Management (Army Chief of Staff for Installation Management) is the proponent of the Installation Status Report.
- Army Environmental Database - Environmental Quality. The Army Environmental Database - Environmental Quality tracks how well the Army's environmental compliance status meets statutory and regulatory requirements and combines other reports (e.g., Department of Defense Measures of Merit, Reforestation Report, etc.). Army Environmental Database - Environmental Quality partially responds to the requirement to perform environmental compliance assessments as required by AR 200-1. The Army Chief of Staff for Installation Management is the proponent for Army Environmental Database - Environmental Quality. Installations shall enter appropriate data and Army Materiel Command, Base Realignment and Closure Office, Installation Management Agency, and the National Guard Bureau shall verify the accuracy.
- Agriculture/Grazing Outlease Annual Work Plans. These work plans are submitted by Army Materiel Command, Base Realignment and Closure Office, Installation Management Agency, National Guard Bureau, to U.S. Army Environmental Center for development of the Conservation Reimbursable Agriculture/Grazing Outlease Account budgets and are due no later than (NLT) 30 June each year.

- Financial Reports. Army Corps of Engineers Districts shall report installation agricultural/grazing outlease and forest product revenues and Army Corps of Engineers District expenses to Army Materiel Command, Base Realignment and Closure Office, Installation Management Agency, National Guard Bureau U.S. Army Environmental Center, and the Army Corps of Engineers Central Finance Office quarterly. The Central Finance Office shall verify the amounts and report to Defense Finance and Accounting Service.
- Financial Data. The U.S. Army Environmental Center shall maintain a minimum of a seven-year historical record of reimbursable program financial data.

B2.7.2.7 Implementing Laws

10 U.S.C. 2667(d)(4) Leases (Agricultural and Grazing Outleases). Money received by the United States from leases for agricultural or grazing purposes of land under the control of the Secretary of the Army may be retained and spent by the secretary in such amounts as the secretary considers necessary to cover the administrative costs of outleasing and the financing of multiple land-use management at any installation under the jurisdiction of the Secretary. (Department of Defense Instruction 4715.3, "Environmental Conservation Program," May 1996; Army Regulation 200-1; and associated natural resources implementation guidance.)

B2.8 Minerals Management

Mineral resources on public lands withdrawn for military purposes in Alaska are managed by the Bureau of Land Management under federal regulations found in 45 CFR 3000. Sale and/or free use of mineral materials require National Environmental Policy Act review and USAG-AK concurrence. Unauthorized use of mineral materials is considered trespass and will be resolved jointly by the military and the Bureau of Land Management.

The Bureau of Land Management identifies three categories of mineral resources on federal lands:

Locatable minerals include most metals, metallic ores, and some non-metallic minerals. If the land is open to mineral location under the federal mining laws, private citizens may stake or “locate” a claim, perform assessment work, and develop the resources. Valid mining claims can result in private ownership of the mineral resources. The withdrawn areas have been closed to mineral location since the 1950s. There are no valid or existing claims within the withdrawals (Keill, personal communication 1998) (U.S. Army Alaska 1999).

Leaseable minerals include oil, gas, coal, geothermal resources, oil, shale, gilsonite, phosphate, potassium, and sodium. These mineral resources are leased from the federal government for a period of time and do not become the developer’s property. The withdrawn areas have been closed to mineral leasing since the 1950s. There are no valid leases on withdrawn lands.

Saleable minerals consist basically of construction materials such as sand, gravel, riprap, cinders, pumice, clay, limestone, and dolomite. They are purchased outright from the federal government. Saleable materials on the withdrawals have been used locally by the Army and other authorized agencies, but have not been extracted commercially since the lands were first withdrawn in the 1950s.

Minerals management goals and objectives are listed below:

- Manage the mineral resources on USAG-AK lands in the best interest of the public within the framework of the military mission.

- Provide the military with a source of saleable construction materials for military construction purposes.

B2.9 Integrated Training Area Management

The United States Army must maintain its capability to put overwhelming land combat power on future battlefields and defeat potential enemies. Decisive victories depend on the Army's ability to deploy rapidly, fight, self-sustain, and win quickly with minimum casualties. As the Department of Defense's premiere land force, the Army relies on land to achieve its training and testing objectives and maintain force readiness. Force readiness depends on high quality, realistic training. The Army must be allowed to train as it will fight.

The Army uses the Sustainable Range program to improve the way it designs, manages, and uses ranges and to ensure that current and future doctrinal requirements are met. The goal of the Sustainable Range program is to maximize the capability, availability, and accessibility of ranges and training land to support training and testing requirements. It consists of two core programs: the Range and Training Land program, which consists of range modernization and range operations; and the Integrated Training Area Management program, which consists of land management and land maintenance activities.

The Army recognizes that training to doctrinal standards under realistic combat conditions will affect the environment. Providing premiere and realistic training opportunities requires training lands to be in good environmental condition. It is in overcoming the apparent conflict between force readiness and environmental stewardship that the Integrated Training Area Management program serves the overall needs of the Army. The Integrated Training Area Management program essentially acts as an ongoing mitigation program for Army training and testing activities. It is the Army's formal strategy for focusing on sustained use of training and testing lands, and it provides the Army with the sound planning and execution mandatory to protect Army land as an essential asset for training.

The intent of the Integrated Training Area Management program is to systematically provide a uniform training land management capability across the total Army. The Army will manage its lands in a manner to ensure no net loss of training capabilities and to support current and future training and mission requirements. The integration of stewardship principles into training land and conservation management practices ensures that the Army's lands remain viable to support future training and mission requirements.

Integrated Training Area Management establishes a systematic framework for decision-making and management of Army training lands. It integrates elements of operational, environmental, master planning, and other programs that identify and assess land use alternatives. The Integrated Training Area Management program also supports sound natural and cultural resources management practices and stewardship of land assets while sustaining those assets to support training, testing, and other installation missions.

The goals of the Army's Integrated Training Area Management program are as follows:

- Achieve optimal sustained use of lands for the execution of realistic training by providing a sustainable core capability that balances usage, condition, and level of maintenance.
- Implement a management and decision-making process that integrates Army training and other mission requirements for land use with sound natural and cultural resources management.
- Advocate proactive conservation and land management practices.
- Align Army training land management priorities with the Army training, testing, and readiness priorities.

There are five components of the Integrated Training Area Management program. These five components work in unison to accomplish the Integrated Training Area Management mission:

- Training Requirements Integration
- Range and Training Land Assessment
- Land Rehabilitation and Maintenance
- Sustainable Range Awareness
- Geographic Information System

B2.9.1 Training Requirements Integration

Training Requirements Integration is designed to integrate mission training requirements with natural resource requirements. This methodology integrates the installation's training and force protection requirements for land use with the natural resource condition or carrying capacity of the installation's lands derived from Range and Training Land Assessment data. The methodologies and algorithms used to integrate these two functions continue to be developed at Headquarters, Department of the Army level. The Training Requirements Integration program for USAG-AK continues to evolve as technologies and data system interface needs are identified across the Army and Department of Defense communities.

Coordination between the trainers and natural resource managers is essential for the success of this program and for the entire Integrated Training Area Management program. The coordination between Directorate of Public Works and G3 involves two parts. The first part of Training Requirements Integration consists of planning to avoid conflicts between training requirements and natural resource requirements. This involves identifying the installation’s training mission requirements and then considering the landscape to determine what areas can best support the different activities. It includes providing information on the training areas and recommendations for how to use them to minimize damage. The second part of Training Requirements Integration consists of strategies to prevent maneuver damage and to conduct maneuver damage assessments when necessary.

One Training Requirements Integration objective is to site military missions (and other land uses) in areas most capable of supporting them. Training Requirements Integration relies on Range and Training Land Assessment and other monitoring programs to determine land capabilities. Training Requirements Integration can include rotation of training lands as well as scheduling lands according to their carrying capacity to support specific missions. Training Requirements Integration includes restrictions necessary to maintain quality training land.

Restrictions on training are sometimes necessary for ecosystem protection. USAG-AK has incorporated environmental restrictions into USAG-AK Regulation 350-2, *Range Regulation*. Chapter 2 of this regulation outlines the protection of environmental resources during training. The intent of this regulation is to enhance training by conserving the training environment and terrain. It is extremely important to use the training resources to the best advantage while conserving them for future use. Preventing maneuver damage and maintaining the quality of training is a Command responsibility. Training will be conducted in a manner that ensures optimum use of the land while adhering to environmental and natural resource regulations, policies, and planning decisions. The Army has an obligation to act responsibly and effectively in the use of land and other natural resources required to fulfill its mission.

B2.9.2 Land Rehabilitation and Maintenance

Land Rehabilitation and Maintenance for USAG-AK installations consists of strategies and resource

allocations for resting and repairing the soils on training lands on a rotational basis as well as repairing other problem erosion areas as the need arises. Land Rehabilitation and Maintenance includes programming, planning, designing, and executing land rehabilitation and maintenance projects based on requirements and priorities identified by the Training Requirements Integration and Range and Training Land Assessment components of Integrated Training Area Management.

The Land Rehabilitation and Maintenance decision-making process involves identifying sites that are most in need of repair. Sites with erosion problems, steep slopes, or easy accessibility by the public are given priority. The sensitivity of nearby areas to siltation is also given consideration, since eroding soil will be deposited at some point down-slope. A list can be compiled from this data and used by range managers to help prioritize Land Rehabilitation and Maintenance projects. In some cases, this can identify sites that may have been overlooked or not considered critical.

B2.9.3 Sustainable Range Awareness

The Integrated Training Area Management Sustainable Range Awareness program is designed to improve troop awareness of environmental issues during field training exercises. By providing installation-specific guidance about environmental issues, severe environmental damage and its associated costs can be prevented. The Sustainable Range Awareness curriculum is a multimedia approach, incorporating videotapes, computer-based training programs, handbooks, posters, and field cards, with each element designed to provide Soldiers with guidance for environmental protection during field training exercises.

B2.9.4 Range and Training Land Assessment

The Range and Training Land Assessment program provides a standard method to inventory, monitor, and analyze natural resource conditions, trends, and management decisions that promote sustained and multiple uses of military lands. The program also addresses unique natural features, such as threatened and endangered species. This long-term program is designed to evaluate current conditions and trends occurring on Army lands and the capability of those lands to support long-term multiple use, including military training and testing.

Range and Training Land Assessment utilizes a computer-based Geographic Information System to support land use planning decision processes. Data collected provides both a qualitative and a quantitative assessment of the condition of Alaska's training lands. It provides information to effectively manage land use and natural resources and is used to help prioritize potential Land Rehabilitation and Maintenance projects.

B2.9.5 Sustainable Range Program Geographic Information System

The Integrated Training Area Management's Geographic Information System provides a state-of-the-art information source for today's military decision-makers. Accurate spatial information ranging from infrastructure to potential training areas will be available for simple map production or for detailed site analysis. Sample data layers include: ranges/training facilities, roads, observation posts, drop zones/landing zones, impact areas, artillery positions, air corridors, nap-of-the-earth training areas, training constraint areas, public works, soils, vegetation, fire breaks, military grid reference system, and digital elevation models.

F2.10 Grounds Management

Grounds management is not a responsibility of natural resources management on military lands. However, natural resource managers play a continuing role in grounds management. Improved grounds provide habitat for many wildlife species, urban forests can be managed as commercial timber as well as for aesthetic purposes, and natural areas within improved grounds provide opportunities for education and outreach.

F2.10.1Standards for Ground Maintenance

Grounds will be maintained at the levels and intensities necessary to meet the designated use criteria, protect, and enhance the natural resources, and ensure a pleasing appearance in harmony with the natural landscape. Designated turf areas will be maintained (renovated, seeded, aerated, fertilized, and irrigated) to the degree required to maintain a permanent vegetative cover of desirable plants necessary to support the intended use. Guidance available from local agricultural agencies and universities will be used in determining the most adapted species of vegetation and the maintenance practices necessary to meet the designated use.

Improved grounds will be maintained at a level comparable with similar public facilities in the area. The Army Community of Excellence and self-help programs are to be an integral and active force in grounds maintenance/landscape improvements and installation beautification initiatives. The appropriate environmental directorate is to provide technical guidance and approved materials to all interested occupants, building managers, tenants, as well as other personnel interested in improving the living and working areas on the installation.

Costs for maintaining grounds will be minimized by providing the least amount of mowed area and landscape plantings necessary to accomplish management objectives and by the use of low maintenance species, agricultural leases, reforestation, natural areas, and wildlife habitat. Standards for maintenance of all categories of grounds will comply with TM 5-630.

F2.10.2 Grounds Maintenance Requirements

F2.10.2.1 Family Housing

See Army Regulation 210-50, *Housing Management*, for command and occupant requirements for government-owned family quarters.

F2.10.2.2 Bachelor Housing

Separate Lawns
For government-owned quarters having separate lawns (for example, separate dwellings or side-by-side duplexes), occupants will mow lawns with power or hand-pushed mowers, irrigate lawns and shrubs, cultivate shrubs, edge adjacent to paved surfaces and flower or shrub beds, and remove leaves, paper, bottles, stones and other litter. Boundaries should be established which clearly delineate the extent of grounds assigned to each occupant for use and maintenance. Boundaries will correspond to the limits of the logical yard of each dwelling but normally will be not more than 50 feet from the dwelling. Grounds maintenance outside these boundaries may be performed by the installation.

Communal Lawns
For other government-owned housing having lawns common to more than one occupant (for example, barracks, Bachelor Officers' Quarters and apartments), occupants will perform grounds maintenance

services as in paragraph above. If impracticable, these services will be performed as a facilities engineering activity.

B2.10.3 Gardens

Preparation (plowing, harrowing, and discing) of a community type garden in excess of one-quarter acre in size may be performed as a facilities engineering function. Preparation of smaller garden plots and the cultivation, maintenance, harvesting, and clean-up of vegetable and/or flower gardens will not be accomplished as a facilities engineering responsibility.

B2.10.4 Irrigation

Irrigation will be limited to areas where it is essential to establish and maintain required vegetation or when an agricultural outlease contract requires it. Lessees using installation water supplies will be charged for water and electrical power to pumps. Installations in arid areas will not use irrigation to create environments to grow non-arid plants. Arid and semi-arid installations will make maximum use of desert and low moisture (xeric) requiring landscape materials. Irrigation in arid areas will, at most, be limited to selected high visibility areas or where required to maintain vegetative cover to meet the designated use (such as golf course greens). Installations will cooperate with and comply with state and local water conservation initiatives and restrictions which are mutually beneficial and which will not have a detrimental impact on the military mission. A water conservation plan will be included in the natural resources management plan at installations where irrigation is practiced.

B2.10.5 Nurseries

Expenditure of appropriated funds is not authorized for the operation of commercial plant nurseries. Trees and shrubs will be obtained from commercial nurseries and federal and state agencies when available. If economical, and in compliance with the INRMP and the Installation Master Plan, trees and shrubs from planted areas as well as natural areas may be used, providing they can be transplanted with sufficient roots and soil to meet American Association of Nurseryman Standards (ANSIZ60), and that the site and associated biological resources will not be adversely impacted.

B2.10.6 Landscape Plantings

All planting, pruning, cultivation, and other maintenance will conform to criteria in TM 5-630, ANSIZ60 standards, and the approved Installation Design Guide. Trees and shrubs will be removed if they have become terminally plagued by insect or disease problems, high maintenance costs, health or safety hazard to persons or property, or have become non-complementary to architectural features of the building area. Justification and merits for landscape and urban forestry expenditures in the urban ecosystem include: energy conservation, preservation of historic and specimen trees, grounds maintenance cost savings, beautification and increased property values, increased species and habitat biodiversity, improved living and working conditions, soil conservation, enhancement of water supplies, control of runoff and non-point sources of pollution, and good land stewardship.

Landscaping will be functional in nature, simple and informal in design, meet professional standards for species, design and installation; be compatible with adjacent surroundings, and complementary to the architectural features and the overall natural setting of the area. Formal landscape designs will be limited to specific high visibility areas including main building and road entrances, ceremonial areas, and other special use sites as warranted. Emphasis will be on the use of low maintenance indigenous plants. Normally not more than one fourth of an individual foundation perimeter will be planted with shrubs or

trees. In arid and semi-arid areas, use water efficient (xeric) plants. A viable Landscape Planting Plan will be an integral part of the INRMP and the Installation Design Guide under the Master Plan.

The expenditure of appropriated funds for shearing hedges and ornamental plants into formal or decorative designs is not authorized except as specifically prescribed in the approved planting plan. Climbing vines, shrubs, and trees that block or damage windows, eaves, gutters or other construction components will be pruned or eliminated, whichever is most feasible. Plantings that reduce visibility or otherwise constitute a traffic hazard near street intersections, walks, and drives will not be permitted. All landscape plantings will be compatible with other grounds maintenance requirements and will be coordinated with, reviewed, and approved by the Facility Engineer, Master Planning, utilities, and the natural resource manager. Painting or white-washing of tree trunks and stones is not authorized. Invasive species will not be use in installation landscaping (see Section B2.6 for more information). Planting and maintenance of flower beds, rose gardens, and nut or fruit trees for their edible products, except for wildlife food purposes, are not facilities engineering duties except as provided below. When flower beds are an important cultural landscape feature of the community, they may be planted and maintained as a facilities engineering activity but should be limited to the main entrance to the installation, headquarters, or in areas used for ceremonial purposes. When authorized, flower beds will be laid out in accordance with a planting and maintenance plan to ensure that:

- Costs are minimized by an appropriate mixture of perennials, annuals, and indigenous wildflowers.
- Plant materials are compatible with the site, exposure, and growing zone, and those exotic species or plant materials that serve as an attractant or host to pests are not used.
- Acquisition and/or maintenance costs are reasonable.
- Indigenous and cultivable threatened and endangered species are to be given primary consideration.

Landscape plans and actions in significant historic sites or districts will be reviewed for their potential effect according to AR 200-4, *Cultural Resources Management*, chapter 3.

B2.10.7 Urban Forest Management

The integrated urban forest ecosystem encompasses many environments, disciplines, and concepts. This includes open lands, water, and vegetated areas in and adjacent to improved and semi-improved grounds as well as woodland borders. The urban forest includes individual trees as well as groupings and small tracts scattered among more dominant land uses. Multiple use of this resource must occur within and among this complex system of interspersed land uses. Urban forests are valued primarily for their non-consumptive contributions to our everyday lives and the environment in which we live. Wood products and volumes from an urban tree are usually identified only for salvage operations. An Urban Forest Management Plan will be an integral part of and integrated with the Installation Master Plan, and the INRMP. The plan should include professional standards (National Arborist Association, American Association of Nurseryman “American Standard for Nursery Stock,” Council of Tree and Landscape Appraisers “Guide for Plant Appraisal”), technical specifications, training, certification, and requirements for all actions impacting the planting, growth, and survival of all trees in the urban forest ecosystem. This includes specific standards for planting, pruning, fertilizing, removal, utility clearance, and integrated pest management; the identification, protection, and preservation of historic and specimen trees, and the training, licensing, and certification of personnel and contractors. All applicable installations with a land management program will have a Command Tree Policy Directive and/or Tree Ordinance that identifies and provides specific requirements, authorization, and approvals for excavation permits, tree removals, and liabilities for unauthorized tree removal and damage.

B2.10.8 Installation Aesthetics

The Army Communities of Excellence program is designed to bring together, under a central umbrella, all those programs and components that directly impact life in Army communities. Its goal is to help the Garrison Commander focus on an integrated plan for improving the community. Tools and guidelines for developing stronger Army communities can be found in Department of Army PAM 600-45, "Guidelines for Community Excellence." Specific installation guidelines and instructions are to be issued by the appropriate directorate. The Army must be supported by both excellent "services" and excellent "facilities." An essential part of any outstanding Army community is the excellence of its facilities. Such facilities are a strong reflection of the whole community's pride and achievements. There are a number of elements in the Army Communities of Excellence program that are considered essential to a good facilities beautification program. They allow standards to be set and determinations of facility excellence to be made. These elements include the Installation Design Guide, the self-help program, building exteriors, signage, screening and the reduction of visual clutter, landscaping and grounds maintenance, lighting, and the design and placement of roads and utilities.

The Installation Design Guide is an essential tool in the planning process (see TM 5-803-5, *Installation Design*, for general guidance). The Installation Design Guide is to provide specific guidelines and information to improve the aesthetics of the installation. This includes site planning for parking; signs, lighting, and utilities; list of plants appropriate for planting at specific installation sites; and standards for the planting, maintenance, and protection of trees, shrubs, groundcovers, and turf. All new construction projects are to include provisions for landscaping and aesthetics with appropriate landscape design and funding authorization. This will include landscaping, buffer zones, screening, parks, and recreational areas as appropriate.

Commanders will include the resources essential to support base attractiveness in budget estimates, project estimates, and other resource justifications. While the design guide is a good and necessary start to facility excellence, an active self-help program is one of the most vital elements for implementation and success. Individuals of the community take self-pride in improving their living and working areas. The individual, building, or community provides the labor while the appropriate installation directorate provides the tools, materials, and technical guidance.

The Army Communities of Excellence and self-help program initiatives provide a means to enhance the aesthetics of the installation, provide an opportunity for all personnel to improve their living and working areas, reduce maintenance costs, and increase the overall value of the Army's physical establishment. The appropriate facility directorate will implement and encourage residents and employees to participate in a self-help grounds maintenance improvement program. The appropriate directorate will provide guidance, specific instructions, and approved materials for self-help projects that contribute to grounds maintenance cost savings, increased installation attractiveness, and good community relations. Special days (Arbor Day, Earth Day, and so forth.) should be designated to promote annual self-help awareness and participation. Both day-to-day type operations and maintenance and project type work will be performed in a way to enhance installation aesthetics. Consideration should be given to the protection of areas that have special scenic values. Areas with archaeological, geological, historical, or ecological significance must be protected.

B3. Proposed Management

The following section details policies or procedures that have changed since the previous Integrated Natural Resources Management Plan or are new projects for 2007-2011.

B3.1 Proposed Policy

There is no new proposed policy for watershed and wetlands management during 2007-2011.

B3.2 Proposed Procedures

Table B3-1. Watershed and Wetlands Standard Procedures.

Category	Standard Practice	Standard Practice Description
Planning	Watershed and Wetlands Management Plan Preparation, Review, and Update.	Prepare, review, and update watershed and wetland management plans, to include the soil resources management plan, soil and water quality management plan, and the wetland management plan.
Planning	Watershed and Wetlands Geographic Information System Planning	Utilize the Geographic Information System to conduct landscape-scale management of watershed and wetland resources.
Planning	Watershed/Wetland National Environmental Policy Act Requirements	Prepare, coordinate, review, and update NEPA documents for wetland and watershed projects, programs, policies, and management plans.
Inventory / Monitoring	Conduct Wetland Monitoring	Conduct monitoring of wetlands on military land to assess the impacts of military training and recreational use.
Inventory / Monitoring	Wetland Planning Level Survey	Conduct wetlands planning level survey.
Inventory / Monitoring	Soil and Water Quality Monitoring	Conduct soil and water quality monitoring
Inventory / Monitoring	Soils Planning Level Survey	Conduct soils planning level survey
Inventory / Monitoring	Floristics Planning Level Survey	Conduct floristics planning level survey
Inventory / Monitoring	Vegetation Communities Planning Level Survey	Conduct vegetation communities planning level survey
Inventory / Monitoring	Topographical Planning Level Survey	Conduct topographic planning level survey
Inventory / Monitoring	Surface Water Planning Level Survey	Conduct surface water planning level survey.
Inventory / Monitoring	Rare, Threatened, Endangered Vegetation Species Survey	Conduct rare, threatened, and endangered vegetation species surveys on military lands.

Category	Standard Practice	Standard Practice Description
Project Management	Plan Watershed and Wetland Projects	Conduct project planning by inventory and identification of potential sites, project development which is accomplished using the project development worksheet, and project prioritization.
Project Management	Design Watershed and Wetland Projects	Conduct project design by providing specific project designs for fuel hazard reduction, habitat improvement, cover and concealment, timber stand improvement, invasive species control, wildlife suppression, timber harvest, and firewood projects. Project designs include site plans, cost estimates, scopes of work, and bill of materials required for each project.
Project Management	Coordinate Watershed and Wetland Activities	Conduct project coordination by coordinating forestry activities by providing project planning and oversight, technical assistance and design; and coordinating NEPA, wetland and cultural activities related to project oversight and management.
Project Management	Watershed and Wetland Project Site Preparation	Prepare a project site for project implementation by flagging boundaries, marking trees, evaluating site conditions, etc.
Project Management	Watershed and Wetland Project Oversight	Provide project oversight by monitoring project progress and execution. Report results back to federal project manager and Contracting Officer's representative.
Protection	Wetland and Watershed Protection	Prepare, coordinate, and review regulations and overlays that protect sensitive and important watersheds and wetlands
Erosion Control and Streambank Stabilization	Watershed Soil Stabilization	Conduct training area soil stabilization and maneuver damage repair in the training areas to improve training realism and support sustainability. Utilize land rehabilitation and maintenance standard practices such as revegetation, soil stabilization practices (temporary and permanent), and erosion and sediment control structures.

Category	Standard Practice	Standard Practice Description
Erosion Control and Streambank Stabilization	Watershed Soil Rehabilitation	Conduct soil rehabilitation in the training areas to improve training realism and support long term sustainability. Utilize the land rehabilitation and maintenance standard practice of revegetation by employing a number of methods, including but not limited to aerial seeding, band fertilizer, broadcast fertilizer, broadcast seeding, chiseling, drill seeding, fabrics & netting, filter stripping, grassed waterways, mulching, hydro-seeding, soil amendments such as limestone & gypsum, moldboard plowing, offset disking, straw mulch, crimped straw mulch, disked sub-soiling, tandem disking, critical area treatment, grass sods, grass stolons, rhizomes, or topsoiling. Employ techniques to prevent or reduce the effects of wind erosion and control dust on and off roads. Methods include but are not limited to windrows, re-vegetation, aggregate application, windbreaks, and surface roughness, wind strip-cropping, ridging or roughening the soil surface to trap moving soil particles and applying water or other emulsions to exposed soil.
Erosion Control and Streambank Stabilization	Watershed Soil Stabilization	Conduct training area soil stabilization and maneuver damage repair in the training areas to improve training realism and support sustainability. Utilize land rehabilitation and maintenance standard practices such as revegetation, soil stabilization practices (temporary and permanent), and erosion and sediment control structures.
Erosion Control and Streambank Stabilization	Wetlands Reclamation and Protection	Conduct wetland reclamation and protection in the training areas. Utilize land rehabilitation and maintenance standard practices such as wetlands reclamation, revegetation, soil stabilization practices (temporary and permanent), erosion and sediment control structures, biological and chemical controls, and prescribed burning.
Erosion Control and Streambank Stabilization	Streambank Stabilization and Repair	Conduct streambank stabilization and repair. Construct or maintain hardened sites on stream banks or shorelines where bridging training habitually occurs. Harden shoreline for habitual amphibious training. Conduct streambank habitat improvement. Utilize land rehabilitation and

Category	Standard Practice	Standard Practice Description
		maintenance standard practice such as streambank repair (interior Alaska or south-central Alaska), revegetation, and soil stabilization practices (temporary and permanent).
Vegetation Management	Watershed Cover and Concealment	Create, upgrade, repair, protect, or maintain cover and concealment by planting, protecting, and maintaining trees and shrubs or removing vegetation and foliage to accommodate large vehicles. Utilize land rehabilitation and maintenance standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, vegetation protection, and revegetation.
Erosion Control and Streambank Stabilization	Low Water Vehicle Crossings	Create, repair, upgrade, and maintain tactical low water vehicle crossings. Construct and maintain low water crossings for tactical vehicles by improving approaches, and hardening stream, at crossing location by utilizing fabrics and netting, stone/gravel, grading and shaping, aggregate, rip rap, interlocking cement structures, cement etc. Construct or maintain low water crossings or stream crossings for vehicles to prevent erosion and sedimentation. Methods include but are not limited to unvented fords constructed of crushed stone, riprap, or precast concrete slabs. Vented fords using pipes embedded in earth fill, aggregate, rip rap, interlocking cement structures, cement structures, etc. Utilize land rehabilitation and maintenance standard practice of low water crossing hardening.
Erosion Control and Streambank Stabilization	Gravel Pit Development, Management, and Reclamation	Develop, upgrade, repair and manage gravel pits. Utilize land rehabilitation and maintenance standard practices such as gravel pit development, gravel crushing, gravel extraction, gravel pit reclamation, sign and Seibert stake installation, and guard rail, gate, fencing, and post installation.
Vegetation Management	Watershed Invasive Species Control	Conduct invasive species control to control exotic and invasive species from spreading. Control invasive species to protect natural species and improve training realism. Utilize land rehabilitation and maintenance standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, and biological and chemical controls.
Outreach	Conduct Presentations/Briefings/Trai	Prepare, coordinate, and conduct fish and wildlife presentations, briefings, and training.

Category	Standard Practice	Standard Practice Description
	ning	
Outreach	Develop Training/Education Materials	Prepare, update, coordinate, publish, and distribute fish and wildlife training and education materials.

B3.3 Proposed Projects

Table B3-2. Proposed Projects for 2007-2011.

Project Information				Year				
Priority	Location	Standard Project Category	Project Title	FY07	FY08	FY09	FY10	FY11
1	FRA	Erosion Control and Streambank Stabilization	FRA TARP FY07	X				
2	FWA	Erosion Control and Streambank Stabilization	FWA TARP FY07	X				
3	DTA	Erosion Control and Streambank Stabilization	DTA TARP FY07	X				
4	FRA	Erosion Control and Streambank Stabilization	Engineer Expressway Widening Phase 1	X				
5	FWA	Erosion Control and Streambank Stabilization	Bravo Battery FOB	X				
6	FWA	Erosion Control and Streambank Stabilization	CACTF Trail Upgrade	X				
7	FWA	Erosion Control and Streambank Stabilization	YTA Demolition Range Phase 1	X				
8	FWA	Erosion Control and Streambank Stabilization	YTA Demolition Range Phase 2	X				
9	FRA	Vegetation Management	Grezelka Fuels Management	X				
10	DTA	Vegetation Management	Nevada Lakes Impact Area, DTA Rx Burn	X				
11	FWA	Vegetation Management	Moose Creek Burn	X				
12	FWA	Vegetation Management	Wills Range Complex DTA RX Burn	X				
13	FWA	Vegetation Management	Alpha Impact Area Burn	X				
14	FWA	Erosion Control and Streambank Stabilization	Training Area 6 Fuels Break	X				
15	FRA	Erosion Control and Streambank Stabilization	M16 Record Range (widen service roads to 20 feet)	X				
16	FRA	Erosion Control and Streambank Stabilization	M16 Record Range Berm erosion control (144) berms	X				

17	FRA	Erosion Control and Streambank Stabilization	Bulldog Trail Widening Phase 2	X				
18	DTA	Erosion Control and Streambank Stabilization	Buffalo Drop Zone Access Phase 1	X				
19	DTA	Erosion Control and Streambank Stabilization	Buffalo Drop Zone Access Phase 2	X				
20	DTA	Erosion Control and Streambank Stabilization	Meadows Road Upgrade and Repair Phase 1	X				
21	DTA	Erosion Control and Streambank Stabilization	Meadows Road Upgrade and Repair Phase 2	X				
22	FWA	Erosion Control and Streambank Stabilization	YTA OP Shack Upgrade	X				
23	ALL	Outreach	Sustainable Range Awareness Updates and Printing	X				
1	FRA	Erosion Control and Streambank Stabilization	FRA TARP FY08		X			
2	FWA	Erosion Control and Streambank Stabilization	FWA TARP FY08		X			
3	DTA	Erosion Control and Streambank Stabilization	DTA TARP FY08		X			
4	FRA	Erosion Control and Streambank Stabilization	Bulldog Trail Widening Phase 3		X			
5	FWA	Erosion Control and Streambank Stabilization	Husky DZ Access Road Phase 2		X			
6	FWA	Vegetation Management	Small Arms Complex Firebreak		X			
7	FRA	Erosion Control and Streambank Stabilization	Engineer Expressway Widening Phase 2		X			
8	DTA	Erosion Control and Streambank Stabilization	Windy Ridge Road Upgrade and Repair Phase 1		X			
9	DTA	Erosion Control and Streambank Stabilization	Windy Ridge Road Upgrade and Repair Phase 2		X			
10	DTA	Vegetation Management	Buffalo Drop Zone Vegetation Management – Burn		X			
11	DTA	Vegetation Management	Buffalo Drop Zone Vegetation Management – Mow		X			
12	FWA	Erosion Control and Streambank Stabilization	YTA Demolition Range Phase 3		X			
13	FWA	Erosion Control and Streambank Stabilization	YTA Firing Point Direct Fire		X			
14	FWA	Erosion Control and Streambank Stabilization	Drivers Training Course Phases 1-5 (200,000 per phase)		X			
15	ALL	Outreach	Sustainable Range Awareness Updates and Printing		X			

1	FRA	Erosion Control and Streambank Stabilization	FRA TARP FY10			X		
2	FWA	Erosion Control and Streambank Stabilization	FWA TARP FY10			X		
3	FWA	Erosion Control and Streambank Stabilization	DTA TARP FY10			X		
4	FRA	Erosion Control and Streambank Stabilization	Engineer Expressway Widening Phase 3			X		
5	FWA	Vegetation Management	Small Arms Complex Firebreak			X		
6	FRA	Erosion Control and Streambank Stabilization	Fire Tower Ridge Road Widening Phase 1			X		
7	DTA	Vegetation Management	Bison Plot Vegetation Management – Burn			X		
8	FWA	Erosion Control and Streambank Stabilization	Warrior Forward Operations Base Phase 3			X		
9	FRA	Erosion Control and Streambank Stabilization	Bulldog Trail Widening Phase 4			X		
10	DTA	Vegetation Management	Bison Plot Vegetation Management – Mow			X		
11	FWA	Erosion Control and Streambank Stabilization	BDE CQM 25-Meter Range			X		
12	DTA	Vegetation Management	Bison Plot Vegetation Management – Fertilize			X		
13	FWA	Erosion Control and Streambank Stabilization	Donnelly Training Area TARP			X		
14	FWA	Erosion Control and Streambank Stabilization	Brigadier Road Upgrade			X		
15	DTA	Erosion Control and Streambank Stabilization	Ober Training Area TARP			X		
16	DTA	Erosion Control and Streambank Stabilization	Butch Training Area TARP			X		
17	DTA	Erosion Control and Streambank Stabilization	Observation Post Training Area TARP			X		
18	DTA	Erosion Control and Streambank Stabilization	Jarvis East Training Area TARP			X		
19	DTA	Erosion Control and Streambank Stabilization	Jarvis West Training Area TARP			X		
20	ALL	Outreach	Sustainable Range Awareness Updates and Printing			X		
1	FRA	Erosion Control and Streambank Stabilization	FRA TARP FY10				X	
2	FWA	Erosion Control and Streambank Stabilization	FWA TARP FY10				X	
3	DTA	Erosion Control and Streambank Stabilization	DTA TARP FY10				X	

4	FRA	Erosion Control and Streambank Stabilization	Engineer Expressway Widening Phase 3				X	
5	DTA	Erosion Control and Streambank Stabilization	OP Road Drainage Upgrades				X	
6	FWA	Erosion Control and Streambank Stabilization	Charlie Battery Forward Operations Base				X	
7	FRA	Erosion Control and Streambank Stabilization	IPBC Range Berm erosion control				X	
8	DTA	Erosion Control and Streambank Stabilization	33 Mile Loop Road Phase 8A				X	
9	FWA	Erosion Control and Streambank Stabilization	YTA Convoy Live Fire Range Phase 1				X	
10	FRA	Erosion Control and Streambank Stabilization	ISBC Range Berm erosion control				X	
11	DTA	Erosion Control and Streambank Stabilization	33 Mile Loop Road Phase 8B				X	
12	FWA	Erosion Control and Streambank Stabilization	YTA Convoy Live Fire Range Phase 2				X	
13	FRA	Erosion Control and Streambank Stabilization	Fire Tower Ridge Road Widening Phase 2				X	
14	DTA	Erosion Control and Streambank Stabilization	33 Mile Loop Road Phase 1 Repair				X	
15	FWA	Erosion Control and Streambank Stabilization	DMPTR/IPBC Forward Operations Base Phase 1				X	
16	FRA	Erosion Control and Streambank Stabilization	Clunie Lake Road Widening Phase 1				X	
17	DTA	Erosion Control and Streambank Stabilization	33 Mile Loop Road Shortcut Upgrade				X	
18	FWA	Erosion Control and Streambank Stabilization	DMPTR/IPBC Forward Operations Base Phase 2				X	
19	FWA	Erosion Control and Streambank Stabilization	DMPTR/IPBC Forward Operations Base Phase 3				X	
20	ALL	Outreach	Sustainable Range Awareness Updates and Printing				X	
1	FRA	Erosion Control and Streambank Stabilization	FRA TARP FY10					X
2	FWA	Erosion Control and Streambank Stabilization	FWA TARP FY10					X
3	DTA	Erosion Control and Streambank Stabilization	DTA TARP FY10					X
4	FRA	Erosion Control and Streambank Stabilization	Bulldog Trail Widening Phase 5					X
5	DTA	Erosion Control and Streambank Stabilization	J Lake Access Control					X

6	FWA	Erosion Control and Streambank Stabilization	YTA Firing Point 11 Upgrade					X
7	FWA	Plan Watershed and Wetland Projects	Alpha Impact Area Survey Line					X
8	DTA	Erosion Control and Streambank Stabilization	J- Lake Gabion Repair					X
9	FWA	Erosion Control and Streambank Stabilization	YTA Firing Point 12 Upgrade					X
10	FRA	Erosion Control and Streambank Stabilization	Clunie Lake Road Widening Phase 2					X
11	DTA	Erosion Control and Streambank Stabilization	Observation Post 2A FOB Upgrade					X
12	FWA	Erosion Control and Streambank Stabilization	YTA Firing Point 13 Upgrade					X
13	FRA	Erosion Control and Streambank Stabilization	Clunie Lake Road Widening Phase 3					X
14	DTA	Erosion Control and Streambank Stabilization	Dome Road Upgrade and Repair					X
15	FWA	Erosion Control and Streambank Stabilization	NBC Parking Upgrade					X
16	FWA	Plan Watershed and Wetland Projects	Stuart Creek Impact Area Survey Line					X
17	DTA	Erosion Control and Streambank Stabilization	Big Lake Road Upgrade and Repair					X
18	FWA	Erosion Control and Streambank Stabilization	Husky Drop Zone Forward Operations Base – Phase 1					X
19	FWA	Vegetation Management	Vegetation Management – General Phase 1					X
20	DTA	Erosion Control and Streambank Stabilization	Big Lake/Windy Ridge Trail Upgrade Phase 1					X
21	FWA	Erosion Control and Streambank Stabilization	Husky Drop Zone Forward Operations Base – Phase 2					X
22	FWA	Erosion Control and Streambank Stabilization	33 Mile Loop Phase 1B					X
23	FWA	Erosion Control and Streambank Stabilization	Husky Drop Zone Forward Operations Base – Phase 2					X
24	FWA	Erosion Control and Streambank Stabilization	Johnson, Skyline, Brigadier and Quarry Road Upgrade					X
25	DTA	Erosion Control and Streambank Stabilization	Old Richardson Highway Upgrade					X
26	FWA	Erosion Control and Streambank Stabilization	MPMG Firing Positions Upgrade					X
27	DTA	Design Watershed and Wetland Projects	Institutional Controls – General Phase 1					X
28	FRA	Erosion Control and Streambank Stabilization	Fire Tower Ridge Road Widening Phase					X

			3					
29	ALL	Outreach	Sustainable Range Awareness Updates and Printing					**X**

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U.S. Army
Garrison
Alaska

2007-2011
Integrated
Natural
Resources
Management
Plan

VOLUME II, Annex C
Forestry and Wildland Fire Management

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C1 Introduction

Forest and wildland fire management is extremely important to protect, maintain, and enhance military training environments. Interior Alaska ecosystems require fire for continued functionality. However, wildfires are also a concern in Alaska due to their impact on human activities and structures, and military operations. Without forest and wildland fire management, vegetation communities become much less diverse, and animal species normally associated with certain successional stages find the environment unsuitable. Forest and wildland fire management rejuvenates these ecosystems and support the military mission.

C1.1 Purpose

This Forestry and Wildland Fire Management Plan is a component of the U.S. Army Garrison, Alaska (USAG-AK) Integrated Natural Resources Management Plan. This plan covers the management, maintenance, protection, and improvement of forest vegetation on USAG-AK managed lands in Alaska. This plan meets the Public Law 106-65 requirement for a forest management plan on military withdrawn lands in Alaska as outlined in the Bureau of Land Management Fort Wainwright and Fort Greely Resource Management Plans (Bureau of Land Management 1994a/b). This plan meets the Army requirement for an Integrated Wildland Fire Management Plan and supports the Alaska Interagency Fire Management Plan.

C1.2 Goals and Objectives

Forestry and wildland fire management goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. Forestry and wildland fire management goals and objectives are:

Stewardship

- Manage vegetation and timber in support of ecosystem management objectives.
    - Maintain and enhance the health, productivity and biological diversity of forest and woodland ecosystems.
    - Maintain a current inventory of forest and vegetative resources.
    - Maintain a current forest stand map.
    - Improve wildlife habitat through timber stand improvement, prescribed burning, mechanized vegetation removal and hand thinning.
    - Maintain ecosystem functionality.
    - Sustain production of forest products.

- Maintain forest health.
    - Conduct forest health monitoring.
    - Control forest pests.
    - Conduct timber salvage operations.

Mission Support

- Maintain a diverse forest to enhance a varied military training environment.

- Manage vegetation and timber in support of military range upgrade projects.
    - Conduct timber sales to remove timber from project sites.
    - Implement forest management practices through timber stand improvement, timber management, timber sales, and timber salvage cuts.

    - Support training area redesign maneuver corridors.

- Protect military facilities.
    - Reduce forest hazard fuels around military facilities.
    - Maintain forest fuel inventory.

- Reduce wildfire starts through wildfire prevention.
    - Fire danger rating system based on Fire Weather Index.
    - Maintain and enforce USAG-AK regulations.

- Control wildfires through suppression activities.
    - Report wildfires.
    - Conduct initial response.
    - Coordinate with Alaska Fire Service during fire fighting operations.

Quality of Life

- Manage vegetation and timber to enhance recreational opportunities.
    - Provide quality recreational opportunities.
    - Provide firewood for local military and civilian population.
    - Provide Christmas trees.

- Conduct public outreach.
    - Educate surrounding public with FireWise Program.
    - Apply annually for Tree City USA.
    - Conduct annual Arbor Day celebration.

Compliance

- Employ standard forestry practices to meet and comply with Migratory Bird Treaty Act, Eagle Protection Act, Clean Water Act, National Environmental Policy Act, National Historical Policy Act.
    - Update annually USAG-AK timber policy.

- Meet annual forestry reporting requirements.
    - Submit annual master Report of Availability.
    - Submit Report of Availability for each timber sale.
    - Submit annual Forestry Annual Work Plan.

Integration

- Involve resources agencies in planning for forest management and the public in review of the plan.
    - Update forest management plan annually and revise every five years.
    - Ensure forestry projects meet multiple objectives.

- Conduct wildland fire planning.
    - Update Integrated Wildland Fire Management Plan annually and revise every five years.
    - Participate in Alaska Interagency Fire Management Plan.
    - Create burn plans for each prescribed burn that meet multiple stewardship, mission objectives, and safety objectives.

- Minimize restrictions to training from forest management policies and issues.

C2 Forest and Wildland Fire Management

Current forest management (Section C2.1) and wildland fire management (Section C2.2) programs and policies are discussed in detail in Section C2. Proposed changes to programs and policy are discussed in Section C3. Proposed standard procedures and proposed projects are also discussed in Section C3.

C2.1 Forest Management

Army forest management is required to support and enhance the immediate and long-term military mission while meeting natural resource stewardship requirements set forth in federal laws and the Army's Environmental Strategy. Army forest management goals include biodiversity; wildlife habitat, including habitat for threatened and endangered species of plants and animals; soil conservation and watershed protection; sustained forest health; capturing the residual forest product value; and, most importantly, the sustainment of viable and diversified training lands to meet the military mission. The harvesting of forest products is allowed and encouraged when conducted consistent with protecting and maintaining a viable, self-sustaining forest ecosystem.

The USAG-AK forest management program is required to support and enhance the immediate and long-term military mission and to meet natural resource stewardship requirements set forth in federal laws. Forest ecosystems perform important, sometimes unique, natural resource functions which are inherently valued and which are of benefit to all living things. The objectives and benefits of forest ecosystem management include biodiversity of species and habitat; natural beauty; outdoor recreation opportunities; wildlife habitat, including habitat for threatened and endangered species of plants and animals; soil conservation and watershed protection, including erosion control; improvement of air and water quality; sustained production of commercially valuable forest products; noise abatement; and the sustainment of viable and diversified training lands to meet the military mission.

It is USAG-AK policy to maintain, restore, and manage its forest lands on an ecosystem basis. The harvesting of forest products, including other consumptive and non-consumptive activities that take advantage of the forest environment, are allowed and encouraged when conducted consistent with protecting and maintaining a viable, self-sustaining forest ecosystem. Revenues generated from the commercial harvesting of forest products will be used to maintain, improve, and, as necessary, restore previously degraded forest ecosystems. Forest ecosystem management strategies should be broad based to optimize overall natural resources benefits and not focused on a single management objective such as maximizing timber production. Forest ecology and management are to be an integral part of the master planning process and review.

Implementation of this plan will maintain and enhance the health, productivity, and biological diversity of forest and woodland ecosystems. Army guidance requires that forest products be managed under sustainable yield management principles, protected from depreciation, and provided for timely removal of merchantable timber. Forest diversity is needed for a varied training environment. Forest management is required to protect, maintain, and enhance military training environments. Tree density, ground cover, and other factors within the forest ecosystem are critical for accomplishing the military mission. In addition, management of the forest ecosystem is important to maintain biodiversity, wildlife habitat management, and the development of outdoor recreation. Timber removal and other forest management practices on all of USAG-AK will be coordinated with a Range Control office to ensure minimal disruption of military training. Scheduling usually will be done three to six months in advance of activities. Appropriate

National Environmental Policy Act documentation will be completed prior to implementation of timber stand improvement projects.

Laws, instructions, regulations, and guidance that must be complied with when performing forest management include, but are not limited to, the Endangered Species Act of 1973, as amended; National Environmental Policy Act; 16 U.S.C. 670a Sikes Act (as amended by the Sikes Act Improvement Act 1997); National Historic Preservation Act of 1966, as amended; Defense Finance and Accounting Service Indianapolis Center (DFAS-IN) Regulation 37-1; Chapter 14-Finance And Accounting Policy Implementation, January 2000; 32 CFR Part 651, Environmental Analysis of Army Actions; Army Regulation 405-80, *Management of Title and Granting Use of Real Property*; 10-Oct-97; and Army Regulation 405-90, *Disposal Of Real Estate*, 10 May 1985.

USAG-AK is responsible for managing over 1.6 million acres for military use, most of which is withdrawn from the public domain. USAG-AK shares responsibility for forest vegetation management with the U.S. Department of Interior, Bureau of Land Management (BLM) on these withdrawn public domain lands. BLM retains vegetation management authority on a portion of these withdrawn lands when specified in the withdrawal language, otherwise the Army gains vegetation management authority. BLM retains vegetation management rights under applicable withdrawal legislation for the Tanana Flats Training Area, Yukon Training Area, Donnelly Training Area East and West, and Public Land Orders 2622 and 2676. Any vegetation manipulation by USAG-AK on these lands is done in cooperation with BLM. BLM and Army timber management practices and contract stipulations govern timber sales from these lands. The withdrawals for the Main Post Training Areas of Fort Wainwright and Fort Greely; Dyke Army Range; Charlie and Bravo Batteries; Gerstle River Test Site; Whistler Creek Rock Climbing Area; homestead sites purchased fee simple; and lands withdrawn under Public Land Orders 2768, 3922, 1153, 1503, 1673 and 4161 do not indicate any vegetative management responsibilities for BLM. On Department of Defense fee simple lands and on lands the Army has vegetation rights, any sale of timber would be processed through the Army's forest management system.

The following sections of this forest management plan outline the programs and policies USAG-AK utilizes to manage its forest vegetation resources. Programs and policies for forest management planning, inventory and monitoring, forest protection, forest health, forest land improvement, timber sales, urban forestry, public outreach and forestry program management are detailed below.

C2.1.1 Forest Management Planning and Integration

C2.1.1.1 Forest Management Plan

A forest management plan is a required component of the Integrated Natural Resources Management Plan for USAG-AK lands in Alaska. The Fort Wainwright (Bureau of Land Management and U.S. Army 1994a) and Fort Greely (Bureau of Land Management and U.S. Army 1994b) Resource Management Plans also require the development of forest management plans compatible with achieving the military mission. This component plan meets both of these requirements. The first forest management plan for Fort Wainwright and Fort Greely was completed in 2001. The first forest management plan for Fort Richardson was completed in 1992 and updated in 2001.

The forest management plan must consider military mission, preservation of habitat, and recreation for all of these forested acres. Harvests of timber products from USAG-AK lands are permitted but not mandatory. Management of the forest ecosystem is one of the most critical aspects of land management on the installation due to the high percentage of forested land and its importance to wildlife. The management of forest and woodland resources on USAG-AK is consistent with ecosystem management principles. It must also consider ecosystem management principles of preservation and manipulation of

habitat, conservation of wildlife, outdoor recreation, and public safety. This forest management plan addresses allowable harvest levels, reforestation methods, and appropriate silvicultural methods by measuring the impact of each on military needs, recreational opportunities, and economic considerations.

Planned forest management activities such as timber harvest, reforestation, and timber stand improvement will be coordinated with and reviewed by all other staff resource professionals (wildlife biologists, fisheries biologists, archaeologists, master planner, and so forth) to protect and improve other resource values, and with training, testing, and other operational personnel to ensure the planned activity supports the planned military use of the land.

C2.1.1.2 Forest Land Classification

Forest management is required to protect, maintain, and enhance military training environments. Information about tree density, canopy and ground cover, and other factors within the forest ecosystem is critical to the accomplishment of the military mission. In addition, management of the forest ecosystem is important to maintain biodiversity, wildlife habitat, and the development of outdoor recreation. The objectives of the forest management program are to inventory and monitor the forest resources, utilize sustainable forest management practices, and manage the forest and vegetative resources in support of the military mission and ecosystem management principles. Under applicable withdrawal legislation for portions of USAG-AK lands in Alaska, the United States Department of the Interior, Bureau of Land Management (BLM) retains vegetation rights. Any vegetation manipulation by the Army is done in cooperation with BLM on these lands. BLM and Army timber management practices and contract stipulations govern forest utilization practices from these lands. USAG-AK uses the following classification system for forest management on Army lands.

Intensive: Intensive forest management units are areas that are highly populated, receive high levels of military use and are easily accessible. All management prescriptions apply to these areas, including urban forestry, timber stand improvement, forest inventory and monitoring, and forest utilization.

Personal Use: Personal use forest management areas have localized military use with good access. Management prescriptions in these areas allow for more public use with occasional intensive forest management at specialized areas. The predominant management activities for these areas include personal-use forest utilization and forest inventory and monitoring.

Limited: Limited forest management areas are difficult to access or are off-limits to the public. Management activities in these areas are driven by special purpose military needs and monitoring.

C2.1.2 Forest Inventory and Monitoring

Recent requests from the public indicate the need to conduct forest inventories on USAG-AK lands to determine if there are sufficient resources to support a commercial forest program. The Sikes Act requires those withdrawn lands be included in Integrated Natural Resource Management Plan planning and program implementation, including forest management. Inventory and monitoring of USAG-AK's forest resources provide an indicator of ecosystem integrity, biodiversity of species and habitats, and sustained production of commercially valuable forest products. In addition, inventory and monitoring help to determine areas where improvements or rehabilitation are needed to maintain ecosystem integrity and to support military training activities. Inventories are conducted by forestry crews from the USAG-AK Natural Resource Forestry Office with equipment purchased for the purpose of conducting these inventories.

Total land area available for forest management is 374,678 acres (Mayo 1993). Beginning in 1999, USAG-AK began an annual inventory of 10% (about 37,000 acres) of lands that may have viable commercial forest values. This inventory used ecological land classification units to delineate and sample stands to determine merchantable volumes by species. The inventory delineated areas where USAG-AK manages vegetation rights and sampled all stands with commercial forest potential. The inventory of these lands was completed in 2004. Permanent sample plots establishment started in 2001 and was completed in 2005. Two hundred sixty five permanent sample plots were established throughout USAG-AK lands.

Forest inventory involves the identification and delineation of species, size class and density of forest and other vegetative resources. USAG-AK utilizes the ecological land classification developed for Fort Wainwright, Donnelly Training Area and Fort Richardson as the basis for identifying general species locations throughout the installation. Within ecological land classification units known as ecosites, stands are delineated through a combination of field surveys, air photo interpretation, satellite imagery and Geographic Information System. Stands are sampled to determine tree species composition, size class distribution, canopy cover, stem density, basal area, regeneration composition and density, and merchantable volumes by species. Forest inventories are conducted using variable plot and permanent plot procedures. Forest inventory and analysis plots and forest health monitoring plots are located throughout the forested areas of USAG-AK. Forest inventory and analysis and forest health monitoring permanent plots are an effective method for detecting changes in forest health, composition, structure, forest fire fuel loading, and determining growth and mortality, which can be applied in growth projection models. They will be re-measured every five years. The periodic re-measurement of permanent sample plots is statistically superior to successive independent inventories for evaluation of changes in forest conditions. Permanent plot locations and intensity will be systematically stratified by forest type across the landscape. Forest inventory information is essential for effective management of forest resources. Stands are sampled to determine tree species composition, size class distribution, understory species composition, canopy cover, crown size and position, stem density, basal area, regeneration composition and density, and merchantable volumes by species.

Permanent plot locations and intensity are systematically stratified by forest type across the landscape. Two hundred sixty five permanent plots were established on USAG-AK lands between 2001 and 2004. One hundred plots are located in the Yukon Training Area. Fifty plots are located at Fort Richardson. Five plots are located in the Gerstle and Black Rapids Training Areas. Fifty plots are located in the Tanana Flats Training Area. Sixty plots are located at Donnelly Training Area. Plots are re-measured every 5 to 10 years and re-measurement starts in 2006. Forest stand maps are updated annually for all USAG-AK lands. Variable plot inventories are conducted on all lands where USAG-AK manages vegetation rights. These inventories are re-measured every 10 years.

Forest cover maps are updated annually using fire history perimeters, military construction overlays and overlays of other clearing projects. Forest stands are delineated and attributed on a Geographic Information System using a combination of air photo interpretation, heads up digitizing, and ground truth plot information. Forest stand data attributed in the Geographic Information System comes from forest inventory plot information. Forest stand maps are used for forest utilization planning, identifying specific military training area requirements, military training range location, and natural resource management concerns.

C2.1.3 Forest Protection

Forest resources are protected on USAG-AK lands through this Integrated Natural Resources Management Plan (INRMP) as well as through local and Army-wide regulations. The three primary activities on Army lands that can affect forest resources are military activities, timber sales and construction activities. Military activities are regulated by U.S. Army Alaska Regulation 350-2, *Range*

Regulation. U.S. Army Alaska Regulation 350-2 allows minor use of vegetation during training exercises but prohibits clearing of trees larger than 4 inches in diameter. Spruce boughs are only to be collected from trees sized less than four inches diameter-breast-height. U.S. Army Alaska Regulation 350-2 also prohibits open fires in the training areas.

This INRMP establishes best management practices (see Volume III, Supplements) during the conduct of timber sales, clearing or construction activities to protect surrounding forest resources, wetlands, surface water and wildlife. Hand clearing techniques should be used to preclude erosion or when conducting harvesting activities in wetlands, if possible. Timber harvest activity is not allowed within 50 feet immediately adjacent to an anadromous stream or high value resident fish water body. Within the next 50 feet, a 50% minimum retention of trees must occur. Permits are required for the vehicular crossing of anadromous and resident fish streams. If spruce logs are not immediately removed from the site, the following special precaution must be taken. All spruce logs greater than four inch diameter-breast-height must be scored the length of the log with a chainsaw to a half-inch depth so as to cause drying of the phloem to prevent bark and ips beetle infestations in nearby healthy trees. Trees with a diameter-breast-height of more than four inches should be salvaged for public use up to a four inch top. Trees with a diameter-breast-height of more than four inches should be stacked separately from smaller diameter trees. All stumps should be cut within six inches or less of the ground surface.

Construction activities that affect commercial forest resources are regulated by Army Regulation 200-3, *Natural Resources - Land, Forest, and Wildlife Management* (28 February 1995) Chapter 5 Forest Management, Section 5-2 Timber Management, b. Harvesting actions, (2) Disposal action, (d) which states,

> "Commercial forest products will not be given away, abandoned, carelessly destroyed, used to offset costs of contracts, or traded for products, supplies, or services. All forest products are to be accounted for and commercial harvests completed prior to the start of any construction that may impact forest resources. When forest products are removed from Army lands by any means other than a commercial timber sale, a dollar amount equal to the fair market value is to be deposited to Budget Clearing Account 21F3875.3960 20-C S99999 for products removed."

If construction activities cannot avoid clearing forest resources, construction activities must follow correct procedures to minimize impacts and to effectively utilize forest products.

1. Planning and Coordination. All harvest and clearing activities must be coordinated with the U.S. Army, Garrison Environmental Resources Department forestry staff with a map of the proposed area to be cleared as soon as practicable to ensure harvest requirements are met prior to action. Opening sites early to timber sale operators and firewood cutters can be used to clear the land and reduce the cost of construction. However, timber sales can take up to one year from the advertising process to the final removal of the timber, so early planning and coordination is essential. Early planning and coordination can also avoid conflicts with vegetation clearing guidelines (no clearing from 1 May through 15 July annually) promulgated by the U.S. Fish and Wildlife Service to help with compliance of the Migratory Bird Treaty Act.

2. Commercial Timber Assessment. Environmental Resources Department forestry staff will conduct a site visit and possible timber cruise to determine species composition, size class distribution, and volume. In general, if the site contains birch, spruce, or aspen over four inches in diameter at breast height, the timber has commercial value. Trees with a diameter-breast-height of less than four inches may be cut without prior approval. Trees with a diameter-breast-height of less than four inches, slash, and other debris may be distributed into adjacent upland areas, piled for burning, hauled away, or chipped and distributed into adjacent upland areas. Stumps and other non-merchantable portions of cleared trees may

be ground, chipped or buried at a proper disposal site. Mechanical clearing techniques must be coordinated with the Environmental Resources Department forestry staff prior to action.

3. Ownership. If the area to be cleared has commercial timber value, the next step is to determine timber rights. Commercial timber utilization procedures depend on whether vegetation management authority belongs to USAG-AK or to BLM. Environmental Resources Department forestry personnel will assist in the determination of vegetation management authority for each project and land parcel in question. Three vegetation rights categories exist on USAG-AK lands: (1) Department of Defense fee simple (Army owns vegetation rights), (2) public domain lands withdrawn for military use where withdrawals specify Bureau of Land Management vegetation management authority (BLM controls vegetation rights), and (3) public domain lands withdrawn for military use where vegetation management authority is not specified (Army controls vegetation rights).

4. Commercial Timber Utilization Procedures. On lands on which the Army has vegetation rights, any sale of timber would be processed through the Army's forest management system. Army timber management practices and contract stipulations govern timber sales. If BLM has vegetation management authority for the forest vegetation resources at the project site, any vegetation manipulation by USAG-AK must be done with BLM approval. BLM timber management practices and contract stipulations govern timber sales from these lands. Any proceeds from these sales will be deposited into the general U.S. Treasury and would not be processed through the Army's forest management system.

4a. Bureau of Land Management Procedure. If the vegetation rights management authority belongs to BLM, Environmental Resources Department forestry staff will consult the designated BLM forestry representative. The BLM forestry representative and Environmental Resources Department forestry staff will agree upon value of the timber and determine utilization procedures. BLM policy is to always utilize timber. If the timber being removed is of significant value and a commercial operator is interested in purchasing the material, a timber sale will be conducted. If more than one commercial operator expresses interest in purchasing the timber, BLM will advertise the sale, accept bids to purchase the timber, and award the timber sale to the highest bidder. If only one operator expresses interest in purchasing the timber, BLM will sell the timber at salvage value. If no commercial operator expresses interest in purchasing the timber, BLM requires the usable timber to be stockpiled in a location where the public has access to it. This timber will then be disposed of through the firewood program. All people collecting the firewood are required to obtain BLM and USAG-AK firewood and Recreational Access Permits.

4b. USAG-AK Procedures. If the vegetation rights management authority belongs to USAG-AK, Environmental Resources Department forestry staff will determine the value of the timber and determine utilization procedures. Army policy requires utilization of timber (Army Regulation 200-3). If the timber being removed is of significant value and a commercial operator is interested in purchasing the material, a timber sale will be conducted. Timber sales conducted by USAG-AK follow procedures outlined in the Army's Timber Sale Policy Guidance (2002). If more than one commercial operator expresses interest in purchasing the timber, USAG-AK will advertise the sale, accept bids to purchase the timber, and award the timber sale to the highest bidder. If only one operator expresses interest in purchasing the timber, USAG-AK will sell the timber at base value set by the State of Alaska Division of Forestry. If no commercial operator expresses interest in purchasing the timber, the usable material will be stockpiled in a location where the public has access to it. This timber will be disposed of through the firewood program. All people collecting the firewood are required to obtain USAG-AK firewood and Recreational Access Permits. If there is sufficient wood stockpiled on post to be utilized by firewood cutters and the wood is likely going to sit for more than two years, the timber may be disposed of by chipping. The chipped material may be stockpiled, utilized for military training purposes, spread out at the project site, or buried.

C2.1.4 Forest Health

Maintaining good forest health is a primary objective of the USAG-AK forestry program. The USAG-AK forestry program must be integrated with the USAG-AK Installation Pest Management program and the U.S. Department of Agriculture Forest Service. Section S of the Cooperative Forestry Assistance Act of 1978 (16 U.S.C. 2101) authorizes the Secretary of Agriculture to protect trees and forests, wood products, stored wood and wood in use from insects and diseases. The Forest Service has the delegated responsibility for carrying out the provisions of the Cooperative Forestry Assistance Act on USAG-AK lands. It is intended that the Forest Service will provide technical assistance and appropriate funds to meet specific pest management project objectives to provide foliage protection, reduce specific insect and disease populations, reduce the risk of artificial spread to uninfested areas, and prevent tree mortality.

A Memorandum of Agreement between the U.S. Department of Agriculture and the Department of Defense was signed on 11 December 1990 for the Conduct of Forest Insect and Disease Suppression on Lands Administered by the Department of Defense. Annual appropriations under the Cooperative Forestry Assistance Act and the Memorandum of Agreement will be based on estimated suppression costs developed by the Forest Service, the Department of Defense, other federal agencies, states and other cooperating entities.

Annual insect and disease detection surveys are conducted by the Forest Service in cooperation with the State of Alaska Department of Natural Resources, Division of Forestry. Data from these surveys are published annually in the Forest Health Conditions of Alaska Report. Continuous forest inventory plots are used to detect changes in insect and disease abundance in representative forest stands across the landscape. Prevention is the primary approach to insect and disease control in intensively managed sites. Prevention consists largely of silvicultural practices that enhance natural control of insects and diseases and removal of infested trees. Salvage timber sales can be used in stands with large outbreaks. Stands suffering extensive damage from snow and ice loading and windstorms will be targeted for salvage sales to prevent insect infestation and resulting outbreaks. Management actions may not be necessary in some areas where natural disturbance from forest insects and diseases is acceptable. Slash management for spruce trees and/or limbs greater than four inches in diameter will be accomplished by utilizing the wood and removing it from site, burning, or drying it by uniform scattering in areas open to sunlight (limbs only). Monitoring for insect outbreaks will follow guidelines established by U.S. Forest Service, State and Private Forestry's Forest Health Protection Unit. Procedures include establishing bait and trapping sites and systemically identifying infected trees. Control procedures will be identified by the Forest Health Protection Unit and include bio-control, mechanical removal, and chemical control techniques.

Insects are active and significant components of Alaska's ecosystems. Arctic and boreal insects are characterized by having few species and large population numbers. Boreal insects are opportunistic in their behavior. They respond quickly to changes in climate and the availability of food and breeding material. Spruce beetles, for example, are one of the most important disturbance agents in mature Lutz and white spruce stands in south-central Alaska and white spruce stands in interior Alaska. Bark beetles respond quickly to large-scale blow down, fire-scorched trees, and spruce injured by flooding. Large numbers of beetles can be produced in such breeding material, leading to potential outbreaks. The spruce bark beetle (*Dendroctonus rufipennis* [Kirby]) is becoming more significant on Fort Wainwright in terms of its effects on the forest ecosystem. Alaska Department of Natural Resources estimates that 30%-50% of forest stands older than 150 years are infected in the Fort Wainwright area. One result of spruce bark beetle outbreaks is increased fire danger. Standing dead timber generally falls within 10 years, creating up to 40 tons of fuel per acre on the ground. New spruce beetle activity encountered during the 2004 aerial survey was minimal on Fort Wainwright, although occasional spruce beetle spots (1–5 trees) were observed along the fringes of recent fires. The fire fringe areas will be included in future surveys for any bark beetle (spruce beetle, *ips* engraver) and wood boring insect activity. Fort Richardson has lost most of

the larger white spruce from spruce bark beetle outbreaks in the 1990s. Within the remaining stands on Fort Richardson, spruce beetle populations maintain endemic levels. Some spruce beetle activity is still occurring in remote, localized pockets. Fire hazard created from stands killed in the 1990s' outbreak in the mid to upper hillside areas continues to put this area at risk of a potential catastrophic fire. The best prevention tactic to reduce spruce bark beetle damage is managing for a diversity of species and age classes within the forest. The combination of mature spruce and a reduction in natural disturbance is ideal for the spruce bark beetle and associated changes in the forest ecosystem. Thus, timber stand improvement and prescribed burning would reduce susceptibility to the spruce bark beetle (Forest Health Conditions of Alaska Report 2004). A species of engraver beetle (*Ips* spp.*)* is found throughout Alaska, but it is most prevalent in the Interior. *Ips* favors sites with accumulation of slash. Ips outbreaks usually develop and disappear rapidly. Ips (*Ips perturbatus)* (Eichhoff) activity can be distinguished from spruce beetle damage by dying and reddening upper crowns in mature spruce. Ips infestations occur mainly along river floodplains and areas disturbed by erosion, spruce top breakage (e.g., snow-loading), harvest, or wind. Increased tree mortality in Alaska caused by *Ips* spp. has stimulated research on new management tactics utilizing semiochemicals such as pheromones and tree bark volatiles to minimize damage from bark beetles.

A variety of changes occur to forest resources when many trees are killed. In the long run, these changes are biological or ecological in nature. There are also socioeconomic consequences in the short term that can be viewed as either positive or negative, depending on the forest resource in question. According to the Forest Health Conditions in Alaska 2004 Report, some of the impacts associated with spruce beetle infestations include, but are not limited to:

- **Loss of merchantable value of killed trees**: The value of spruce as saw timber is reduced within three years of attack in south-central Alaska due to weather checking and sap-rots. The value of beetle-killed trees as house logs, chips, or firewood continues for many years if the tree remains standing.
- **Long-term stand conversion**: The best regeneration of white and Lutz spruce and birch occur on a seedbed of bare mineral soil with some organic material. Site disturbances such as fire, windthrow, flooding, or ground scarification can provide excellent sites for germination and establishment of seedlings if there is an adequate seed source. However, on some sites in south-central Alaska, blue-joint reed grass and other competing vegetation quickly invade the sites where spruce beetles have "opened up" the canopy. This delays reestablishment of tree species.
- **Impacts on wildlife habitat**: Wildlife populations, which depend on live, mature spruce stands for habitat requirements, may decline. We expect to see decreases in red squirrels, spruce grouse, Townsend warblers, ruby-crowned kinglets, and possibly marbled murrelet populations. On the other hand, wildlife species (moose, small mammals and their predators, etc.) that benefit from early successional vegetation such as willow and aspen may increase as stand composition changes.
- **Impacts on scenic quality**: Scenic beauty is an important forest resource. It has been demonstrated that there is a significant decline in public perception of scenic quality where spruce beetle impacted stands adjoin corridors such as National Scenic Byways. Maintaining or enhancing scenic quality necessitates minimizing impacts from spruce beetle infestations.
- **Fire hazard**: Fire hazard in many spruce beetle impacted stands has increased. After a spruce beetle outbreak, grass or other fine vegetation increases and fire spreads rapidly through these vegetation types. As the dead trees break or blow down (5–10 years after an outbreak), large woody debris begins to accumulate on the forest floor. This material is the largest component of the fuels complex. Heavy fuels do not readily ignite, but once ignited they burn at higher temperatures for a longer period. A dangerous fire behavior situation results from a combination of fine, flashy fuels and abundant large woody debris. Rate of fire spread may increase as well as

burn intensity. Observations from recent fires on the Kenai Peninsula have shown an increase in crown fires. This fire behavior is caused by fire traveling up the dead spruce trees and spotting into the crowns of adjacent beetle killed trees.

- **Impact on fisheries**: If salmon spawning streams are bordered by large diameter spruce and these trees are subsequently killed by spruce beetles, there is a concern as to the future availability of large woody debris in the streams. Large woody debris in spawning streams is a necessary component for spawning habitat integrity. Also, stream temperatures may increase.
- **Impact on watersheds**: Intense bark beetle outbreaks can kill large amounts of forest vegetation. The "removal" of significant portions of the forest will impact to some degree the dynamics of stream flow, timing of peak flow, etc. There are a variety of techniques that can be used to prevent, mitigate, or reduce impacts associated with spruce beetle infestations. Before pest management treatment options can be developed, the forest manager must evaluate the resource values and economics of management actions for each stand in light of management objectives. The beetle population level must also be considered because population levels will determine the priority of management actions and the type of strategy to be invoked. The key to sustainable forest ecosystems is to manage vegetation patterns in order to maintain species diversity, both plant and animal, while providing for a multitude of resources such as recreation, fisheries, wildlife, and the production of wood fiber. Properly applied silvicultural practices as well as fire management in south-central and interior Alaska can maintain the forest diversity needed to provide the range of products and amenities available in the natural forest for now and in the future.

Defoliator insects eat the leaves or needles of forest trees. Defoliators are found throughout Alaska and on all tree types. Bark beetles are often considered the more significant disturbance agents in boreal Alaska (due to the high potential for causing tree mortality). Even so, defoliators can have a significant affect on both coniferous and deciduous trees, and can cause tree mortality with several seasons of defoliation. If complete defoliation of a conifer occurs before midsummer, the trees will not have formed buds for the following year and the tree could be killed. In a defoliator outbreak where insect populations are at epidemic levels, vast acreages can be affected. During an outbreak, nearly every tree in a stand can be affected to varying degrees. This defoliation often results in a variety of biological and ecological impacts, but there are socioeconomic impacts as well. According to the Forest Health Conditions in Alaska 2004 Report, some of the impacts associated with a defoliator infestation include, but are not limited to:

- **Impacts on wildlife habitat**: Wildlife may be positively or negatively affected by defoliator outbreaks. Larvae are a necessary food source to fledgling chicks, but bird habitat may be negatively affected by the decrease in cover. Conversely, predatory birds may benefit from the cover change. The added light to the forest floor will result in an increased ground cover of herbaceous plants, benefiting browse animals.
- **Impacts on aquatic systems**: Aquatic systems may also be positively or negatively affected. Nutrient cycling is accelerated as foliage and insect waste enters the aquatic system. Larvae may drop into streams and can serve as a food source for fish. In addition, the loss of overstory cover can increase sunlight exposure to the stream, affecting the aquatic environment.
- **Economic concerns**: Heavy defoliation will decrease the growth rate of trees, resulting in the delayed harvesting of merchantable trees. In addition to growth loss, repeated and or heavy defoliation events can cause top kill and, in some cases, tree death.
- **Aesthetics and recreation**: The visual impact of a stand in the midst of an outbreak can be quite alarming and often will lose attractiveness for recreation. Large numbers of larvae can be a nuisance in picnic grounds and campgrounds. Dead tops and dead trees pose a hazard in recreational areas. However, the effect is often short term, and the following year, scenic quality

usually returns to "normal." Defoliator outbreaks tend to be cyclic and closely tied to climatic conditions. The synchronization of larval emergence and tree bud break is closely related to population increases. The better the synchronization of insect and host throughout larval development, the more likely that an epidemic will occur. Higher temperature during pupation and oviposition of western black-headed budworm, for example, improves adult emergence and survival, which increases the number of viable eggs that develop into larvae, the most damaging insect stage. Outbreaks of spruce aphid are closely tied to the survival of over-wintering adults. Short duration but very cold temperatures (below -10 °C), especially in April, probably have an effect on aphid populations. Suppression efforts of insect populations are usually limited to small-scale urban settings or high value recreational sites. Suppression techniques vary depending on the species of defoliator. Healthy forests include periodic insect defoliation. Land managers should consider the predicted duration and extent of the event and predicted effects on the resource when considering suppression actions.

In 2004, 83,989 acres of spruce in interior Alaska were defoliated by the spruce budworm *Choristoneura fumiferana* (Clemens). Near Fairbanks, 25,873 acres were infested, mostly in the hills and ridges around Fairbanks. Spruce budworm is one of the most destructive insect pests of white spruce in North America. In Alaska, budworm has only recently become a major issue. During outbreaks, budworms are responsible for significant mortality of young white spruce and a factor in spruce regeneration, as mature trees that are top-killed do not produce cones. During the previous recorded 1990–1996 budworm outbreak, over 150,000 acres of white spruce were defoliated along the Tanana and Yukon rivers. Moderate defoliation of localized areas around Fairbanks to Nenana was observed in 2002–2003. In 2004, indications are that another outbreak has begun. Terminal leader mortality was observed in most trees following the outbreak in the early 1990s. Young seedlings and saplings are often killed by repeated severe defoliation (Forest Health Conditions in Alaska 2004).

Larch sawfly (*Pristiphora erichsonii* [Hartig]) activity has increased, reversing a decline that began after 1999 when sawfly populations impacted nearly 450,000 acres in Alaska. The activity is light and scattered, less than one tree per acre, and was observed in numerous small patches. Typically, low level activity such as this would not be considered significant; however, the trees currently infested represent some of the last remaining live trees in many of these areas (Forest Health Conditions in Alaska 2004).

Aspen leaf miner (*Phyllocnistis populiella* (Chambers)) infested acreage increased significantly for the fourth consecutive year. In the current outbreak, leaf miner activity in the extensive hardwood stands surrounding Fairbanks was first noticeable in 2000. Adult moths over-winter in the duff layer and under bark scales. Adults become active in late May to early June and deposit eggs singly on the leaf edges, then slightly fold the leaf to form a protective covering for the egg until larval emergence. Newly hatched larvae bore into and feed between epidermal leaf tissues. Meandering larval mines of *P. populiella* are produced in the epidermal layers on the underside of leaves. Affected foliage takes on an almost silvery sheen as the larvae mature in the last stages of development and consumes most of the green photosynthetic area of affected leaves. Adult emergence generally occurs prior to or sometimes after the leaves drop in late August and September. Defoliation intensity is expected to increase next year in the more recently affected areas. Heavy, repeated attacks by the aspen leaf miner can reduce tree growth and may cause branch dieback, or in some cases, tree death. Many aspen trees, especially in the hills, were severely drought stressed in 2004, and began losing leaves already by late July. The effects of drought stress and the repeated stress of leaf miner may begin to take its toll on the aspen in the Interior (Forest Health Conditions in Alaska 2004).

C2.1.5 Forest Land Improvement

Forest land improvement on USAG-AK lands involves reforestation, timber stand improvement and habitat improvement using scientific silvicultural principles. USAG-AK uses hand thinning, mechanized thinning and clearing, timber sales and prescribed burning to accomplish these silvicultural treatments.

C2.1.5.1 Silviculture

The major objective of the USAG-AK's forestry program is to promote a healthy ecosystem capable of supporting mission and conservation requirements. Silvicultural treatments will be designed to restore, maintain, and improve the ecological functions and values of the particular forest unit being managed. Silvicultural treatments used on Army lands will be designed to improve military mission areas, and when possible, attain multiple use and sustained yield timber management while enhancing watersheds, wildlife habitats, and natural beauty values along scenic corridors. When silvicultural treatments provide opportunity for commercial sale of forest products, each commercial forest activity will be performed in accordance with 10 USC 2665, and operating expenses will be commensurate with anticipated financial returns.

Silvicultural systems used will be consistent with the silvics of the species and ecology of the forest type, maintain the site's productivity, and be chosen to best achieve the management objectives. In general, boreal forests naturally occur as even-aged stands across the landscape and the preferred management scheme is to maintain a diverse mosaic of even-aged stands. A variety of silvicultural systems will be used, including uneven-aged management on a limited basis, in order to achieve the desired management objective (Table C2-1). The basic silvics of some native trees are listed in Table C2-2. Timber harvesting areas will be sized and configured to best meet silvicultural, wildlife, scenic, military, and other specific objectives of the area. Harvest methods can include intermediate partial cuts prior to the final stand renewal reproduction cuts as listed in Table C2-1. A forest land use plan is required for each timber harvest, except for harvests on land that is cleared for non-forest use. The plan describes harvest methods, access, site conditions, reforestation plan, multiple use provisions, additional stand maintenance procedures, and identifies the target stand conditions to be achieved. The harvest method used must meet the requirements (silvics) of the species to be established in the new stand. Harvest unit sizes and required harvesting techniques, including required or restricted equipment use, will be determined in the plan for each timber harvest. No timber harvest activity is allowed within 50 feet immediately adjacent to an anadromous stream or high value resident fish water body. The next 50 feet must have 50% retention of trees. Permits are required for the crossing of all anadromous and resident fish streams. Harvest activities in wetlands will adhere to all guidelines of the wetland management plan. The forest land use plan will be subject to all National Environmental Policy Act, National Historic Preservation Act and other applicable legal requirements.

Table C2-1. Silvicultural Methods Used in Different Forest Types.

Forest Type	Intermediate Cuts	Reproduction Cuts
White Spruce	Thinning Sanitation Improvement	Clearcut Seed tree Group selection Shelterwood
Paper Birch	Thinning Sanitation	Clearcut Seed tree Group selection
Aspen and Balsam Poplar	None	Clearcut Shelterwood (only to suppress reproduction)

Mixed	Hardwood removal Sanitation	Clearcut Seed tree Group selection Shelterwood

Table C2-2. Characteristics of Some Interior Alaskan Tree Species.

Species	Shade Tolerance	Seed Crops	Seed Dispersal	Preferred Seedbed	Sprouting Ability
White Spruce	moderate	3-6 yr.	200 ft.	Mineral soil Rotten wood	none
Paper Birch	intolerant	1-2 yr.	400 ft.	Mineral soil	Stump sprouts (moderate if mature, low if overmature)
Aspen	intolerant	annual	Long distance	Mineral soil	High (root suckers)
Balsam Poplar	intolerant	annual	Long distance	Mineral soil	High (suckers and buried stems)

USAG-AK strives to design management activities to maintain a mix of native forest types (including aspen, birch, mixed hardwood-spruce, and white spruce types) and stand ages. Harvests activities are located and designed to provide key benefits of natural disturbances, particularly fire. These benefits include warmer soils, increased sunlight, a mosaic of vegetation patterns, fuel reduction, and some wood left on harvested sites, such as snags, logs, and diseased trees. Specific cuttings will be designed to achieve site-by-site objectives. Examples of silvicultural practices include:

- Clumping harvest areas to produce larger aggregate openings over time with patches of residual trees.
- Using irregular shapes, following stand type boundaries in layout.
- Removing or killing all tree species in harvested areas (e.g., white spruce and hardwoods rather than just white spruce).
- Designing harvests to increase disturbance and early successional forests.
- Tailoring reforestation techniques to ensure seedbed availability and adequate regeneration of a range of native upland forest types.
- Where feasible, allowing wildland fire in areas to maintain a mix of stand types and ages.
- Using prescribed fire where feasible for site preparation, habitat management, and fuels management.
- Experimenting with a variety of silvicultural systems to reflect none-fire disturbances.

Lowland forests are managed to maintain a mosaic of lowland forest types (balsam poplar, mixed spruce-balsam poplar and spruce-birch, and white spruce stands), and a range of stand ages, including some older stands, to maintain structural diversity. Examples of silvicultural practices include:

- Using a variety of harvest systems with variable levels of canopy removal to simulate diverse natural disturbances.
- Dispersing canopy openings resulting from harvest activities.
- Using irregular and/or meandering border for harvest units.

- Planting a mix of white spruce and hardwoods when artificially reforesting.
- On cold soils in areas susceptible to fire under natural conditions (e.g., sites adjacent to upland areas or black spruce cover), using site preparation or prescribed fire to warm soils on harvested lowland sites.
- Where feasible, allowing wildland fire in areas to maintain a mix of stand types and ages.

The objective of the USARAK silvicultural program is to promote a healthy ecosystem capable of supporting the military mission and conservation requirements. Silvicultural treatments are designed to restore, maintain, and improve the ecological functions and values of the particular forest unit being managed. Silvicultural treatments used will improve military mission areas and, when possible, attain multiple use and sustained yield timber management while enhancing watersheds, wildlife habitats, and natural beauty values along scenic corridors. When silvicultural treatments provide opportunity for commercial sale of forest products, each commercial forest activity will be performed in accordance with 10 USC 2665, and operating expenses will be commensurate with anticipated financial returns on lands on which the Army holds vegetation rights.

C2.1.5.2 Reforestation

The objective of the forest regeneration program is to quickly reestablish trees on cleared and harvested sites. Regeneration of forests, either natural or planned, is an essential part of forest ecosystem development. Regeneration of forests can be made through planting seedlings, planting sprigs, coppice cuts or seeding. Regeneration of forests, either naturally or artificially, is an essential part of forest ecosystem development. A regeneration plan is required for each harvested site as part of the forest land use plan; unless the area is to be converted to a non-forest condition or the stand is composed of insect and disease-killed trees, fire killed, wind thrown, or fatally damaged trees. Exempt stands from regeneration plans must be approved on an individual basis from Natural Resource Office personnel with a written explanation for exemption. In areas exempted from reforestation requirements, existing reproduction must be protected from damage where feasible. Decisions will be made whether to try to guide future forest development through planned regeneration or to allow natural conditions and processes to prevail.

The first step in establishing trees on a site is the preparation of the seed/planting bed. The reduction of competition from existing plants, allowing sunlight to reach the ground, and exposure of mineral soil is critical in the establishment of trees. Scarification and prescribed fire are effective techniques for site preparation. Distance from seed source should not exceed 200 feet for white spruce and 400 feet for hardwoods (Table C2-3). Coppice, vegetative reproduction, is an effective method for regenerating hardwoods on sites previously occupied by hardwoods. Artificial regeneration of forests occurs in limited instances when sites need to be reclaimed quickly, natural regeneration has failed or needs to be supplemented, and when target tree species for a site cannot be established by natural regeneration. Seed source and seedlings for artificial regeneration should come from genetic stock originating from the area to be planted and follow guidelines set forth in the *Provisional Tree Seed Zones and Transfer Guidelines for Alaska* (Alden 1991). Only appropriate tree species for a specific site will be planted with emphasis given to native species. Natural regeneration is mostly relied upon following harvest and other disturbance activities. Table C2-3 lists acceptable reforestation methods for major tree species.

Table C2-3. Probability of Success by Recommended Reproduction Methods.

Species	Artificial		Natural	
	Planting	Seeding	Seeding	Sprouting
Spruce	High (Note 1)	Low (Note 2)	Medium (Note 3)	
Birch			High (Note 1)	Medium (Note 2)

Aspen and Balsam Poplar			Medium (Note 1)	High (Note 2)

Notes:

Spruce

1. Plant immediately following harvest or site preparation.
2. Spot seed on mineral soil seedbed; site preparation recommended.
3. Seed is only available every 3 to 5 years depending on cone crop; mineral soil seedbed and seed source within 200 feet is required.

Birch

1. Mineral soil seedbed required with seed trees within 400 feet.
2. Sprouting is unreliable for trees over 70 years.

Aspen and Balsam Poplar

1. Mineral soil seedbed needed.
2. All stems in clone should be cut; leave uncut 15+ native stems/acre if it is desired to minimize sprouting.

Reforestation plans are to be developed for sites regenerated after harvest or disturbance. A reforestation plan outlines the objective of the regeneration project and additional treatments needed if the objective is not being met. The plan defines site preparation, regeneration technique, seed/seedling source, planting technique, spacing, and target stems per acre at maturity. The plan discusses the stand type and composition to be achieved at the target year. Stand maintenance/improvement treatments are outlined. Natural Resource staff will periodically conduct site visits to ensure minimal regeneration standards and the objective of the reforestation plan is met. The reforestation plan is a part of the forest land use plan.

Minimal regeneration standards adopted from the State of Alaska's Forest Practices Act should be followed. Land must be reforested seven years after harvest. The number of vigorous, well-distributed residual trees free from significant damage, or a combination of trees and seedlings, must average a minimum of 450 trees per acre and must have survived on site a minimum of two years. No more than 105 of the harvest area or contiguous areas may be below the stocking level. To determine residual tree stocking levels, first estimate the number of residual trees that will be left after timber harvest in each size class. Then divide, by size class, the number of stems per acre needed to meet the minimum stocking standard into the estimated number of trees per acre left after harvest and multiply by 100 to determine stocking percentage. Percentages from each size class are then added to determine overall residual stocking levels. An example is provided in Table C2-4.

Table C2-4. Residual Stocking Calculation: Example Residual Stocking Table.

Average DBH	Estimated Number of Residual Trees per Acre	Minimum Stocking Standard	Stocking Percentage
>9"	20 trees	120 trees/acre	17%
6"-8"	30 trees	170 trees/acre	18%
1"-5"	60 trees	200 trees/acre	30%

Residual Stocking Percentage = 65% Total

Determination of Minimum Seedling Requirements is as follows: in the example above with 65% residual stocking, 158 additional tree seedlings per acre will be needed to satisfy the minimum stocking requirement. This is determined by multiplying the minimum 450 trees/acre times the balance stocking percentage of 35% to achieve the minimum stocking level. The required number of seedlings may be achieved through natural regeneration, planting, or artificial seeding and must have survived on site a minimum of two years within seven years of harvest. An example is provided in Table C2-5.

Table C2-5. Residual Stocking Calculation Table

Average DBH	Estimated Number	Minimum Stocking	Stocking Percentage

	of Residual Trees per Acre	Standard	
>9”	__trees	120 trees/acre	__%
6”-8”	__trees	170 trees/acre	__%
1”-5”	__trees	200 trees/acre	__%

Residual Stocking Percentage = __% Total Seedlings Required

Percentage Understocked: 100 - _____ Residual Stocking Percentage = _____

Percentage Understocked _____ x 450 = Seedlings/Acre

C2.1.5.3 Timber Stand Improvement

Timber stand improvement activities are designed to improve the quality of forest stands, support military training activities, and improve wildlife habitat. Timber stand improvement is often categorized as noncommercial activities used to improve the quality of commercial timber, but it may also be used to improve forest conditions for other uses. Timber stand improvement may include thinning, spacing, chemical injection, chipping, prescribed burning, etc., all of which are designed to improve species composition, quality, and/or growth rate of existing stands by removing competing vegetation to allow preferred trees to grow faster. Timber stand improvement is also an effective treatment for wildland fire hazard fuel reductions and insect and disease control. Usable material from timber stand improvement projects will be disposed of through timber sales or the personal use firewood program.

The military needs to train personnel under certain environmental conditions. This may require the removal of trees to create open areas for drop zones, small arms firing ranges, or construction. Thinning stands of trees to allow maneuverability in certain areas may also be necessary. USAG-AK environmental personnel must determine timber rights management authority when there is a need to clear or thin timber with commercial value on withdrawn lands. If Bureau of Land Management has vegetation rights, USAG-AK can request support from Bureau of Land Management to conduct a timber sale or stockpile material to be disposed of through the firewood program. If the Army holds vegetation rights, they can conduct a timber sale or dispose of the material through the firewood program after National Environmental Policy Act analysis. Troops are permitted to harvest forest products to achieve training objectives. Trees less than four inches diameter at breast height may be cut without prior approval. Removal of larger trees on approved sites requires coordination with the Environmental office. Stumps must be less than six inches high.

Vegetation and timber resources are managed to meet ecosystem management objectives while maximizing the commercial value of the timber that must be cut to meet those objectives. Management of white spruce should be conducted on a 120-year rotation, and birch pole timber should be conducted on an 80-year rotation. Black spruce is not suitable for commercial management at this time. Timber should be harvested using the most appropriate techniques for the target species: selective harvest, shelter wood, seed tree, or reproduction harvest. *Calamagrostis* infestation of cut sites is a problem on all harvest sites. Early regeneration is the key to preventing *Calamagrostis* infestation.

C2.1.5.4 Forest Timber Sales

Timber sale activities are designed to improve the quality of forest stands, support military training activities, and improve wildlife habitat. Timber sales are categorized as commercial activities. Timber sales on portions of USAG-AK lands could be used to improve conditions for conduct of the military mission as well as and enhance the local economy. Bureau of Land Management and Army timber management practices and contract stipulations govern timber sales on USAG-AK lands. Timber sales on

withdrawals where the Army holds vegetation rights will be governed by Army practices and contract stipulations. The Garrison Commander has the authority to conduct timber sales and must work through a Contracting Officer. Some common timber sale requirements include:

- The construction, improvement, and maintenance of safe and environmentally sound road systems.
- Adherence to National Environmental Policy Act, Natural Historic Preservation Act, and other applicable requirements.
- Minimal damage to wetlands as defined by the wetland management plan.
- The felling and yarding of timber in such a way as to protect soil and water quality, residual trees, and human safety.
- The treatment of logged sites to prepare them for the next generation of trees.
- The disposal of logging slash for silvicultural, insect control, and/or fire hazard reduction purposes.
- Mitigation measures for protecting wildlife habitat.
- Adherence to best management practices to preclude erosion from roads and harvest operations.
- Other miscellaneous provisions, where appropriate, such as meeting minimum fire requirements and application of disease control measures.
- Adherence to State of Alaska Forest Practices Act Guidelines.

Forest land use plans are prepared prior to commercial sales of forest products. Plans include sale boundaries, cruised volume, silvicultural prescription, road layout, best management practices for prevention of soil erosion and sedimentation, water quality considerations, cultural resources protection, wildlife considerations, harvest method(s), scaling requirements, slash disposal, site preparation, and regeneration requirements. Documentation for compliance with National Environmental Policy Act as well as required cultural resources surveys would be completed prior to sales. The timber sale program is designed to utilize material to be clearing for military mission support and offset clearing costs.

Installation Commanders have the authority and responsibility to execute timber sales—draft, distribute, and advertise invitations for bids; review and accept bids; award and administer timber sales contracts; and collect, deposit and account for fees. This authority may involve the following installation personnel—installation foresters and natural resources managers, Directorate of Public Works Environmental Division, legal and contracting offices. The Commander/Contracting Officer designates the Contracting Officer's representative. USAG-AK timber sales guidance procedures, developed from Installation Army Guidance for Timber Sales, Procedures for Installation-Conducted Timber Sales (2004), can be found in Volume III, Supplements.

There are four implementing laws and regulations for timber sales. 10 U.S.C. 2665, Sale of Certain Interests in Land-Logs says that the Department of the Army may sell to any person or foreign government any forest products produced on land it owns or leases except as restricted by the Forest Resources Conservation and Shortage Relief Act of 1990. Also, appropriations of the Department of the Army may be reimbursed for all costs of production of forest products from amounts received as revenue from the sale of forest products; the state in which a military installation is located from which forest products are sold in a fiscal year is entitled at the end of such year to 40% of the net revenue of forest product sales. Net revenues are the gross proceeds received less the amount of reimbursement of appropriations to the Department of the Army on an installation pro rata basis. The total amount received by the Department of the Army as revenue from the sale of forest products, under 10 U.S.C. 2665(b), less: (1) reimbursements of appropriations made under 10 U.S.C. 2665(d); and (2) payments made to states under 10 U.S.C. 2665(e), shall be deposited in the Department of Defense Forestry Reserve Account. The Forest Resources Conservation and Shortage Relief Act of 1990 dictates that no person who acquires

unprocessed timber originating from federal lands west of the 100th meridian in the contiguous 48 States may export such timber from the United States, or sell, trade, exchange, or otherwise convey such timber to any other person for the purpose of exporting such timber from the United States, unless such timber has been determined to be surplus to the needs of timber manufacturing facilities in the United States. Department of Defense Instruction 4715.3, "Environmental Conservation Program," May 1996, and Army Regulation 200-1, and associated NR Implementation Guidance also include directives for the conduct of timber sales.

C2.1.5.5 Firewood/Personal Use Program

The Firewood/Personal Use program consists of Christmas tree cutting, house log harvesting, and firewood cutting. Christmas tree permits are free and available starting December 1 each year. Designated cutting areas vary year by year. The topping of larger trees is not allowed, nor is cutting trees over 15 feet tall. On USAG-AK lands where USAG-AK controls vegetation rights, firewood permits are sold for five dollars a cord with a three-cord minimum and five dollars for each additional cord. In other areas, permits are free. Long-term designated firewood cutting areas are established in several training areas. These areas undergo extensive environmental review and are subject to the same stipulations as timber sales. Firewood permits are available year-round and expire one year after the date of acquisition. House log harvesting is allowed in designed areas by permit. Up to five permits may be issued annually. Permits are issued on a first-come basis starting the first working day of January each year. The permit is good for two years and allows the permit holder to cut up to 50 trees. The permit fee is $1000 paid at time of issue. Tree cutting must adhere to all regulations applied to timber sales. Areas to be cleared or thinned for military training, construction, and habitat enhancement are selected for cutting; consequently, available volume will vary year by year depending on the amount of clearing and thinning. Personal use permits for firewood, Christmas trees and house logs are made available for military personnel, their families, and local residents. The Firewood/Personal Use program is designed to utilize material to be cleared for military mission support and to offset clearing costs.

In recent years there has been growing interest from the public to harvest house logs in the Tanana Flats Training Area of Fort Wainwright. USAG-AK has initiated a house log program in response to public request. The program closely follows guidelines set by the State of Alaska Division of Forestry's House Log Program. However, the Division of Forestry's House Log Program was discontinued due to lack of funding.

House log harvesting is allowed in designed areas by permit. Four permits will be issued for the Tanana Flats Training Area and one permit will be issued for Donnelly Training Area West. Permits for the Tanana Flats Training Area are allocated within 3 units. Unit 1 consists of the area along the Wood River and along the Tanana River down stream of Crooked Creek. Unit 2 consists of the area along the Tanana River down stream of Willow Creek up to Crooked Creek. Unit 3 consists of the area starting at the boundary of Tanana Flats Training Area across from Flag Hill and proceeding downstream to the upstream start of Salchaket Slough along the Tanana River. The unit located in Donnelly Training Area West goes from the Delta River to Delta Creek and lies north of the impact areas. Permits are issued starting the first working day of January each year. Permits are issued at the Environmental Resources Department located at Fort Wainwright. Permits are issued on a first-come-first-serve basis. Personal use permits for house logs are made available for military personnel, their families, and local residents. The permit holder must also obtain a USAG-AK Recreation Access Permit and any necessary BLM permits. The USAG-AK permit fee is $1,000 paid at time of issue. All monies collected are to be deposited in the Army's Forestry Reserve Account. The permit is good for two years and cannot be extended. No more than five permits can be active at any time. The permit allows the holder to cut up to 50 trees. The permit holder must select a site. All trees to be cut must come from the selected site. The selected site cannot exceed 5 acres in size. The permit holder must identify the site on a map and present the map to

Environmental Resources Department forestry staff. The permit holder and Environmental Resources Department forestry staff will visit the site together and lay out travel routes. The permit holder must also notify Environmental Resources Department forestry staff of the method of cutting and hauling trees from the selected site. The permit holder must notify Environmental Resources Department forestry staff at the start of house log harvesting and completion. The forestry staff will flag and map the boundaries of the selected site prior to any cutting. The site will also be periodically inspected during harvest to ensure environmental compliance. If extensive environmental damage is found to have occurred, the permit will be revoked. Any activity in wetland areas must occur in winter. No ground-disturbing activities will be allowed. House log harvest activity is not allowed within 50 feet immediately adjacent to an anadromous stream or high value resident fish water body. Within the next 50 feet, a 50% minimum retention of trees must occur. Permits are required for the vehicular crossing of anadromous and resident fish streams. Permits can be obtained from the State of Alaska Department of Natural Resources. If spruce logs are to remain on site over summer, the following special precaution must be taken. All spruce logs greater than four inches in diameter must be scored the length of the log with a chainsaw to a half-inch depth so as to cause drying of the phloem to prevent bark and Ips beetle infestations in nearby healthy trees. All stumps should be cut within six inches or less of the ground surface.

C2.1.6 Urban Forestry

The integrated urban forest ecosystem encompasses many environments, disciplines, and concepts. This includes open lands, water, and vegetated areas in and adjacent to improved and semi-improved grounds as well as woodland borders. The urban forest includes individual trees as well as groupings and small tracts scattered among more dominant land uses. Multiple use of this resource must occur within and among this complex system of interspersed land uses. Urban forests are valued primarily for their non-consumptive contributions to our everyday lives and the environment in which we live. Wood products and volumes from an urban tree are usually identified only for salvage operations An Urban Forest Management Plan will be an integral part of and integrated with the Installation Master Plan, and the Integrated Natural Resource Management Plan. The plan should include professional standards (National Arborist Association, American Association of Nurseryman “American Standard for Nursery Stock,” Council of Tree and Landscape Appraisers “Guide for Plant Appraisal”), technical specifications, training, certification, and requirements for all actions impacting the planting, growth, and survival of all trees in the urban forest ecosystem. This includes specific standards for planting, pruning, fertilizing, removal, utility clearance, and integrated pest management; the identification, protection, and preservation of historic and specimen trees; and the training, licensing, and certification of personnel and contractors. All applicable installations with a land management program will have a Command Tree Policy Directive and/or Tree Ordinance that identifies and provides specific requirements, authorization, and approvals for excavation permits, tree removals, and liabilities for unauthorized tree removal and damage.

Concern over the past two decades for the environment has brought to the forefront the role plants play as physical and chemical filters for improving our surroundings. Urban forestry helps soften the industrial environment and improves the quality of life. The large areas of leaf surface trap airborne particulate such as dust and pollen and effectively remove them from the atmosphere. Through photosynthesis, plants chemically remove carbon dioxide, the major by-product of fossil fuel combustion, and provide a major source of oxygen. Planted trees and shrubs reduce the intensity of noise, another pollutant of the industrial age. An evergreen shelterbelt between a road and a building can be very attractive and helps reduce road noise and dust problems. Plants also provide food and shelter for birds and other wildlife. Woody ornamentals provide an effective means to create desirable microclimates by providing windbreaks, shade, and screening for privacy. A well-placed shelterbelt can help reduce snow accumulations in yards and driveways and reduces the time and fuel costs necessary to keep them free of snow. Conifers on the north and west sides of buildings can reduce the cooling effect of harsh winter winds while providing

shelter for songbirds. Hardwoods can be planted on the south side of buildings to shade them in the summer and reduce cooling costs. In addition, the use of woody ornamentals increases property values when they occur in a well-landscaped area.

C2.1.6.1 Landscape Plantings

All planting, pruning, cultivation, and other maintenance will conform to criteria in TM 5-630, ANSIZ60 standards, and the approved Installation Design Guide. Trees and shrubs will be removed if they have become terminally plagued by insect or disease problems, high maintenance costs, health or safety hazard to persons or property, or have become non-complementary to architectural features of the building area. Justification and merits for landscape and urban forestry expenditures in the urban ecosystem include: energy conservation, preservation of historic and specimen trees, grounds maintenance cost savings, beautification and increased property values, increased species and habitat biodiversity, improved living and working conditions, soil conservation, enhancement of water supplies, control of runoff and non-point sources of pollution, and good land stewardship.

Landscaping will be functional in nature; simple and informal in design; meet professional standards for species, design and installation; be compatible with adjacent surroundings; and complementary to the architectural features and the overall natural setting of the area. Formal landscape designs will be limited to specific high visibility areas including main building and road entrances, ceremonial areas, and other special use sites as warranted. Emphasis will be on the use of low maintenance indigenous plants. Normally, not more than one fourth of an individual foundation perimeter will be planted with shrubs or trees. In arid and semi¬arid areas, use water efficient (xeric) plants. A viable Landscape Planting Plan will be an integral part of the Integrated Natural Resources Management Plan and the Installation Design Guide under the Master Plan.

The expenditure of appropriated funds for shearing hedges and ornamental plants into formal or decorative designs is not authorized except as specifically prescribed in the approved planting plan. Climbing vines, shrubs, and trees which block or damage windows, eaves, gutters or other construction components will be pruned or eliminated, whichever is most feasible. Plantings that reduce visibility or otherwise constitute a traffic hazard near street intersections, walks, and drives will not be permitted. All landscape plantings will be compatible with other grounds maintenance requirements and will be coordinated with, reviewed, and approved by the Facility Engineer, Master Planning, utilities, and the natural resource manager. Painting or white-washing of tree trunks and stones is not authorized. Invasive species will not be use in installation landscaping. Planting and maintenance of flower beds, rose gardens, and nut or fruit trees for their edible products, except for wildlife food purposes, are not facilities engineering duties except as provided below. When flower beds are an important cultural landscape feature of the community, they may be planted and maintained as a facilities engineering activity but should be limited to the main entrance to the installation, headquarters, or in areas used for ceremonial purposes. When authorized, flower beds will be laid out in accordance with a planting and maintenance plan to ensure that:

- Costs are minimized by an appropriate mixture of perennials, annuals, and indigenous wildflowers.
- Plant materials are compatible with the site, exposure, and growing zone; and those exotic species or plant materials that serve as an attractant or host to pests are not used.
- Acquisition and/or maintenance costs are reasonable.
- Indigenous and cultivable threatened and endangered species are to be given primary consideration.

Landscape plans and actions in significant historic sites or districts will be reviewed for their potential effect according to Army regulations and Department of the Army Pamphlet 200-4 *Cultural Resources Management*, chapter 3.

C2.1.6.2 Tree City USA

The National Arbor Day Foundation, in cooperation with the United States Department of Agriculture, Forest Service and the National Association of State Foresters, recognizes towns and cities across America that achieve the standards of the Tree City USA program. The Tree City USA program is designed to recognize those communities that effectively mange their public tree resources and to encourage the implementation of community tree management based on four Tree City USA standards. These four standards provide structure for a community forestry program, require that a program demonstrate success based on the judgment of the state forester's office, and provide for an awareness and appreciation of trees among the residents of the community. The four standards are: establish a Tree Board which consists of representatives from the Natural Resource Offices, with the installation forester serving as the lead; develop and follow a Community Tree Ordinance; a minimum of $2 per capita must be spent annually on the Community Forestry Program; and Arbor Day must be observed annually with media coverage and a proclamation must be given by the Post Commander. USAG-AK will apply annually at both Fort Wainwright and Fort Richardson for the Tree City USA designation when resources allow and either post has met the requirements to apply.

The Tree Board Ordinance (USAG-AK, 2002), in accordance with Army Regulation 200-3 , *Natural Resources-Land, Forest and Wildlife Management*, and other applicable regulations, establishes policies and standards for the planting, maintenance, and protection of trees in the Fort Wainwright and Fort Richardson community forest, to include the cantonment area, travel corridors and established recreation areas. There will be a conscious and active concern for the inherent value of trees in all installation plans, decisions, actions, and programs. The provisions of this document are enacted to maintain urban trees in a healthy and non-hazardous condition through good cultural practices, and to establish and maintain diversity in tree species and age classes to provide a stable and sustainable community forest. Along with the Tree Board Ordinance, Fort Richardson and Fort Wainwright also have developed landscape management plans (USAG-AK, 2005). Landscaping is the responsibility of the Directorate of Public Works in accordance with Army Regulation 200-3, Department of the Army Pamphlet 420-7, TM 631, the Integrated Natural Resource Management Plan, and utilization of the Installation Design Guide. These plans present the user with information regarding procedures for landscape planting on the cantonment areas and provide principles and techniques for maximum benefit and beautification. Although not a complete list, those plants listed in the appendix of the plan are known to grow and survive in Alaska's climate. Many of the trees and shrubs listed, particularly those native to interior Alaska, will require minimal maintenance once they are well established in their new environment. All landscaping efforts at Fort Wainwright should concentrate on establishing plants grown in Alaska north of the Alaska Range. Attempts at unproven exotics should be avoided. Handling and planting techniques described within this text are standard practices and if properly employed will limit plant mortality rates to an acceptable level. Design principles should complement existing vegetation and strive for a more informal and natural look.

C2.1.6.3 Installation Aesthetics and the Army Communities of Excellence Program

The Army Communities of Excellence program is designed to bring together, under a central umbrella, all those programs and components that directly impact on life in Army communities. Its goal is to help the Garrison Commander focus on an integrated plan for improving the community. Tools and guidelines for developing stronger Army communities can be found in Department of the Army Pamphlet 600-45, "Guidelines for Community Excellence." Specific installation guidelines and instructions are to be issued by the appropriate directorate. The Army must be supported by both excellent "services" and excellent

"facilities." An essential part of any outstanding Army community is the excellence of its facilities. Such facilities are a strong reflection of the whole community's pride and achievements. There are a number of elements in the Army Communities of Excellence program that are considered essential to a good facilities beautification program. They allow standards to be set and determinations of facility excellence to be made. These elements include the Installation Design Guide, the self-help program, building exteriors, signage, screening and the reduction of visual clutter, landscaping and grounds maintenance, lighting, and the design and placement of roads and utilities. The Installation Design Guide is an essential tool in the planning process (see Technical Manual 5-803-5, Installation Design, for general guidance). The Installation Design Guide is to provide specific guidelines and information to improve the aesthetics of the installation. This includes site planning for parking; signs, lighting, and utilities; list of plants appropriate for planting at specific installation sites; and standards for the planting, maintenance, and protection of trees, shrubs, groundcovers, and turf. All new construction projects are to include provisions for landscaping and aesthetics with appropriate landscape design and funding authorization. This will include landscaping, buffer zones, screening, parks, and recreational areas as appropriate. Commanders will include the resources essential to support base attractiveness in budget estimates, project estimates, and other resource justifications. While the design guide is a good and necessary start to facility excellence, an active self-help program is one of the most vital elements for implementation and success. Individuals of the community take self-pride in improving their living and working areas. The individual, building, or community provides the labor while the appropriate installation directorate provides the tools, materials, and technical guidance.

The Army Communities of Excellence and self-help program initiatives provide a means to enhance the aesthetics of the installation, provide an opportunity for all personnel to improve their living and working areas, reduce maintenance costs, and increase the overall value of the Army's physical establishment. The appropriate facility directorate will implement and encourage residents and employees to participate in a self-help grounds maintenance improvement program. The appropriate directorate will provide guidance, specific instructions, and approved materials for self-help projects that contribute to grounds maintenance cost savings, increased installation attractiveness, and good community relations. Special days (Arbor Day, Earth Day, and so forth.) should be designated to promote annual self-help awareness and participation. Both day-to-day type operations and maintenance and project-type work will be performed in a way to enhance installation aesthetics. Consideration should be given to the protection of areas that have special scenic values. Areas with archaeological, geological, historical, or ecological significance must be protected.

C2.1.6.4 Nurseries

Expenditure of appropriated funds is not authorized for the operation of commercial plant nurseries. Trees and shrubs will be obtained from commercial nurseries and federal and state agencies when available. If economical and in compliance with the Integrated Natural Resources Management Plan and the Installation Master Plan, trees and shrubs from planted as well as natural areas may be used, providing they can be transplanted with sufficient roots and soil to meet American Association of Nurseryman Standards, and that the site and associated biological resources will not be adversely impacted.

C2.1.7 Forestry Outreach

Public involvement is a key component to USAG-AK's commitment to community outreach. Implementation of this plan requires keeping the public informed of firewood and Christmas tree cutting areas, providing permits, and other items of interest. Arbor Day activities are centered around the public tree planting ceremony. Additional activities include educational presentations on Arbor Day, tree care, and forestry practices. The Environmental Resource Offices schedule media and tree seedling give-away

events at Fort Wainwright and Fort Richardson for Arbor Day. Documents pertaining to forestry activities are available on USAG-AK's environmental resources web site. These include:

- Firewood permit information
- Christmas tree permit information
- Military requirements for tree cutting
- Environmental documents pertaining to forestry
- Maps of firewood and Christmas tree cutting areas
- Arbor Day activities
- Contact phone numbers

Personal use permits for firewood and Christmas trees are available at Fort Wainwright, Donnelly Training Area, and Fort Richardson training areas for military personnel, their families, and local residents. Personal use firewood permits are sold for five dollars a cord with a three-cord minimum and five dollars for each additional cord at Fort Wainwright. Firewood permits are available free of charge at Fort Richardson and Donnelly Training Area. Christmas tree permits are free and available December 1st - December 30th. The availability of firewood and Christmas tree cutting areas is limited. Areas to be cleared or thinned for military training, construction, and habitat enhancement are selected for cutting; consequently, available volume will vary year by year depending on the amount of clearing and thinning.

C2.1.8 Forestry Program Management

Funding, reporting, staffing, Memoranda of Agreement and equipment are all components of forestry program management and are covered in detail below.

C2.1.8.1 Funding

The Army Forest Management Program begins each fiscal year with zero dollars in its operating account. Until receipts from sales accumulate in the Budget Clearing Account 21F3875.3960 20-C S99999, installation forest management costs are normally charged to the installation's operation and maintenance account. Forest management financial support may be derived from either automatic reimbursement from proceeds of sales or direct appropriated funds. Appropriated Operations and Maintenance and other funds may be expended for forestry activities. Only expenses that are directly related to the management of the forest ecosystem may be reimbursed from sale receipts and include: timber management, reforestation (to include enhancements, tactical island and tactical corridor plantings), timber stand improvement, inventories, fire protection, construction and maintenance of timber area access roads, purchase of forestry equipment and supplies, disease and insect control, planning (to include actions necessary to maintain forestry compliance with applicable laws and regulations), timber marking, inspections, sales preparation, training of personnel, and timber sales.

Expenses of commercial forestry activities performed on Army installations will be commensurate with projected financial returns. Such expenses may be distributed to Army Regulation 37-100 series account code 423012.26, "Maintenance of Forest Areas." Budget estimates of requirements for 423012.26 reimbursable funds will be submitted annually according to instructions provided by Headquarters, Department of the Army, Directorate of Environmental Programs, Army Chief of Staff for Installation Management. Army Chief of Staff for Installation Management will provide the Secretary of the Army Financial Management with Installation Management Agency reimbursement budget authority guidance based on fund requirements and anticipated proceeds. Command and installation budget documents pertaining to this account will be coordinated with appropriate natural resources management personnel.

A prioritized list for the use of reimbursable funds (423012.26) for Table of Distribution and Allowances authorized equipment and minor construction projects (requirements over the expenses/ investment threshold), used exclusively in forest management will be submitted through the Installation Management Agency to Headquarters Department of Army, Directorate of Environmental Programs, ATTN: DAIM-ED, 2511 Jefferson Davis Hwy, NC1 (Presidential Tower), Suite 9300, Arlington, Virginia 22202, for review and approval. All requests will include description of the equipment, national stock number (if available), the item cost, purpose of the equipment, and justification for purchase. When approval is granted for an installation to procure equipment with forestry receipts costing in excess of the expense/investment threshold, a Military Interdepartmental Purchase Request citing the timber receipt account will be furnished to the installation. The installation will forward the approved equipment request and Military Interdepartmental Purchase Request to the appropriate major end item manager for processing and procurement action.

Installation forest management and silvicultural expenses may be charged to various Army accounts, including Base Operations - Environmental Conservation, Maintenance and Repair - Grounds, Fire and Emergency Response Services. Forest management and silvicultural activities may be supplemented by the Conservation Reimbursable Forestry Account. Forest product revenue generation is cyclic. The Conservation Reimbursable Forestry Account is a supplemental fund that fluctuates, in terms of total Army-wide proceeds, from year to year based on mission needs, threatcon, forest product market conditions, etc. Installations must not rely on this account to fund fixed costs related to forest management, such as employee salaries. Requests for Conservation Reimbursable Forestry Account funds will be submitted annually through the Reimbursable Programs Tracking System. Assistant Chief of Staff for Installation Management will provide installation specific budget authority as determined through the process outlined in the Protocol for Determining Recommended Installation Specific Forestry Automatic Reimbursable Authority - Initial Budget Build and Continuing Adjustments. Command and installation budget documents pertaining to this account will be coordinated with appropriate training mission and natural resources management personnel.

C2.1.8.1.1 Execution of the Conservation Reimbursable Forestry Account

The Director of Environmental Programs for the Assistant Chief of Staff for Installation Management provides execution oversight of all programs funded by Conservation Reimbursable Forestry Account, via the issuance of programmatic guidance and instructions, program reviews, staff visits, resourcing, inter-service and interagency coordination, analysis of program performance based on feedback tools, and review of selected management plans. The U.S. Army Environmental Center provides program management support to the Director of Environmental Programs in all capacities of oversight and provides technical expertise to Department of Defense, Headquarters, Department of Army, Installation Management Agency and installations as requested. At the installation level, the proponent activity is the first point of contact for programmatic and technical support.

The Conservation Reimbursable Forestry Account begins each fiscal year with zero dollars in its operating account. Forest management financial support may be derived from either from direct appropriated funds or the Conservation Reimbursable Forestry Account. Appropriated Operations and Maintenance and other funds may be expended for forest management activities. Only expenses that are directly related to the management of the forest ecosystem may be reimbursed from the Conservation Reimbursable Forestry Account.

Installation mission operations personnel (Directorate of Plans Training and Mobilization) shall determine optimum mission landscape requirements (i.e., ecosystem characteristics) in consultation with installation conservation personnel. Installation conservation personnel shall determine technical feasibility of achieving landscape requirements and integrate environmental compliance (e.g., endangered species protection), stewardship and sustainability requirements. Forest management activities shall then

contribute to achieving those integrated requirements. Forest management and ecology are to be an integral part of the Master Planning process and review. Installations that conduct these activities must identify how specific forest management activities eligible for Conservation Reimbursable Forestry Account funds directly support mission landscape requirements and environmental stewardship in the forest management plan section of their Integrated Natural Resources Management Plan. Forest management activities that obstruct these requirements are not eligible for Conservation Reimbursable Forestry Account funds.

C2.1.8.1.2 Allowable Expenditures to the Conservation Reimbursable Forestry Account

The use of revenue from forest product sales is restricted by law. Forest product revenue generation is cyclic. Allocation of installation-specific Conservation Reimbursable Forestry Account funds will be determined through the process outlined in the Protocol for Determining Recommended Installation Specific Forestry Automatic Reimbursable Authority - Initial Budget Build and Continuing Adjustments.

Installations operating a sustained forest management activity must meet the following criteria to be eligible for Conservation Reimbursable Forestry Account funds. If there is any doubt, the installations proponent organization is responsible to determine what is eligible for Conservation Reimbursable Forestry Account. These criteria are not intended for the occasional removal of forest products for mission purposes. Conservation Reimbursable Forestry Account funds are not to be used to cover real property services or compliance costs.

Projects must support the mission. Projects must not encumber land that is needed for conducting mission operations. While pursuing and planning reimbursable activities, natural resource managers must coordinate with mission operators to identify opportunities to improve long-term mission access to land, increase training realism, and improve training flexibility. Mission use of land includes uses as determined by the Installation Commander, e.g., individual/collective training, testing, storage, and production.

Projects must comply with applicable laws and have an Integrated Natural Resource Management Plan (INRMP) developed in accordance with the National Environmental Policy Act (NEPA) that addresses the impact, if any, on the composition, structure, and function of natural communities and biological diversity. Where INRMPs are not required, impacts must be documented in other suitable installation plans that have been prepared in accordance with NEPA.

Projects must be a fiscally sound investment and capable of ecosystem sustainability. Proponent organizations shall closely evaluate installation budget requests to ensure program expenditures are balanced with proceeds (revenue) and benefits. Periodic negative net proceeds can be anticipated and are allowable. Consistent negative net proceeds at an installation indicate a reimbursable program that may not be viable and may not be eligible for Conservation Reimbursable Forestry Account resources, depending on the extent to which the mission is benefited.

Project must be consistent with installation safety restrictions.

USAG-AK must keep forest inventories current (not older than ten years) and utilized to support the installation INRMP on forests essential to the mission and/or capable of commercial product production. Inventory systems will be of an intensity that is appropriate for the planned use of the forest and for monitoring the long-term health and sustainability of the forest. Integrating forest inventories with vegetation communities planning level surveys is encouraged.

USAG-AK must document prerequisites for availability to harvest forest products in the installation's forest management plan, the installation's INRMP, and Endangered Species Management Plans, and compliance with the Endangered Species Act.

USAG-AK must comply with 36 CFR 800 Protection of Historic Properties, Native American Graves Protection and Repatriation Act, and other applicable statutes as outlined in Army Regulation 200-1; coordinate with the U.S. Fish and Wildlife Service; and keep environmental documentation in accordance with Army Regulation 200-1. USAG-AK must consider the potential effects on significant archeological resources and historic properties per Army Regulation 200-1.

USAG-AK must include plans for forest harvesting, e.g., thinning, intermediate harvests, and final harvests, as appropriate, in the installation forest management plan and INRMP.

USAG-AK must develop and execute a proactive forest management plan to clarify short and long-term forestry objectives, and develop sound silvicultural prescriptions to qualify for Conservation Reimbursable Forestry Account funding. This plan will be part of the INRMP. USAG-AK will use aerial photography, forest modeling software, Geographic Information System applications, and other appropriate methods to assist in developing forest management plans. Forest management plans will strive to meet the following goals and objectives:

- Manage forest resources for long-term stewardship to maintain productive forest ecosystems and forest health and vitality, and meet the future needs of the mission.
- Institute practices to protect natural resources of the installation including: soil, water, fish and wildlife, natural vegetation, recreation, and aesthetic resources.
- Balance the ecological, social, and economic values of forested parcels.
- Maintain healthy forest ecosystems through active management.

Installation silviculture and forestry activities may be supplemented with Conservation Reimbursable Forestry Account funds if they incorporate the following principles and requirements:

- Silvicultural uses of prescribed burning include promoting successful forest regeneration, cycling nutrients for healthy ecosystems, maintaining fire-dependent species, and controlling understory. Conservation Reimbursable Forestry Account funds will not be used for prescribed burning activities that are above and beyond those silvicultural activities outlined in the forest management plan. Prescribed burning for silvicultural and other purposes should be integrated into the INRMP and forest management plan.
- Management costs for personnel at all levels (installation, Installation Management Agency) and auxiliary or contracted staff (e.g., through interagency agreements, Oak Ridge Institute for Science and Education, etc.) may be eligible for Conservation Reimbursable Forestry Account funds, if the primary (majority) duties are to administer eligible silviculture and forest management programs.
- Surveys and studies needed to evaluate the status of natural resources as affected by, and are directly attributed to the forest management activity – water quality, soil erosion, and biodiversity (particularly threatened and endangered species and neotropical migrants) may be eligible for Conservation Reimbursable Forestry Account funds, if they have directly been effected by forest management practices.
- Soil erosion control projects to reduce erosion that has been accelerated by and are directly attributed to forest management may be eligible for Conservation Reimbursable Forestry Account funds.

- Surveys and studies needed to evaluate the status of cultural resources as affected by forest management.
- Construction, repair, and maintenance of forest access roads and trails may be funded by Conservation Reimbursable Forestry Account if they are exclusively used for forest management and silvicultural prescriptions. When not in use, these roads must be blocked, seeded, and water barred to prevent erosion. The repair of other roads may be funded by Conservation Reimbursable Forestry Account if damage is a direct result from forest management, or the production and harvest operations.

Conservation Reimbursable Forestry Account funds may be used to secure office/storage space and equipment directly supporting eligible forest management but may not be used for major construction, ornamental landscaping, or decorative plants. Organizations may exchange or sell similar items of federal property and may apply the exchange allowance or proceeds of sale in whole or in part-payment for the property being acquired in accordance with Department of Defense 4140.1-R Department of Defense Materiel Management Regulation; note that the exchange/sell procedure excludes fire fighting equipment.

Conservation Reimbursable Forestry Account funds may not be used to augment the general operating expenses of the installation as overhead. For example, overhead outside of the forestry program, such as Joint Logistic Support Center or Net Operating Result surcharges, may not be charged to the extent that the adjustments include costs that do not directly benefit the forestry programs. Conservation Reimbursable Forestry Account funds are not to be used to cover real property services or compliance related costs.

C2.1.8.1.3 Allocation of Conservation Reimbursable Forestry Account Funds

Requirements for Conservation Reimbursable Forestry Account funds will be identified annually through the proponent organization to U.S. Army Environmental Center to the Office of the Director of Environmental Programs. The Director of Environmental Programs will issue Conservation Reimbursable Forestry Account to the proponent organization, for identified requirements and Army needs. Allocation of Conservation Reimbursable Forestry Account funds is prioritized as follows:

- Priority I: installations that support higher priority missions (e.g., Integrated Training Area Management categorized installations and power projection platforms).
- Priority II: installations where revenues are consistently more than expenses.
- Priority III: administrative personnel at Major Commands, Division, and Army staff level for duties directly attributable to reimbursable forestry management, installations that have periodic revenue, and installations capable of sustained productivity.

C2.1.8.1.4 DOD Forestry Reserve Account

The Department of Defense Forestry Reserve Account was established under 10 USC 2665 to collect surplus funds from the sale of forest products. These funds are the monies remaining after program expenses are reimbursed and the state entitlements are paid. Installations of all the Services may apply for Department of Defense Forestry Reserve Account funds to fund natural resources management projects, even if that installation has not received Conservation Reimbursable Forestry Account dollars.

Within 90 days after the conclusion of each fiscal year, Defense Finance and Accounting Service-IN, Directorate of Accounting, Budget Execution and Reporting Division will compute the concluding fiscal year's unfilled forestry orders (transferring excess to or removing required funds from that fiscal year's General Fund Budget Clearing Account, 21F3875.3960), compute and provide 40% of the net proceeds per installation to the appropriate states and deposit the remaining net proceeds into the Department of Defense Forestry Reserve Account, 21X5285. The Department of Defense Forestry Reserve Account

funds are made available for military departments for use in the continental U.S. for improvements of forest lands, unanticipated contingencies in the administration of forest lands, and natural resources management that implements approved plans and agreements. Department of Defense has designated the Army as the executive agent for the Department of Defense Forestry Reserve Account. Forestry Reserve Account funds must be used in the fiscal year issued.

Periodically the Director of Environmental Programs will request that the Installation Management Agency submit a prioritized list of installation requirements for use of Department of Defense Forestry Reserve Account funds. The U.S. Army Environmental Center will consolidate requests and submit a recommended list of projects for funding to the Office of the Director of Environmental Programs. Uses of Department of Defense Forestry Reserve Account funds are restricted to continental U.S. for the following purposes:

- Improvements of forest lands.
- Unanticipated contingencies in the administration and management of forest lands and the production of forest products for which other sources of funds are not available in a timely manner.
- Natural resources management that implements approved plans and agreements.

Natural resources management projects are eligible for Department of Defense Reserve Account funds if they are specifically included in an approved INRMP and provide for one of the following purposes:

- Fish and wildlife habitat improvements or modifications.
- Range rehabilitation where necessary to support wildlife.
- Control of off-road vehicle traffic.
- Specific habitat improvement projects and related activities and adequate protection for species of fish, wildlife, and plants considered threatened or endangered.

Equipment purchases may be eligible for Forestry Reserve Account funding if used in direct support of Department of Defense's conservation reimbursable forestry program, but not for general natural resources management. All revenue from the sale of equipment procured with Forestry Reserve Account funds shall be deposited to the Conservation Reimbursable Forestry Account. Additional guidance regarding the purchase of forestry equipment can be found in Army Forestry Vehicle Purchasing & Leasing Guide.

C2.1.8.1.5 State Entitlements

The state in which a military installation is located, from which forest products are sold in a fiscal year, is entitled at the end of such year to 40% of the net revenue of forest product disposal. Net revenue is defined as the gross proceeds received less the amount of reimbursement of appropriations to the Department of the Army on an installation pro-rata basis. See 10 U.S.C. 2665, "Sale of Certain Interests in Land; Logs (Reimbursable Forestry)" and Department of Defense Financial Management Regulation Chapter 7 for further clarification.

C2.1.8.2 Forestry Reporting Requirements

Headquarters, Department of Army requires management information and is required to compile and provide information regarding the status of natural resources management activities and programmed requirements on Army installations to the Department of Defense and, at times, to Congress. The following annual reports require input by applicable Army installations and organizations.

C2.1.8.2.1 Reports of Availability

To facilitate annual work planning requirements for the forest manager, USAG-AK and Alaska Corps of Engineer District, USAG-AK will furnish an annual master Report of Availability that reflect the forest management plan. The master Report of Availability will include a descriptive list summarizing each planned sale by management unit. Master Reports of Availability differ from sale specific Reports of Availability by the fact that they plan for an entire year. USAG-AK will submit an annual master Report of Availability to the Installation Management Agency no later than 30 May of the current year for all timber planned for disposal during the upcoming fiscal year. The Installation Management Agency will review the master Report of Availability to insure that the timber disposal complies with the installations forest management plan, INRMP and federal, state, and local environmental compliance standards, and, when applicable, submit approved reports of availability to the appropriate disposal agency for disposal action.

The annual master Report of Availability will include a descriptive list summarizing each planned sale by management unit. Minimum information to be included with each individual sale outlined in the Master Report of Availability is:

- Number of acres in each sale.
- Estimated volumes in species and product, and unit of measure.
- Brief description of the stand characteristics prompting harvest and the desired results of the harvest.
- Maps indicating the timber sale area and all special interest areas, e.g., endangered species habitat or cultural sites, to be avoided by harvesting activities.
- Other requested contract stipulations and harvesting restrictions/requirements.

C2.1.8.2.2. Sale Specific Reports of Availability

Installation Commanders are required to submit a sale specific Report of Availability to the disposal agency, proceeding each individual requested disposal action. (See Army Regulation 405-90 for U.S. Army Corps of Engineers disposal actions). Sale specific Reports of Availability will state the volume and type of timber and provide a map of general harvest areas. Installations will coordinate specific Reports of Availability in advance with the disposal agency to maximize market potential for timber. Sales of metal-contaminated timber will be segregated from other sales. The disposal agency will award contracts within 90 days after receipt of specific reports of availability unless otherwise agreed by the installation and the disposal agency. Prerequisite for timber harvest availability is a current and approved forest management plan and INRMP.

C2.1.8.2.3 Installation Status Report, Part II (Environment)

The Installation Status Report provides information to the Chief of Staff of the Army regarding the status of natural resources and their influence on installation missions. The goal of Part II is to capture macro-level status of installations' environmental program and to improve the justification/prioritization of limited resources. Project objectives are to assess installation environmental compliance, summarize environmental conditions, measure mission impacts, and assess the effectiveness of environmental program performance. Analysis of Installation Status Report data should assist commanders at all levels to improve installation conditions and ultimately the readiness of forces that our installations support. The Assistant Chief of Staff for Installation Management is the proponent of the Installation Status Report.

C2.1.8.2.4 Army Environmental Database - Environmental Quality

The Army Environmental Database - Environmental Quality tracks how well the Army's environmental compliance status meets statutory and regulatory requirements and combines other reports (e.g., Department of Defense Measures of Merit, Reforestation Report, etc.). Army Environmental Database -

Environmental Quality partially responds to the requirement to perform environmental compliance assessments as required by Army Regulation 200-1. The Assistant Chief of Staff for Installation Management is the proponent for Army Environmental Database - Environmental Quality. Installations shall enter appropriate data and installation proponent organizations shall verify the accuracy.

C2.1.8.2.5 Conservation Reimbursable Forestry Annual Work Plans

These installation specific work plans are submitted through Installation Management Agency to U.S. Army Environmental Center for development of the Conservation Reimbursable Forestry Account budget and are due no later than 30 June each year. To request Conservation Reimbursable Forestry Account funds, installations must submit an annual work plan through the Reimbursable Program Tracking System.

The following categories and directions shall be used in annual forestry work plans:

- Forestry Equipment. Includes lease and purchase of forestry equipment (e.g., vehicles, heavy equipment) used exclusively in reimbursable forest management.
- Forest Fire Protection. Includes silvicultural uses of prescribed burning include promoting successful forest regeneration, cycling nutrients for healthy ecosystems, maintaining fire-dependent species, and controlling understory. Includes equipment costing less than the Capital Expenditure Limit.
- Forest Management. Includes reimbursable forest management functions. Includes supervision, planning, programming, and conducting field surveys and inventories, training, and attending professional meetings. Includes improvements of existing forest stands whether they are planted, seeded, or natural. This includes controlling undesirable vegetative growth, prescribed burning, pre-commercial thinning, and pruning. Include the protection of reimbursable forests from insect, disease, animal, flood, and erosion damage. Includes the sale and preparation for sale of forest products. Includes appraising, cruising, marking, scaling, preparing sales contracts, escorting prospective bidders, advertising, sales administration, and contract compliance inspections. Includes equipment costing less than the Capital Expenditure Limit.
- Forest Access Roads. Includes construction, repair, and maintenance of those forest access roads and trails solely used for forest management and silvicultural prescriptions. Includes the repair of other roads resulting from the production and harvest operations.
- Reforestation. Includes natural or artificial regeneration, including planting, purchasing of seeds or seedlings, and preparing sites. Includes equipment costing less than the Capital Expenditure Limit.
- Forestry Support. Includes Phase I archaeological surveys necessary to perform forest management, threatened and endangered species surveys necessary to perform forest management, and military mission coordination efforts driven only by forestry activities (e.g., planting and harvesting).

C2.1.8.2.6 Other Reports

Value of Army Standing Timber, General ledger Account 1840, Other Natural Resources. The U.S. Army Environmental Center coordinates this report with Office of the Director of Environmental Programs and submits it quarterly.

Verification of Consolidated Analysis of Department of Army Forest Products Report. Installation Management Agency and Army Corps of Engineers Districts must verify to U.S. Army Environmental Center the accuracy of this report and correct installation specific and/or district specific errors quarterly.

Financial Reports. Installations and Army Corps of Engineers Districts shall report installation forest product proceeds and Army Corps of Engineers District expenses to Installation Management Agency quarterly. The Central Finance Office shall verify the amounts and report to Defense Finance and Accounting Service.

Forest Product Sales and Projections. Installations shall update and report forest product sales and fiscal year forest sale projections to U.S. Army Environmental Center monthly.

Department of Defense Forestry Reserve Account Reports. Status of projects and funds shall be reported by installations, as directed.

Financial Data. The U.S. Army Environmental Center shall maintain a minimum of a seven-year historical record of conservation reimbursable program financial data.

Reforestation Report. The acres of trees planted or seeded on Army installations, categorized by state, is reported to the U.S. Forest Service. The U.S. Army Environmental Center coordinates this report with Office of the Director of Environmental Programs and submits it each January. Data will come from the Army Environmental Database - Environmental Quality.

C2.1.8.3 Staffing

TableC2-6. Positions needed at Fort Wainwright to implement the Forest Management Plan.

Position Title	Recreation Management Responsibilities
Natural Resources Chief	Director of overall forestry program and budget
ITAM/Natural Resources Coordinator	Decisions on Forestry Projects Coordinates Forest Management
Forester and Natural Resources Staff	Inventory Forest Resources Public Outreach Project Coordinator Coordinate with outside agencies
LCTA Coordinator	Monitor impacts on forests Coordinate with outside agencies
National Environmental Policy Act Coordinator	National Environmental Policy Act documentation Permit Applications
Geographic Information System Specialist	Creates and maintains database on forest use and condition
Conservation Officers (Game Wardens)	Conservation Law Enforcement

C2.1.8.4 Memorandum of Understanding

Each installation working with the U.S. Army Corps of Engineers with forest management or timber disposal will prepare a Memorandum of Understanding with the supporting U.S. Army Corps of Engineers District. The purpose of this Memorandum of Understanding is to provide for mutual and reciprocal support for the U.S. Army Corps of Engineers Timber Disposal and U.S. Army Forest Management Programs, to increase effectiveness and eliminating duplicate effort, thereby reducing costs. The Memorandum of Understanding will identify the roles and responsibilities of both parties in relation

to administration of timber sales and forest management. The installation and U.S. Army Corps of Engineers District will review the Memorandum of Understanding annually.

The Memorandum of Understanding should define the expectations, terms and conditions of forest management and timber disposal between the installation and the district. Generally, the installation is responsible for timber management while the district is responsible for timber disposal. However, U.S. Army Corps of Engineers foresters may be used for timber management in instances of insufficient installation staff. Established Memoranda of Understanding that precede the date of current guidance regarding timber disposal shall be updated to reflect changes in policy. District and installation responsibilities and authorities should be identified in the Memorandum of Understanding. Specific services required and methods of cost reimbursement should be detailed in the Memorandum of Understanding. Methods of tracking costs for services, including costs for timber disposal, contract administration, and timber sale monitoring, and forest management should be described in the Memorandum of Understanding.

C2.1.8.5 Equipment Lease or Purchase

Vehicles and equipment (to include heavy equipment) necessary for the installation forestry program and eligible for Conservation Reimbursable Forestry Account or Forestry Reserve Account should be leased if possible. Equipment procured with Conservation Reimbursable Forestry Account and Department of Defense Forestry Reserve Account dollars is federal property and shall not be given away. Installations should consider the option of contracting equipment services.

Installations must obtain prior approval to exceed the capital expenditure limit for equipment or procure centrally controlled equipment if using Conservation Reimbursable Forestry Account funds or Department of Defense forestry reserve account for the purchase. Requests for approval are submitted by installations to their proponent organization and from proponent organization through U.S. Army Corps of Engineers to the Office of the Director of Environmental Programs. The detailed procedure is provided in U.S. Army Field Activity Center Letter of Instruction, “Accounting and Reporting Procedures for Production and Sale of Forest Products” and Defense Finance and Accounting Service Indianapolis Center Regulation 37-1(rulebook), Chapter 14.

C2.2 Integrated Wildland Fire Management

Wildland fire is an important component of the ecosystem on military lands in Alaska. Fire has been a natural force in the Alaskan interior for thousands of years and has been a key environmental factor in these cold-dominated ecosystems. Without fire, organic matter accumulates, the permafrost table rises, and ecosystem productivity declines. Vegetation communities become much less diverse, and their value as wildlife habitat decreases. Even some of the plant and animal species normally associated with later successional stages will find the environment unsuitable. Fire rejuvenates these ecosystems. It removes some of the insulating organic matter and results in a warming of the soil. Nutrients are added both by ash from the fire, and by increased decomposition rates. Vegetative regrowth quickly occurs, and the cycle begins again.

Fire is critical for maintaining the viability of boreal ecosystems, yet fire can also be a threat to human life, property, and valued resources. The realization that fire plays an essential ecological role, but also has a destructive potential in relation to human life and values can make the fire management decisions process very difficult. This component plan describes the programs, policies and procedures for integrated wildland fire management on USAG-AK lands.

C2.2.1 Introduction

This component of the Integrated Natural Resource Management Plan (INRMP) serves as the USAG-AK Integrated Wildland Fire Management Plan. This Integrated Wildland Fire Management Plan reduces wildfire potential, effectively protects and enhances valuable natural and cultural resources, integrates applicable state and local permit and reporting requirements and implements ecosystem management goals and objectives on USAG-AK lands. As a component of the INRMP, it will be reviewed and updated annually and revised at a minimum once every five years. The Integrated Wildland Fire Management Plan directly supports U.S. Army Alaska missions and is consistent with USAG-AK emergency operations plans while being integrated into the INRMP, the USAG-AK's fire and emergency services plan, and the Integrated Cultural Resources Management Plan.

The management of fire on the landscape is consistent with ecosystem management principles and is required by the Sikes Act and Army Regulation 200-3. Development of an Integrated Wildland Fire Management Plan is also required by the Fort Wainwright and Fort Greely Resource Management Plans mandated by Public Law 106-65, the Military Lands Withdrawal Act. Additional direction regarding fire management comes from the Memorandum of Understanding between the Bureau of Land Management and USAG-AK concerning the Management of Certain Public Lands Withdrawn for Military Use and the Interdepartmental Support Agreements WC1SH3-95089-502 and 140138-95089-905 between USAG-AK and the Bureau of Land Management. Additional national authorities for implementing an integrated wildland fire management program come from:

- Protection Act of September 20, 1922 (42 Stat. 857: 16 U.S.C. 594)
- Economy Act of June 30, 1932 (47 Stat.417: 31 U.S.C. 1535)
- Taylor Grazing Act of June 28, 1934 (48 Stat. 875; 43 U.S.C. 315)
- Oregon and California Revested Lands Sustained Yield Act of August 28, 1937 (50 Stat. 875: 43 U.S.C. 1181e)
- Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471; et seq.)
- Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66; 42 U.S.C. 1856a)
- Disaster Relief Act of May 22, 1974 88 Stat. 143; 42 U.S.C. 5121) Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C. 2201)
- Federal Land Policy and Management Act of 1976 (90 Stat. 2743)
- Federal Grant and Cooperative Agreement Act of 1977 (P.L. 95-224, as amended by P.L. 97-258, September 13, 1982 (96 Stat. 1003; 31 U.S.C. 6301 thru 6308))
- Supplemental Appropriation Act of Sept 10, 1982 (96 Stat. 837)
- Wildfire Suppression Assistance Act of 1989 (P.L. 100-428, as amended by P.L. 101-11, April 7, 1989)

C2.2.1.1 Goals and Objectives

The goal of the USAG-AK Integrated Wildland Fire Management Plan is to establish fire management procedures and protocols to provide USAG-AK the capability to complete its mission to maintain combat readiness and fulfill resource management intent. Implementation of this Integrated Wildland Fire Management Plan maintains and enhances the health, productivity, and biological diversity of USAG-AK lands. Interior Alaska ecosystems require fire for continued functionality. However, wildfires are a concern at Fort Wainwright and Fort Richardson due to their impact on human activities and structures, and military operations. Fire management is required to protect, maintain, and enhance military training environments. In addition, management of the boreal ecosystem is important to maintain biodiversity, wildlife habitat, and the development of outdoor recreation. Fire management goals and objectives all

contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. Fire management goals and objectives are:

Safety

- Provide for firefighter and public safety in every fire management activity.

Stewardship

- Incorporate the role of wildland fire as an essential ecological process and natural change agent into the planning process.
- Maintain and enhance the health, productivity and biological diversity of the ecosystem through fire suppression, fire prevention, and prescribed fire planning.
- Develop fire management programs and activities which are based on the best available science; that incorporate public health and environmental quality considerations; and support USAG-AK and Bureau of Land Management land, natural, and cultural resource management goals and objectives.
- Protect all natural and cultural resources, to the extent feasible, through a program of prevention, pre-suppression, and suppression. Support the goals and objectives of existing land management plans.
- Base all fire management activities on the best available science.
- Control the timing of ignitions such that fires that occur do so when conditions are such that there is a high probability of controlling the fire and protecting all valued resources.

Mission Support

- Establish fire management procedures and protocols to provide USAG-AK the capability to complete its mission to maintain combat readiness and fulfill resources management intent.
- Improve military training opportunities through the use of sound fire and fuels management practices.
- Maintain or improve the quality of training lands.
- Allow military training to occur at the tempo required to maintain a high level of combat readiness.
- Establish a series of firebreaks and/or fuel breaks at high fire risk installations to reduce the probability of a fire moving into high value areas or off installation. Establish monitoring protocols and minimum specifications for these breaks.

Compliance

- Establish fire management qualifications for all firefighters and fire managers and insure all personnel assigned to those positions are trained to a level appropriate for their expected duties.

Integration

- Define and standardize procedures among agencies.
- Maintain full interagency coordination, cooperation, and corroboration.
- Complete, update, and maintain this Integrated Wildland Fire Management Plan.
- Involve resources agencies in planning for fire management and provide public review.
- Ensure economically viable fire management programs and activities are based on values to be protected, costs, and risk management.

- Incorporate public health and environmental quality considerations into fire management planning and execution.
- Examine and identify resource requirement and availability at each organizational level to provide needed suppression and support. Establish suppression measures and determine the confine, contain, and control strategies.
- Continually evaluate and improve upon fire management policies and procedures with the goal of constantly improving the level of fire protection.
- Prioritize installations and locations within installations for funding and implementation of fire management improvements.
- Establish guidelines and implement a prescribed burn program that includes the use of wildland fires for resource benefit in predetermined areas and under predetermined conditions.
- Communicate within the fire management hierarchy to improve practices and policies. Communicate and educate other departments to facilitate a reduction in fire starts.
- Update interagency agreements as necessary to ensure prompt and complete cooperation during wildfire incidents.

C2.2.1.2 Integrated Wildland Fire Management Plan

This Integrated Wildland Fire Management Plan has been developed to help meet the land stewardship responsibilities of USAG-AK and comply with federal and state environmental legislation, while at the same time allowing military units to accomplish their mission of maintaining a high level of combat readiness. It lays out specific guidance, procedures, and protocols in the prevention and suppression of wildfires on Army training lands in Alaska. This Integrated Wildland Fire Management Plan complies with all Bureau of Land Management and Department of Army policies as defined in the Department of Interior, Departmental Manual; Part 910 Chapters 1-3; Bureau of Land Management Manual 1203; Federal Wildland Fire Management Policy and Program Review; Dec 18, 1995; and the Environmental Protection Agency Draft Wildland Fire/Air Quality Policy, Dec 1, 1997. In addition, this plan is directly linked to the Alaska Interagency Wildland Fire Management Plan which gives direction for management of wildland fires within the state of Alaska.

C2.2.1.2.1 Purpose

The Integrated Wildland Fire Management Plan provides the planning framework for all fire management decision-making and specifies the uses of fire, which are consistent with and can enhance land management objectives. Training is essential to the U.S. Army's mission of preparedness and military readiness. Wildland fire management has become an increasing concern on training sites in recent years as the activities associated with training increases the risk of unplanned fire ignitions with the use of ammunition and pyrotechnics. This document provides guidance and direction to establish an effective wildland fire management program that fulfills interagency guidelines. This document identifies responsibilities and standard practices for fuels management, pre-suppression, prevention, and suppression while supporting military preparedness along with United States Department of the Interior, Bureau of Land Management and USAG-AK resource management goals.

C2.2.1.2.2 Scope

This Integrated Wildland Fire Management Plan covers all lands administered by USAG-AK in the state of Alaska, including Fort Wainwright Main Post, Tanana Flats Training Area, Yukon Training Area, Donnelly Training Area, Gerstle River Training Area, Black Rapids Training Area, and Fort Richardson.

Army Wildland Fire Management Policy directs that the Integrated Wildland Fire Management Plan must include goals and objectives, organizational structure and responsibilities, interagency cooperation and mutual aid agreements, smoke management and air quality, safety and emergency operations, risk

assessment/decision analysis processes, wildland fire history, natural and cultural resource considerations, mission considerations, wildland fuel factors, monitoring requirements, public relations, funding requirements, personnel training and certification standards, opportunities for maintenance of current knowledge on the science of fire and fire management and to take advantage of new technology, and programmatic environmental assessment.

C2.2.1.2.3 Relationship to Other Plans

This Integrated Wildland Fire Management Plan is a component of the INRMP and meets the requirements of a wildland fire management plan as directed by the Fort Wainwright and Fort Greely Resource Management Plans. This plan complements and designates wildland fire management areas as described in the Alaska Wildland Fire Management Plan. All policies in this document are in accordance with the 2001 Federal Wildland Fire Management Policy, to which the Department of Defense is a signature, and the Army Wildland Fire Policy Guidance dated September 2003.

C2.2.1.2.4 Review

This Integrated Wildland Fire Management Plan is a living document that allows flexibility to incorporate new data as it develops. Updates of this Integrated Wildland Fire Management Plan are required by the Memorandum of Understanding between the Bureau of Land Management and USAG-AK concerning the Management of Certain Public Lands Withdrawn for Military Use and the Interdepartmental Support Agreements WC1SH3-95089-502 and 140138-95089-905 between USARAK and Bureau of Land Management, Public Law 106-65 (Military Land Withdrawal Act) as mitigation for the land withdrawal LEIS and Public Law 86-797 (Sikes Act) every five years to implement the INRMP.

C2.2.1.3 Wildland Fire Fighting Resources

Wildland fire management in Alaska requires multi-agency cooperation. Fire management is a joint effort by USAG-AK and the Bureau of Land Management, Alaska Fire Service. The agencies have developed two inter-service support agreements, which establish the Alaska Fire Service's responsibility for all fire detection and suppression on installation lands (Alaska Fire Service and U. S. Army Alaska 1995a/b, U. S. Army Alaska and Alaska Fire Service 1995). In exchange, the Army provides the Alaska Fire Service with use of certain buildings, utilities, land, training services, air support, and other support services. Army organizations involved in wildland fire activities will incorporate National Wildfire Coordinating Group organizational standards into their organizational structure when necessary to accommodate cooperation and integration with other federal, state, and local wildland fire organizations across jurisdictional boundaries.

C2.2.1.3.1 USAG-AK Directorate of Emergency Services

The USAG-AK Directorate of Emergency Services is responsible for providing detection, initial response, and fire fighting on Army lands in Alaska. The Directorate of Emergency Services Fire Department provides fire fighting services for Fort Wainwright. Fire fighting on Fort Richardson is provided through an inter-service agreement with the Joint Fort Richardson-Elmendorf Fire Department and initial response on Donnelly Training Area is provided through an inter-service agreement with the Fort Greely Fire Department.

C2.2.1.3.2 BLM Alaska Fire Service

The Interdepartmental Support Agreement 140138-95089-905 (1995), attachment III, states that fire management services, including pre-attack planning and hazard reduction, will be provided by Bureau of Land Management, Alaska Fire Service to USAG-AK on a reimbursable basis only upon receipt of the appropriate funding document from USAG-AK prior to performance of services. The fire suppression services provided by the Alaska Fire Service are not reimbursable in consideration of the value of land use, property, and other services provided to Alaska Fire Service. USAG-AK has the authority to enter

into a reciprocal agreement with the Bureau of Land Management (BLM) regarding fire protection through the Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66; 42 U.S.C. 1856). Public Law 99-606 (1986) Withdrawal of Public Lands for Military Purposes further states that USAG-AK shall take necessary precautions to prevent and suppress wildfires occurring within and outside the lands withdrawn as a result of military activities and may seek assistance from BLM in the suppression of such fires. It further states that a Memorandum of Understanding, shall provide for BLM assistance and for a transfer of funds as compensation for such assistance. The Cooperative Fire Protection Agreement between BLM and the State of Alaska Department of Natural Resources, Division of Forestry states that the Division of Forestry agrees to provide detection and initial attack wildfire suppression services upon request, and subject to available forces, on USAG-AK lands; No Entry Areas are excluded. The request for services will be made by the Military Fire Chief or the Alaska Fire Service Military Fire Management Officer. All suppression costs are reimbursable by Bureau of Land Management,Alaska Fire Service to Division of Forestry.

C2.2.1.3.3 State of Alaska Department of Natural Resources Division of Forestry

The Alaska Fire Service also has a Reciprocal Fire Management Agreement with the State of Alaska's Department of Natural Resources, Division of Forestry (Alaska Fire Service and State of Alaska 1998). Under this agreement, the agencies have implemented a coordinated fire suppression effort and have identified areas where each agency has agreed to provide wildland fire suppression, regardless of whether the lands are under state or federal ownership.

C2.2.1.3.4 National Interagency Fire Center

Following proper coordination with the Office of the Deputy Chief of Staff, G-3, military assistance (both military and civilian personnel) may be furnished to the National Interagency Fire Center in national fire emergencies pursuant to the Memorandum of Understanding between the Department of Defense and The Departments of Agriculture and the Interior dated 1975. Support to National Interagency Fire Center is reimbursable under the Economy Act. Local area assistance included in existing agreements may be authorized by the Garrison Commander.

C2.2.1.3.5 Responsibilities

Protection of natural resources on USAG-AK lands, including forests, is the task of the Garrison Commander using appropriated funds. All operational costs incurred to fight forest fires occurring as results of military activities, unknown causes, or on unimproved grounds areas, will be charged to the Operations and Maintenance appropriated Army Management Structure codes, the military unit causing the fire, or a combination of both. Protection of Army's forests from fires will be done by assigned personnel trained and equipped to control forest fires.

The installation Wildland Fire Program Manager is responsible for development of the Integrated Wildland Fire Management Plan. Additionally, the Wildland Fire Program Manager reviews and approves burn plans for prescribed fires to insure consistency with the Integrated Wildland Fire Management Plan, the INRMP, and the Alaska Interagency Wildland Fire Management Plan. The Joint Director of Military Support is responsible for deployment of military firefighters and equipment. In the implementation of this policy guidance, activities should ensure compliance with their statutory labor relations obligations.

C2.2.1.4 Values to be protected

The values to be protected on Army training lands from wildfires include personnel safety, built-up improvements (structures, electronic weaponry, and targets) and cultural resources. Unauthorized structures will be allowed to burn during wildfires. The Alaska Fire Service has been notified of the

locations of all known illegal structures and known hazardous contents. Since fire is a natural component of the ecosystem in Alaska, there are few natural resources that require protection.

C2.2.1.4.1 Human Safety

The primary concern during any fire is human safety and protection. Neighboring towns and industrial areas provide additional priority protection considerations. Additionally, firefighters on the line, in the air, and at the command post must all be properly trained, outfitted, and informed of all threats and safety measures. Fire management safety concerns on military lands include threats posed by fire and smoke to local residents, employed personnel, and wildland firefighters.

C2.2.1.4.2 Structures and Infrastructure

USAG-AK lands include over 1,000 buildings, electronic training equipment, and military family housing units, with a total land and improvement value of well over $1 billion. In addition, there are tens of millions of dollars worth of equipment located on the training areas within high fire hazard vegetation.

C2.2.1.4.3 Cultural Resources

There are many archaeological sites found on Army training lands in Alaska. The Army is committed to conserve, protect, and enhance these cultural resources.

C2.2.2 Mission and Environment

The military mission can cause impacts to the environment by increasing the number and frequency of fire starts in an area. Conversely, fire can also impact the military mission.

C2.2.2.1 Effects on Military Training

Fire does not only affect ecosystems. It also affects the military's ability to accomplish its mission. Fire can directly endanger Soldier’s lives. Soldiers training in the field are normally on foot and have limited access to transportation. Fires that are driven by high winds could easily overtake Soldiers, trapping them and ultimately causing injury or death. Fire can also increase the explosive hazard of unexploded ordnance. The explosive hazards inherent in military training in the field are multiplied when exposed to wildfire. Normal and unexploded ordnance on the ranges and in the training areas creates extremely hazardous conditions to personnel when they are in close proximity to a fire. Fires can also prevent access to training areas. Fires on Army land result in a loss of access to training areas and ranges either during or after a fire. When notified of a wildfire, Range Control will call for a cease-fire and close that particular range or training area. If the fire is out of control, adjacent areas may require evacuation as well. Fire can cause disruption to training schedules. Cease-fire and closures of ranges/training areas due to wildfires create a ripple effect from the range scheduling office down to the training unit. Rescheduling an area cannot always be accomplished within a unit’s required time frame. Fire can result in destruction of targets and control systems. Wildfire damage to electronic targets and associated control systems on live-fire range complexes can be extremely costly. The time necessary to repair these systems causes the loss of valuable training opportunities. Fire also affects vegetation, important for use by the Army for cover, concealment and camouflage. Without this vegetation, training in the art of camouflage and concealment is rendered difficult or impossible. The absence of vegetation also promotes erosion, which in turn reduces trafficability and creates unsafe driving conditions during inclement weather (U.S. Army Hawaii, Integrated Wildland Fire Management Plan 2003).

C2.2.2.2 Environmental Stewardship

Fire can cause impacts to the ecosystem in Alaska, but not all of those impacts are bad. In fact, many of the impacts on vegetation provide positive long-term effects. The following section discusses impacts to environmental conditions, cultural resources, and air quality.

C2.2.2.2.1 Environmental Conditions and Fire Effects

Fire may be the chief factor maintaining vegetative productivity in cold Alaskan soils, in which the lack of nutrients is a major factor limiting plant growth. Most nutrients are tied up in the vegetative overstory and in the thick moss and organic layers, and are unavailable to plants. The insulating effect of the organic mat limits summer warming of soil and keeps the level of permafrost close to the surface. Burning organic material changes nutrients from complex forms unavailable for plant growth to the simpler and more readily available forms in ash. The soil becomes warmer because the overstory and moss layer have been removed, the organic layer is thinned, and the darkened soil surface absorbs more of the sun's heat. The degree to which these changes occur is closely related to the amount of organic matter removed by the fire, a factor which can vary considerably for different fires and for different areas of a single fire.

The three major means of plant regeneration after burning are: resprouting from the stumps of plants killed by fire, resprouting from lateral roots and rhizomes, and plant development from buried or wind-carried seeds. The depth of organic material remaining as a mat on the mineral soil will determine which of these means of revegetation will be the most important. Complete consumption of the organic layer removes many or all of the potential sprouting sites, truly killing most plants on the site. A fire which burns away most (or all) of the organic layer will greatly limit the amount of vegetative reproduction which can occur after fire, but will favor development of new plants from seeds by creating good seedbed conditions. Most plants of interior Alaskan forests require bare or nearly bare mineral soil as a prerequisite for successful seed establishment.

A mosaic of fuel, organic layer and soil moisture conditions on a site can lead to a variable pattern of burn severity, and thus favors the development of a vegetation mosaic after the fire. Sprouts, seedlings, and vegetation that survived the fire may all be found. Successful re-establishment of seedlings, however, depends on more than the presence of a suitable seedbed. Other factors are also critical, such as the type and age of pre-fire vegetation, the time of year when the fire burned, the distance to the nearest seed source, the amount of seed consumed by animals, and the periodicity of seed crops (Cook 1982).

Generally, the effects of fire on habitat are much more significant than the effects on existing animals. Habitat changes determine the suitability of the environment for future generations of animals. Fires may have a short-term negative impact on existing animals by displacing or sometimes killing them or by disrupting critical reproductive activities. However, these animal populations recover quickly if suitable habitat is provided. Generally, fire improves the habitat for a wide variety of species. The adverse effects that the immediate generation of wildlife may experience are usually greatly offset by the benefits accrued to future generations (Cook 1982).

Information concerning the effects of fire and fire suppression activities on cultural resources is scanty. Nevertheless, logic and reason would seem to indicate that surface historic structures are subject to severe effects from fire itself. Organic materials used in construction are likely to be completely destroyed or substantially damaged as a result of burning. Subsurface resources are much less likely to be significantly affected by fire. The possibility of damage to surface cultural resources from fire suppression activities is limited due to the fact they are easily observable. Subsurface resources do have the possibility of being damaged by fire suppression activities, particularly fire lines. Care needs to be taken to map all known cultural resources and identify allowable fire suppression activities.

C2.2.2.2.2 Cultural Resources

A cultural assessment has been completed for Fort Wainwright. All sites and fire protection status have been forwarded to the State Historic Preservation Officer via USAG-AK and Bureau of Land Management cultural resource managers and have been approved. The results are captured on fire protection maps with protection options. New cultural resources discoveries on Fort Wainwright will receive full fire protection status until a determination from the Cultural Resource Advisor or his designee can be made to determine otherwise. Further assessments pertaining to environmentally sensitive sites (i.e., raptor nests, critical habitat areas, wetlands, wildlife, etc.) are mapped and compiled. All fire management activities will adhere to National Environmental Policy Act, National Historic Preservation Act, and other applicable legal requirements. A fire management plan will be created to address environmental effects of fire management activities. Mechanized equipment will not be used unless authorized by land manger representatives from USAG-AK and Bureau of Land Management. Range Control will be contacted to ensure fire management activities will not conflict with military training activities.

C2.2.2.2.3 Clean Air

All fire management activities on military lands will be conducted in full compliance with local, state, and interstate air pollution control regulations as required by the Clean Air Act, 42 U.S.C. 7418. The Alaska Department of Environmental Conservation issues open burning permits.

As per Public Law 95-95, compliance with federal, state and local air quality regulations is mandatory and will require coordination with state and local air quality authorities. Smoke management can also be a significant part of determining the complexity of a prescribed fire project. The National Wildfire Coordinating Group publication *Prescribed Fire Smoke Management Guide*, National Fire Equipment Service 1279 / Publication Management System 420-2, provides a guide to the understanding of smoke management concepts. Several computer models are available to help determine the potential smoke impacts on a given area.

Personnel developing prescribed fire plans must be aware of state and local regulations and the impacts that a specific project may have on critical areas. Potential smoke impacts on critical areas such as Class I air sheds, restricted areas, and non-attainment areas (often called designated areas) must be considered. Equally important are local features that could be impacted, such as highways, airports, recreation sites and smaller population centers. Prescribed fire plans need to identify sensitive areas and provide operational guidance to minimize the impacts from smoke.

The Alaska Department of Environmental Conservation is the regulatory agency responsible for air quality and smoke management on both state and federal lands in Alaska. Prescribed burns, other than burning to combat a wildland fire, require written approval from the department. The Alaska Department of Environmental Conservation is also responsible for declaring air episodes and issuing air quality advisories, as appropriate, during periods of poor air quality of inadequate dispersion conditions. The Alaska Interagency Coordination Center is notified of any advisories or declarations.

The Alaska Department of Environmental Conservation is represented on the Alaska Wildland Fire Coordinating Group. During periods of wildland fire activity, the multi-agency coordinating group addresses air quality and smoke management issues. Press releases with recommended actions that individuals can take to protect their health would be issued by the Alaska Department of Environmental Conservation, in coordination with the multi-agency coordinating group.

The Army's air quality specialist will be informed of all proposed prescribed fire and grounds maintenance activities using fire at the beginning of each year from which a report will be made available to the Alaska Department of Environmental Conservation. A final end-of-year report will also be made available to the Alaska Department of Environmental Conservation of actual area burned from prescribed

fires and grounds maintenance activities. If potential negative impacts from smoke could occur, an assessment of potential downwind impacts using an appropriate smoke management model will be completed. Concerns about public health related to air quality and visibility are considered in actions taken within all fire management option areas.

C2.2.2.3 Fuels

Common fuels found on USARAK installations include: black spruce (highly flammable, located in wetter and cooler sites, crown fires common); white spruce (less flammable, located in warmer and drier sites, crown fires less common); mixed spruce/hardwood stands (mostly white with occasional black spruce, hardwoods less flammable, moderate fire intensity); bluejoint reedgrass (patchy occurrence, fires can start and spread easily, and burn intensely); and tundra (grasses are typically highly flammable, slightly less so in alpine tundra areas) (Musitano and Hayes 2002).

C2.2.2.3.1 General Wildfire Fuels

Vegetation is the fuel for any wildfire. Petroleum based fuels, wood products, and plastics that are associated with human development are normally not found in the training areas. Structural facilities in training areas are addressed under structural fire protection programs. All vegetation is either already a fuel source or is a potential fuel source under specific conditions. The dry dead foliage or litter produced by all vegetation creates fuel for fire. Living vegetation becomes a viable fuel source when drought conditions dry the living plants sufficiently or when, during a wildfire, they are dried by the convective or radiant heat of the fire itself. Fuel conditions are directly related to moisture patterns and seasonal rainfall. During short periods of no or low moisture, the burning potential of vegetation can persist throughout the year. Fluctuations in precipitation can also result in short periods of vegetation green-up, followed by periods of drying. Dry conditions contribute to an increase in dead foliage and litter in plant communities.

C2.2.2.3.2 Fuels Classifications

Fuels are a combination of the dead vegetative litter, dry or flammable standing foliage, and the live vegetation that can be dried and become a fire fuel. Fuels can be defined as the portion of the biomass, which is likely to burn if ignited. Fuels are broken down into classes described by the amount of time or “time lag” that is required to change the moisture content of the individual fuel particle being classified. This time lag is the amount of time for a substance to lose or gain approximately two-thirds of the moisture above or below its equilibrium moisture content. The shorter the time lag, the more responsive the fuels are to changes in environmental moisture.

There are four fuels classifications. One-hour fuels consist of dead vegetation less than ¼ inch in diameter, the 10-hour fuel class is 1/4" to 1" diameter, 100-hour fuel class is 1” to 3" diameter, and the 1000-hour fuel class is 3” to 10” or larger diameter. The one-hour classes of fuels are considered to be "fine fuels" and the most sensitive to ignitions. Calculation of the current moisture content of the fine or one-hour fuels is based on weather conditions. These calculations are used to monitor the level of flammability of the fine fuels based on the amount of moisture they are estimated to contain. Careful monitoring of the estimated Fine Fuel Moisture level will provide an accurate indication of fuel combustibility. It should be noted that these moisture percentages can change rapidly (within minutes) depending upon temperature and relative humidity readings. In fuel types dominated by one-hour fuels, fine fuels become the most critical concern of a fire manager. This size class reacts rapidly to changes in weather conditions and is the primary carrier of fire, especially in wind driven conditions.

C2.2.2.3.3 Fuel Types

The predominant fuel types on USAG-AK lands are mixed spruce/hardwoods, grass, black spruce, white spruce, or tundra. Mixed spruce/hardwoods fuel type contains conifers which are generally white spruce, but black spruce is sometimes present. Black spruce is characterized by high flammability with

continuous ladder fuels. White spruce has lower flammability and has fewer ladder fuels. Hardwoods (deciduous) are generally low flammability and may include birch, aspen and/or cottonwood. Surface fuels may be comprised of mosses, lichens, leaf litter, grasses and shrubs. Fires in mixed stands are generally of moderate intensity. Grass consisting primarily of bluejoint reedgrass (*Calamagrostis canadensis*) occurs on all areas in varying abundance. It may occur as a predominant or co-dominant understory fuel type in hardwood or mixed forests or occur as the predominant fuel type in clearings. Reedgrass may grow to several feet tall. Fires start easily, spread quickly and burn intensely when conditions are right. Black spruce types are characterized by high flammability and are found in generally wetter and cooler sites. Black spruce is easily killed by fire because it has thin bark and shallow roots. Even low-intensity surface fires often kill trees. Crowning is common in black spruce stands because ground fires easily ignite low-growing, lichen-draped branches. Crown fires typically result in extensive mortality. White spruce exhibits lower flammability, is generally found on warmer and drier sites, may have ladder fuels, but does not carry fire well, and can be near moving water. In extreme fire weather conditions (drought), surface fires often spread to white spruce crowns because the highly flammable fine fuels concentrated under the trees often produce flames that reach the low-growing, flammable, lichen-draped branches. Tundra consists of grasses and shrubs. Grass-dominated tundra is very flammable, has moderate to high rates of spread, and responds quickly to weather changes. Shrub and grass tundra is generally dominated by dwarf birch and willow, may have high lichen content, and is moderately to highly flammable. Alpine tundra consists of short shrubs, mosses and lichens dominate, and is moderately to highly flammable.

C2.2.2.4 Fire Behavior and Fuel Models

Fires ignited from any source, including ammunition or military weapons systems, can alter the many components, structures, and processes of the ecosystem. The 'fire regime' is a measure of fire size, frequency, seasonality, intensity, and severity. Size and frequency combine to determine the proportion of the landscape touched by fire. Seasonality determines how fire interacts with the environment. Intensity and severity are defined by fire behavior and influence the after-effects, such as tree mortality, ground char, and seedling success. Fires can have dramatic effects across broad landscapes or minimal impact in a small area. They can accelerate or retard the succession of seral stages, increase or reduce nutrient availability, and alter an ecosystem's physical structure. Whatever the impact, every fire is unique, and every fire contains considerable variability within its bounds (U.S. Army Hawaii, Integrated Wildland Fire Management Plan 2003).

C2.2.2.4.1Fire Behavior

Much of the literature on fire behavior in Alaska comes from the research of Rod Norum formally with the U.S. Department of Agriculture Forest Service Institute of Northern Forestry (Norum 1980). Forests in Alaska often do not appear capable of producing much fire. There is seldom much dead wood on the ground and everything looks lush and green in the summer. In many areas, rivers wind and loop all over the countryside and it doesn't look like a setting for a raging fire. Appearances can be deceiving.

The fuels on the floor of Alaskan forests are composed almost entirely of small, fast drying fuels piled or growing one upon another. When the relative humidity goes down, the fuel moistures of these fuels follow very quickly. Surface fuels in Alaska nearly stop burning if they get as wet as 15% moisture content. They burn readily at 8 to 10%. At 5 to 7%, they burn with fierce intensity and will carry fire into tree crowns.

Black spruce forests have an almost mattress-like layer of moss, lichens, and dead material on the forest floor. Dead tree branches extend to the ground. The ground fuels are either dead or contain enough flammable substance to carry a fire when they dry out. When the fire stays on the ground it is relatively easy to suppress. When it kicks up and involves the trees, it has intensity comparable to California brush

fires. The trees are always moisture starved. Needle fuel moisture is under 90% coming out of winter. It rises only slightly during the growing season; therefore, the canopies are ready to burn any time they get enough heat underneath. When the relative humidity drops into the 40% range, trees start to torch out. If wind speed is under 10 mph, expect a slow moving crown fire, with a ground fire ahead of the crown fire. If relative humidity falls into the 30s, fire intensity increases; however, well-established lines can hold if wind is under five mph. With wind speeds 10 mph or greater, expect a full-blown, running crown fire that spots ahead and is too hot for crews to handle. Relative humidity 30% or lower is always dangerous. Crown fires are nearly certain, and the fire too intense to work next to. Any wind will cause spotting across all but the widest fuel breaks. Winds above 10 mph spell a "get out" situation.

Fire in forests of white spruce and mixed hardwoods is easier to manage. Fires sometimes stop here, but not always. In drought periods, fire can and will move through them, though with less intensity than in black spruce.

Tussock tundra is a distinct case. Fires in grass prairies in the mountain states are similar, but walking is much tougher here. Fires can burn through these fuels while the ground is saturated with water. Unless the wind is strong, the rate of forward spread is moderate. With wind, these fires can be quite hot. Escape from a running fire in these fuels may well be impossible if crews do not keep track of easy routes and safe havens. Foot travel is extremely difficult.

A fire may be very quiet; burnout attempts don't succeed. In an hour, the relative humidity drops and the fire becomes a raging inferno. A cool rainy day is often followed by a day when the fire stands up and runs over lines, and crews, if they're not careful. Fires come to life quickly when conditions change ever so slightly. As a rule of thumb, things will be quiet for half a burning period after a light rain and for 1 ½ days after a wetting rain. The sleeping giant can wake up in a hurry if dry air moves in and especially if wind is with it (Norum 1980).

C2.2.2.4.2 Fuel Models

Standard fire behavior fuel models have been assigned to the various plant communities occurring throughout USAG-AK lands. In addition, two custom fuel models are applied to vegetation, which is not well represented by the standard models. Factors in the fire behavior fuel models are fuel loading in each time lag class, fuel bed depth, the surface area to volume ratio, the heat content of the fuel, and the extinction moisture. Fuel depth can be critical to fire behavior determination. Very deep grasses will permit the highest wildfire intensities, although not necessarily the most rapid fire spread rates. Seasonal changes in the amount of live biomass for perennial and annual species are very important to potential fire behavior. Grass fuel beds composed entirely of green material (e.g., an immediate post-fire stand of grasses) are difficult to burn. However, green grass can be "under burned" where the fire carries in a well-developed thatch layer when relative humidities and soil moistures are low.

In addition to fire behavior fuel models, the Canadian Fire Danger Rating System fuel models have been assigned to each installation to aid in determining the threat of fire given the current weather conditions. The Canadian Fire Danger Rating System provides an estimate of the risk a fire would present, should one be ignited.

C2.2.2.4.3 Fuel Load

Fuel load is described as the amount (weight) of flammable biomass that builds up in a given area over time or at a specific time. Fuel loading is normally measured in tons of biomass fuels per acre. Fuel loads in a given area can vary greatly depending on fuel types and environmental conditions, particularly soil moisture and soil quality.

Fuel loads are constantly in flux, and the more variable the vegetation type over time, the more difficult it is to assess the fuel conditions. Herbaceous fuels are the most difficult to estimate over time because they change so readily with alterations in climate.

Fuel loading is one of the primary factors in the fire behavior fuel models and the Fire Danger Rating System fuel models. The Directorate of Public Works Environmental and the Integrated Training Area Management programs support the Wildfire Management program by providing continued vegetation surveys. These surveys will be used to the extent possible to monitor fuel conditions.

C2.2.2.5 Ignition Sources

Incendiary devices and lightning are the two major causes of fires on USAG-AK lands. Other less common causes of fire are field burning, exhaust, recreation, trash burning, and warming fires.

C2.2.2.6 Fire History

Fire history maps are updated annually by obtaining wildfire perimeters from the Bureau of Land Management, Alaska Fire Service's Geographic Information System office. Perimeters of fires smaller than 100 acres, cost, ignition point, and cause are obtained directly from the Military Zone of Alaska Fire Service. Data is consolidated with the previous years in a Geographic Information System. Two data bases are maintained, one of perimeters and one of ignition points. Wildfire and prescribed fire perimeter data is generated from satellite imagery and/or flying the perimeter with a helicopter and recording the data in a Global Position System unit.

C2.2.2.6.1 Fort Wainwright

Fire surveillance activities have been ongoing since Fort Wainwright was created in the 1950s. From 1980 through 2000, 148 wildfires have been reported from Fort Wainwright. Thirty-one of these fires were attributed to natural causes and 117 were attributed to human causes. Of the 117 fires resulting from human activities, 85 were attributed to military training activities. Human-caused fires and, in particular, military training-caused fires, represent nearly 80% of the fire ignitions reported on Fort Wainwright. These high numbers of ignitions present a challenge to fire managers in terms of regular suppression and surveillance efforts. It also indicates the need for fuels mapping and hazard fuel reduction projects to lessen the chance of undesirable fires spreading to areas requiring suppression options. In 1999, a fire fuel hazard map was created for Fort Wainwright.

The average fire return interval for Fort Wainwright varies from 100 to 150 years. The majority of land burned on Fort Wainwright has been done by relatively few fires. Fire surveillance activities remain an integral part of range operations and the fire department.

Fires are frequent in interior Alaska, and they play an important ecological role by making nutrients stored in undecayed, accumulated matter available to plants. Approximately 30% of Fort Wainwright has burned since 1950 (Jorgenson et al. 1999), and a substantial portion of the area has burned more than once. Records of fire occurrences since 1950 indicate that about 1% of Fort Wainwright has burned annually (Jorgenson et al. 1999). The average interval for fire recurrence on any given area at Fort Wainwright varies from 100 to 150 years (U.S. Army Alaska 2002c).

Both natural and human-caused fires occur on the post. From 1980 through 2000, 148 wildfires were reported on Fort Wainwright (Table 3.12.a). Thirty-one of these fires were attributed to natural causes while 117 were attributed to human causes. Of the 117 fires resulting from human activities, 85 were attributed to military training activities (U. S. Army Alaska 2002c). The need for fuels mapping and hazard fuel reduction projects has been identified (U.S. Army Alaska 2002c).

Main Post
The Fort Wainwright Fire Department is responsible for fire suppression on the Main Post. The cantonment area is categorized as critical fire management due to the urban and residential areas adjacent to it (Alaska Wildland Fire Coordinating Group 1998). Cultural resources potentially at risk from fire damage have not been identified outside of the cantonment area. Private and borough-owned lands surround the Main Post (U. S. Army Alaska 2002c).

Tanana Flats Training Area
The Alaska Fire Service is primarily responsible for fire suppression on the Tanana Flats Training Area (TFTA). Currently the training area is classified for limited fire suppression because relatively few resources are at risk from fire and because USAG-AK recognizes fire as a natural process in ecosystem function (Alaska Wildland Fire Coordinating Group 1998). Military and cultural resources at risk from wildland fire have been identified and mapped, and management options relating to wildland fire have been determined. The Tanana Flats Training Area is bounded by allotments, private parcels, state lands, and Native Corporation lands (U. S. Army Alaska 2002c).

Table C2-7. Fires ≥ 100 Acres on Tanana Flats Training Area.

Date	Alaska Fire Service #	Fire Name	Acres	Cause [1]	Management Option
09/05/1957	200	Eielson	360	Unknown	N. A.
06/10/1958	29	Quartz Lake	120	Lightning	N. A.
05/27/1963	19	Eielson N20	160	Human	N. A.
07/10/1966	Z85	Salcha Military	20,000	Human	N. A.
07/23/1968	Z82	Redmond Creek	2,000	Lightning	N. A.
04/29/1969	9364	35 Mile Richardson	280	Human	N. A.
06/21/1969	9476	Ninety Eight	56,640	Lightning	N. A.
06/10/1969	9431	Bluff Ridge	4,590	Human	N. A.
06/10/1976	8559	EIL NE 20	5,200	Human	N. A.
07/20/1976	8648	Military 3	100	Human	N. A.
06/19/1981	69	111069	600	Human	N. A.
06/19/1981	8630	Blair NE 6	1,900	Human	N. A.
05/15/1984	A012	412018	120	Human	N. A.
06/30/1986	A138	Caribou	3,800	Lightning	Moderate
06/15/1986	A076	Rapid Creek	4,630	Lightning	Full
06/16/1986	A083	FBK E 35	200	Human	Unplanned
06/27/1990	A128	Not given	880	Human	Unplanned
07/17/1990	Not Assigned [2]	Not given	1,820	Lightning	Moderate
06/18/1991	B306	Not given	1,000	Human	Unplanned
06/20/1991	B323	Not given	100	Human	Unplanned
08/05/1992	A454	Not given	200	Human	Unplanned
07/16/1993	B580	Butte Creek	840	Lightning	Limited

06/27/1997	B407	Midway	400	Recurrent	Full
07/02/1997	B462	Butte Creek	4,222	Lightning	Moderate
06/05/1997	B262	Brigadier	940	Human	Full
06/04/1998	A334	Crooked	857	Lightning	Limited
04/28/1999	B028	Small Arms Range	409	Human	Limited
07/05/1999	B413	McCoy Creek	5,100	Lightning	Limited
06/13/2000	A232	Beaver Creek	3,379	Lightning	Limited
06/20/2001	B247	Survey Line	112,112	Unknown	Limited
06/23/2001	B247	Tractor Trail	3,257	Unknown	Limited

[1] Other, Military, Recreation, Incendiary, and Blasting categories were changed to Human.
[2] State fire # 11163
Source: Alaska Fire Service, personal communication 2002.

Dyke Range
Dyke Range covers approximately 2,200 acres. Dyke Range consists of the Tanana River, gravel bars, riverine moist broadleaf forest, and riverine moist tall shrub. Currently, Dyke Range is in Full fire suppression due to the close location of the community of North Pole. The islands of the Tanana River located within Dyke Range are under limited fire management (Alaska Interagency Wildland Fire Management Plan 1998). Dyke Range is no longer used for military purposes; however, the area, having been a former firing range, possibly contains ordnance. Further investigation is required to ascertain previous areas where ordnance has been used and disposed. Due to the possibility that Dyke Range contains un-exploded ordnance, no ground firefighting activities will take place. The unit plan needs to address wildland firefighting options under this scenario. No cultural resources have been identified in Dyke Range. Private parcels and borough lands bound Dyke Range.

Yukon Training Area
Records indicate that 16 fires of 100 acres or more burned on the Yukon Training Area (YTA) from 1959-2000. Three of these fires occurred between 1998 and 2000 (Table C2-8). The two largest of these fires happened in 2000. The fires were caused by lightning and affected a total of 4,538 acres.

The eastern portion of the training area is under Limited fire management because it is too close to an impact area, few resources are at risk, and USAG-AK recognizes fire as a natural and desirable process for ecosystem function. The western portion of the training area is assigned full fire management due to its proximity to developed residential areas, in addition to resources of value on adjacent military lands. The central portion of the training area is listed for modified fire management, and this area acts as a buffer between the limited and full management areas (U. S. Army Alaska 2002a).

Military resources at risk from fire have been identified and mapped. Cultural resources potentially in danger from wildfire have been identified at YTA. Private parcels, state lands, borough lands, and other federally managed lands border YTA (U. S. Army Alaska 2002a).

Table C2-8. Fires ≥ 100 Acres on Fort Wainwright Yukon Training Area.

Date	Alaska Fire Service #	Fire Name	Acres	Cause [1]	Management Option

9/06/1957	202	Colorado Roadhouse	1,800	Human	
9/05/1957	200	Eielson	360	Human	N. A.
6/01/1958	32	Chena Dome	50,000	Lightning	N. A.
6/18/1959	50	Eielson	7,080	Lightning	N. A.
5/27/1963	19	Eielson N20	160	Human	N. A.
6/10/1976	8559	EIL NE 20	5,200	Human	N. A.
6/16/1986	A083	FBK E 35	200	Human	Unplanned
6/23/1987	B078	Eielson	10,960	Lightning	Unplanned
6/27/1990	A128	Not given	880	Human	Unplanned
6/18/1991	B306	Not given	1,000	Human	Unplanned
6/20/1991	B323	Not given	100	Human	Unplanned
6/28/1991	B508	Not given	220	Human	Unplanned
8/05/1992	A454	Not given	200	Human	Unplanned
6/05/1999	B176	Engineer Hill	273.6	Human	Full
6/24/2000	A280	Beaver Creek	1,159	Lightning	Limited
6/13/2000	A232	Beaver Creek	3,379	Lightning	Limited
05/18/01	B087	South Fork 2	369	Human	Limited
07/19/01	B341	South Fork 3	150	Human	Limited

[1] Other, Military, Recreation, Incendiary, and Blasting categories were changed to Human.
Source: Alaska Fire Service, personal communication 2002.

C2.2.2.6.3 Donnelly Training Area

Fires are also common at Donnelly Training Area. According to Jorgenson et al. (2001), 59% of Donnelly Training Area has burned since 1950, and a considerable portion has burned more than once. Approximately 16% of Donnelly Training Area has burned within the past 30 years, and, based on fires recorded on the installation since 1950, 1.2% of the area has burned annually.

From 1980 to 2000, 89 fires were reported at Donnelly Training Area (U. S. Army Alaska 2001a). Of these, 78 were caused by humans and 11 were due to natural causes. Eighty-eight percent of all reported fires were caused by military training activities. Two large fires occurred between 1997 and 2000. The first was a 2,500-acre fire caused by lightning in 1997, and the second was a 357-acre fire in 1998. The average interval for recurrence of fire for any given area varies from 100 to 150 years (U. S. Army Alaska 2001a).

Most of Donnelly Training Area West is classified for limited fire management because few resources are at risk from fire and USAG-AK recognizes that fire is a natural process in ecosystem function (Alaska Wildland Fire Coordinating Group 1998). The northern boundary of the Donnelly Training Area West is classified for modified fire management to provide a buffer to adjacent state lands that are classified under full management status.

Several military resources in Donnelly Training Area West are at risk from wildland fire (U. S. Army Alaska 2001a). Also, a private hunting lodge located along the extreme western boundary of Donnelly Training Area West is given full fire suppression status. The central portion of Donnelly Training Area

West is an impact area used by both the Army and the Air Force. Cultural resources staff identified management options related to wildland fire. Donnelly Training Area West is bounded by private parcels and state lands (U. S. Army Alaska 2002a).

Currently, Donnelly Training Area East is a full fire management area due to the close proximity of the community of Delta Junction and the cantonment area of Donnelly Training Area. This area is subject to high winds and extreme fire behavior, further supporting the full fire suppression status. The northern portion of the Main Post is a critical fire management area due to the life and property at risk (Alaska Wildland Fire Coordinating Group 1998). The Army does have structures at risk from wildland fire throughout Donnelly Training Area East. These resources have been identified and mapped. Donnelly Training Area East also surrounds a portion of private and state land known as the "Key Hole" (U. S. Army Alaska 2002a).

In 1999 the Donnelly Flats Fire burned approximately 18,000 acres of Donnelly Training Area East and Main Post. The western portion of Donnelly Training Area East and the Main Post along the Delta River is an impact area used by the Army for small arms and sub munitions. Cultural resources potentially at risk from wildfire have been identified in Donnelly Training Area East and Main Post, and management options related to wildland fire have been determined. Donnelly Training Area East and Main Post are bounded by allotments, private parcels, and state lands (U. S. Army Alaska 2002a).

Table C2-9. Fires ≥ 100 Acres on Donnelly Training Area.

Date	Alaska Fire Service #	Fire Name	Acres	Cause [1]	Management Option
06/14/1956	45	Walsh	8,000	Human	N. A.
07/08/1963	72	Delta Creek 2	130	Lightning	N. A.
06/23/1971	8656	Iowa C	17,500	Lightning	N. A.
07/27/1971	8856	Strafi	227	Human	N. A.
06/16/1981	57	111057	1,200	Lightning	N. A.
05/09/1983	8480	313001, Big W 17	35,450	Human	N. A.
04/27/1984	A003	41.... , FBK SE 66	100	Human	N. A.
06/17/1986	A085	632026	200	Human	Full
05/20/1990	A009	Not given	100	Lightning	Unplanned
06/28/1990	A132	Not given	7,000	Human	Unplanned
06/28/1990	A133	Not given	16,640	Human	Unplanned
05/06/1992	A034	Not given	1,410	Human	Unplanned
05/06/1992	A035	Not given	960	Human	Unplanned
05/10/1996	A145	Hillbilly Lake	14,200	Human	Limited
05/29/1996	A321	100 Mile Creek	66,560	Human	Limited
06/07/1996	A416	Observation Post 27	2,000	Human	Moderate
06/13/1997	B320	Oklahoma	2,500	Lightning	Limited
05/21/1998	A188	Carla Lake	53,720	Lightning	Full
04/23/1998	A043	Simpsonville	357	Human	Limited
09/23/1999	B222	Donnelly Flats	18,720	Human	Full

05/09/2001	B049	Winter Ridge	110	Human	Limited
09/24/2001	B374	Deluth	2,110	Human	Limited
09/27/2001	B376	Hillbilly	1,475	Human	Limited

[1] Other, Military, Recreation, Incendiary, and Blasting categories were changed to Human.
Source: Alaska Fire Service, personal communication 2002.

Gerstle River Test Site
In 1994, the Hadjukovich fire burned a large portion (approximately 55%) of the Gerstle River Test Site (Clark, personal communication 2002). The test site is classified as limited management area due to risks of unknown ordnance and other weapons used on the site (Alaska Wildland Fire Coordinating Group 1998). Plans for addressing wildland fire fuels on the Gerstle River Test Site have been completed. Adjacent lands are classified for limited, modified, and full fire management status. No resources at risk from wildland fire have been identified in the Gerstle River Test Site. Cultural resource surveys have not been conducted at Gerstle River Test Site. The Gerstle River Test Site is bounded by state lands (U. S. Army Alaska 2002a).

Black Rapids Training Center
The last wildfire in the Black Rapids Training Center is believed to have been in 1954 (Rees, personal communication 2002). The training center is classified under the full fire management option in order to protect the resources of the site (Alaska Wildland Fire Coordinating Group 1998). The road corridor adjacent to Black Rapids is classified for modified fire management status, while the training center is located within a limited fire management area. The Army has structures at Black Rapids Training Center that could be at risk from fire. These resources have been identified, mapped, and visited to assess pre-protection tactics and fuel treatment options (U. S. Army Alaska 2001a). Cultural resources surveys have not been conducted for Black Rapids. Black Rapids is bounded by federal and state lands (U. S. Army Alaska 2002a).

C2.2.2.6.4 Fort Richardson
Although wildfires are a concern at Fort Richardson, they are rarely a significant problem. Numerous fires have been recorded in the Matanuska-Susitna Valley to the north, but no major fires have occurred on Fort Richardson since 1950 (Jorgenson et al. 2002). Severe drought conditions occur about once every 20 years, and, in normal years, there is an average of less than five wildfires. These fires are usually mission-related, small, and easily contained. Fire probably had a more important influence on ecosystem functions in the Anchorage area during pre-settlement times. Wildfires were found to be prevalent in the 1800s and early 1900s. Forty eight percent of Fort Richardson over the past 200 years has been affected by fire (Jorgenson et al. 2002). This was indicated by the occurrence of early to mid-successional forest stages that have developed since the fires in the 1800s and early 1900s (Jorgenson et al. 2002).

There is some concern over the spruce bark beetle that killed most of the larger white spruce in the North and South Post training areas. The dead spruce has resulted in high fuel load conditions on the forest floor. Additionally, the death of the larger spruce trees has allowed areas to be taken over by the grass *Calamagrostis* spp., another potential fire risk (U. S. Army Alaska 2002b).

The North Post is classified for full and critical fire management options due the high value of resources at risk from fire, in addition to the post's proximity to Anchorage, Eagle River, and Elmendorf Air Force Base (Alaska Wildland Fire Coordinating Group 1998). Most of the North Post is classified for critical fire management. The training areas along Knik Arm are classified for full fire management. Many military resources at North Post are at risk from wildland fire. Cultural resources staff identified sites in the North Post area, but management options related to wildland fire have not been determined. The

North Post is bounded by Elmendorf Air Force Base, private parcels, railroad lands, and Native Corporation lands (U. S. Army Alaska 2002b).

The South Post has portions classified under full and limited fire management. Most of the South Post is under full fire management because the area is mainly used for military training and small arms ranges. The alpine zones are classified for limited fire management because of their remote location. Many military resources are at risk from wildland fire in the training areas of the South Post, including two small arms complexes. Additional surveys are needed to ascertain sites where ordnance has been used and disposed. Cultural resources staff identified sites in the South Post area, but management options related to wildland fire are pending. The South Post is bound by private parcels and state lands (U. S. Army Alaska 2002b).

The Fort Richardson Fire Department provides the initial response for wildfire suppression, which has traditionally been confined to areas behind the small arms complex. Because of the extensive mortality of white spruce in the area, fire prevention activities were conducted in 1999 and 2000 to reduce fuel loads adjacent to the small arms ranges (U. S. Army Alaska 2001b).

When necessary, the Bureau of Land Management reimburses the Alaska Division of Forestry to suppress wildfires in the southern half of the state, including Fort Richardson. The Alaska Fire Service also provides training for wildfire suppression at Fort Richardson. U. S. Army Alaska and Elmendorf AFB have a mutual aid agreement for fire suppression (U. S. Army Alaska 2001b).

Table C2-10. Fires > 1 Acre on Fort Richardson.

Date	Alaska Fire Service #	Fire Name	Acres	Cause [1]	Management Option
06/06/1956	31	Eagle River #2	2	Human	N. A.
07/08/1958	67	Beach Lake	25	Human	N. A.
04/19/1969	9078	Mile 15	2	Human	N. A.
06/05/1970	9191	Fire Lake	5	Human	N. A.
06/20/1989	B038	Not assigned	5	Human	Full
08/13/1993	Not assigned	Fort Rich Br	5.3	Human	Full
05/13/1999	B075	Bravo	5	Human	Full
05/12/2000	A079	Small Arms	1	Human	Full

[1] Other, Military, Recreation, Incendiary, and Blasting categories were changed to Human.
Source: Alaska Fire Service, personal communication 2002.

C2.2.3 Pre-Suppression Actions

In fire-prone areas, climate, human activity, and types of vegetation (or fuels) determine the level of wildland fire risk. Pre-suppression activities are those activities that reduce wildland fire risk. These pre-suppression actions are planning, prevention, fuels management, and prescribed burning.

C2.2.3.1 Pre-Suppression Planning

Pre-suppression planning stresses safety, effective fire response planning, and pre-suppression priority.

C2.2.3.1.1 Personnel Safety

Public and firefighter safety is the first and highest priority. Safety is the responsibility of everyone assigned to a wildfire incident. Safety is an attitude that must be promoted at all operational levels. Once personnel are committed to an incident, those resources become the highest value to be protected.

Fighting wildfires is inherently dangerous, and firefighters risk injury or even death in these operations. Nationally, there are wildland firefighter fatalities nearly every year. In addition to the danger from the fire itself, the need to use cutting tools, mobile apparatus, heavy equipment, and aircraft add to the risk involved. If firefighters know how to recognize potentially hazardous situations and how to mitigate them, they can reduce or eliminate much of that risk.

The training program and the qualification and certification process are the foundations of the safety program. Only qualified personnel will be assigned firefighting duties. All assigned wildland fire personnel, whether on wildfires or prescribed fires, must meet National Wildfire Coordinating Group training standards. All personnel engaged in actual fire line operations (in the vicinity of the fire) must have completed: S-110 Basic Fire Suppression Orientation; S-130, Firefighter Training; S-190, Introduction to Fire Behavior, Your Fire Shelter, and Standards for Survival; and I-100, Introduction to Incident Command System. All trained personnel will be required to complete an annual four-hour refresher course. All personnel will have National Wildfire Coordinating Group certified training for tasks they are assigned.

The Incident Commander must ensure that safety briefings take place at all operational levels. The identification and location of escape routes and safety zones will be stressed at every briefing.

All fire suppression actions must be in compliance with Army Regulation 420-90, *Fire Protection*, and the National Wildfire Coordinating Group "10 Standard Fire Orders" and "18 Watch-Out Situations." It is mandatory that all firefighting personnel assigned be equipped with the proper personal protective equipment necessary for fighting wildfires. Wildland firefighters must be intimately familiar with the tools used and personal protective equipment worn. Knowledge of proper selection, use, and care of the various tools used in wildland firefighting aids firefighters in performing their job as efficiently and effectively as possible. Likewise, knowledge of the proper donning, care, capabilities, and limitations of personal protective equipment, gives firefighters a better sense of which situations are tenable and which are not. Firefighting personnel will ensure that proper personal protective equipment is worn at all times when actively engaged in firefighting duties.

USAG-AK uses the range facilities for various forms of live-fire training. Some of the live-fire range facilities are hazardous only during use due to ballistics dangers. These ranges are considered hazardous past the normal use area, (i.e., from the firing line forward to the down-range portion, or toward the impact area) during live-fire operations. Access to this down-range portion of the live-fire ranges to conduct firefighting operations is prohibited to all personnel while live firing is taking place. A responding Incident Commander must ensure that these ranges are in a "check or cease fire" condition before sending fire suppression forces down-range.

The explosive hazards inherent with military training on the ranges are multiplied when unexploded ordnance is exposed to wildfires. Duds on the ranges and in the training areas and live ammunition or explosives in the possession of military training units on the ranges create extremely hazardous conditions. Due to various types of military ammunition, some range areas are hazardous even after the range has closed for normal live-fire operations due to the probable presence of unexploded ordnance. These hazardous areas are divided into two categories, those presenting a low hazard to trained, authorized personnel and those containing a high hazard to all personnel.

A low hazard rating means that the government has taken reasonable and prudent measures to reduce the hazard to an acceptable level, consistent with generally accepted standards. This low rating applies only to personnel trained in unexploded ordnance identification and having appropriate safety courses while they are performing authorized duties, under the direction of their supervisor. The area is considered hazardous to any other person. Authorization to enter low hazardous areas is subject to approval by the Range officer, Range Control safety technicians, or Explosive Ordnance Disposal personnel knowledgeable of hazardous areas. Fire suppression forces will not enter low hazard areas to conduct fire suppression operations down-range unless authorized and properly escorted. If proper safety precautions are taken, firefighting in these areas is approved per Army Regulation 385-63, *Range Safety*.

A high hazard rating means that the government has been unable or it is not feasible to reduce the unexploded ordnance hazards. The area contains hazards that cannot be mitigated by training or safety measures. All personnel are prohibited from entering hazardous areas without proper authorization. Under no circumstances will firefighters or Soldiers enter designated high hazard areas to fight fires.

C2.2.3.1.2 Fire Response Planning

Fire planning is a continuing process. Most fire planning is based on five years of records including both fire weather and fire occurrence. The fire reporting system at USAG-AK has been improved with the addition of the weather stations, which provide daily weather data collection, and WeatherPro™ software that automatically archives weather data that can be analyzed for fire planning purposes. Combining this information with fire occurrence data can improve the efficiency with which USAG-AK can staff its response resources. Based on fire occurrence data and response time, fire managers can determine if existing fire control forces are adequate and if additional suppression forces will be needed.

The installation Range Office can also determine if additional training restrictions need to be imposed as a result of unfavorable fire danger ratings or, conversely, if the Fire Danger Rating System restrictions are too tight. This kind of planning, based on experience with the fire danger, allows fire managers to fine tune the Fire Danger Rating System and associated restrictions over time.

Fire Danger Rating System data can also be worked into the Geographic Information Systems computer database. By putting spatial data in an integrated system where it can be organized and analyzed, fire managers will be able to find patterns and relationships to increase efficiency in the decision-making process. Response times, suppression success, and risk factors can all be combined to determine what locations and times require more or fewer suppression resources. In addition, fire managers need to analyze such things as the adequacy of detection to determine if fires are reported while they are small enough to control (U.S. Army Hawaii 2003).

C2.2.3.1.3 Pre-Suppression Priority

Pre-suppression priorities for USAG-AK lands are established by this Integrated Wildland Fire Management Plan component of the Integrated Natural Resources Management Plan. Pre-suppression priorities are shown for each training area in Volume IV, Prescriptions.

The Alaska Wildland Fire Management Plan established four fire management options to be used by land owners to determine pre-suppression priorities: Critical, Full, Modified, and Limited. Land managers may select among these options for different parcels of land, based on evaluation of legal mandates, policies, regulations, resource management objectives, and local conditions (Alaska Wildland Fire Coordinating Group 1998). The fire management options are:

> Critical Management Option – These lands receive maximum detection coverage and are given highest priority for attack response, which is immediate and aggressive. Land owners/managers

are notified of the situation as soon as possible. These areas receive priority over adjacent lands and resources in the event of escaped fires.

Full Management Option – Areas receive maximum detection coverage as well as immediate and aggressive initial attack response. If initial attack is successful, or the fire is controlled within the first burning period, special agency notification is not required. If the fire escapes and requires additional suppression, affected land owners/managers are notified to develop further fire suppression strategies.

Modified Management Option – This option provides a level of management equivalent to full or limited, depending on conditions. The level of management is assigned on an annual basis each summer. A high degree of protection is provided during critical burn periods, but decreases as risks are diminished. Initial attack action is based on the potential for damage, constraints on affected land, and/or discussions with the land owner/manager. If there is no initial attack, the land owner/manager is informed of the fire status daily, and unmanned fires are monitored.

Limited Management Option – This option is used in areas where the resources at risk do not warrant the expense of suppression or in areas where natural fire is important to ecosystem sustainability. Fires within these areas receive routine detection effort. Attack response is based on the need to keep the fire within limited management option areas and the need to protect critical sites. Land owners/managers are immediately notified of the fire situation, and the status of unmanned fires is monitored.

In addition, another additional fire management option category has been developed specifically for lands managed by USAG-AK.

Restricted Areas or Hot Zones – These areas include impact areas and other locations where no "on the ground" firefighting can be accomplished due to danger of unexploded ordnance. High hazard impact areas are managed as hot zones with limited management. One small arms range that extends onto withdrawal lands on Fort Wainwright's Yukon Training Area is also listed as a hot zone. Fire in these areas is suppressed through backburning and aerial-dropped retardants (Alaska Wildland Fire Coordinating Group 1998).

Boundaries between management options should be readily identifiable from both the air and on the ground throughout the fire season and also be feasible for potential placement of suppression control lines. The absence of readily available boundaries should not result in providing protection to very large geographic areas when the land manager only wants to protect a small area or specific site. Any management option may border against any other management option. Either the suppression organization or land managers may make recommendations for relocating or reinforcing fire management option boundaries through prescribed fire or mechanical methods. Only the land managers can approve boundary changes or boundary reinforcement activities for the lands they manage. Consensus between land managers adjacent to proposed fire management option boundary changes should be attempted to minimize establishing boundaries that reflect administrative unit boundaries or creates boundaries that are not operationally or ecologically feasible. Hazard reduction plans may be developed to reinforce fire management option boundaries. Any reinforcement activities will be reviewed by the suppression organization, but can only be authorized by the land managers.

The land managers determine the fire management option for the lands under their jurisdiction. An essential attribute of the fire planning effort in Alaska is providing the land managers with the flexibility to change the fire management option for lands they manage as warranted due to changes in land use,

protection needs, laws, mandates or policies. The suppression organizations are encouraged to suggest option changes to land managers based upon suppression concerns.

To accommodate changes in the map atlas and distribution of maps, land managers are encouraged to make changes in their selected fire management option boundaries between September 30 and March 1. All changes should be recorded on the map atlas by April 1. Fire management options boundaries should not be changed during the fire season. However, if a change of the selected management option is requested and can be accommodated by all affected land managers and the suppression organization, it may be accepted and recorded on the map atlas outside the aforementioned time period.

C2.2.3.1.4 Responsibilities

The Directorate of Public Works, Environmental Department, Conservation Branch is responsible for preparing and updating this Integrated Wildland Fire Management Plan, coordinating project funding, and conducting land management responsibilities on all USAG-AK lands, to include:

- Hazard fuel reduction projects
- Fuels maps
- Compliance with cultural resource issues
- Compliance with Integrated Natural Resource Management Plan
- Wildland fire crew to carry out hazard fuel reduction projects, wildfire prevention, and fire suppression on an as-needed basis
- FireWise program with adjacent private land owners and public relation activities
- Determine landscape fire management options according to the Alaska Interagency Wildland Fire Management Plan
- Attend fall fire review meetings
- Completes Wildland Fire Situation Analysis process during wildfires
- Acts as a resource advisor during wildland fires
- Risk assessments for military lands and structures on training lands
- Fire history
- Ecosystem management considerations
- Burned area rehabilitation
- Pre and post wildland fire monitoring requirements
- Fuels and weather monitoring
- Fire planning

The USAG-AK Directorate of Emergency Services, Fire Department is responsible for developing fire indices on a daily basis during fire season. The fire department also provides initial response and limited suppression activities. Under an Inter-Service Support Agreement, Fort Greely provides initial response and fire suppression on Donnelly Training Area. The Bureau of Land Management, Alaska Fire Service maintains firefighter training records, acts as the prescribed fire program manager and conducts wildfire suppression on Fort Wainwright and Donnelly Training Area. Under an agreement with the Bureau of Land Management, the State of Alaska Division of Forestry provides fire suppression on Fort Richardson.

C2.2.3.2 Prevention

Fire prevention activities include fire prevention education, enforcement, engineering, the Fire Danger Rating system, automated weather stations, and ignition control policy.

C2.2.3.2.1 Fire Prevention Education

All commanders, directors, natural/cultural resource managers, and fire managers have a role in developing fire prevention orientation and training programs to educate the users of USAG-AK lands. In coordination with Range Control and resource protection managers, fire prevention orientation and training programs will be designed and implemented to explain wildfire ignition potentials, probability of escape, impact on natural resources, and the threat to high value areas within and outside of each installation. USAG-AK and Bureau of Land Management Alaska Fire Service will actively implement an education and notification process relating to wildland fire for military personnel, the public and adjacent landowners. Range Control will be notified when fire danger is high. Wildland fire prevention and awareness will be taught to troops at their annual Range Certification Class. The FireWise program will be made available to adjacent landowners along the military's urban/wildland interface. During the spring each year an article will be written for the Alaska Post newspaper addressing wildland fire prevention and awareness. During ongoing wildland fires, articles and news releases will be written and released to Range Control, the media, and the Public Affairs office in a timely manner. Public information notices will be issued at least two weeks in advance of all prescribed fires in newsprint and radio. Each spring the Bureau of Land Management will host public information meetings in Anchorage, Fairbanks, and Delta describing proposed prescribed burning projects for the summer.

C2.2.3.2.2 FireWise Program

The FireWise program was established nationwide to convey information to private homeowners on how to protect their property from wildfires. The FireWise program mainly focuses on the urban/wildland interface, both on Army lands and on adjacent property owners. USAG-AK has adopted the FireWise principles to evaluate and protect range structures and cantonment area buildings. USAG-AK has also implemented the FireWise program to inform adjacent landowners on how to protect their property from the risk of wildfire. USAG-AK's FireWise program strives to reduce wildfire starts on adjacent property which then have to potential of spreading onto to Army lands, damaging valuable training areas. USAG-AK also implements an aggressive hazard fuel reduction program to reduce the threat of wildfires starting on Army lands and spreading to adjacent landowners. Adjacent lands ownership is updated annually by going through state and borough land ownership records. The records are added to a Geographic Information System database with attributes relating to owner, contact information, and structures present.

C2.2.3.2.3 Enforcement

Enforcement is a very important component of an effective fire prevention program. Enforcers of wildfire prevention include Range Control staff; land management staff, fire management personnel, law enforcement personnel (military police and game wardens) and all commanders, their staff and leaders at all levels. The Range Control staff has the responsibility for ensuring that all regulations and standard operating procedures are adhered to in accordance with U.S. Army Alaska Regulation 350-2. Range Control has authority to stop live-fire training for noncompliance with any regulation or standard operating procedures. Range Division range inspectors; maintenance, integrated training area management personnel, Directorate of Public Works Environmental, Real Estate and Grounds staff have the responsibility to report fires and/or any observed noncompliance with fire prevention procedures to Range Division safety staff. Commanders and managers must be aware and involved in fire prevention to ensure compliance with the requirements of the Wildland Fire Management Program.

Existing military training regulations and standard operating procedures cover training activities and restrictions based on specific fire danger ratings. However, communication and enforcement of these restrictions even at the lowest levels is necessary to make them effective. Supervising personnel will be held accountable for knowing and implementing these restrictions. Range Control managers and safety technicians who manage the training areas are also accountable.

Public laws, Army regulations, the Commanding General's command policies/guidance, and range directives outline individual responsibilities and accountabilities for enforcement of fire restrictions and implementation of the Integrated Wildland Fire Management Plan. This information must be passed along by the commander and supervisor and discussed in training sessions given to individuals using Army land. In order to effectively control ignitions to the maximum extent possible, the installation must ensure that the necessary precautions are followed and that there is strict enforcement and accountability for violations. Though the burden for enforcement will largely fall upon Range Control, it is ultimately the responsibility of all users of USAG-AK lands to prevent fires and enforce fire prevention regulations. Wildland fire prevention is similar to personnel safety – everyone has a responsibility to prevent its occurrence. All personnel must know and understand the fire prevention procedures.

C2.2.3.2.4 Engineering

Engineering involves the alteration of a range design/alignment or physically disrupting the fuels to reduce the likelihood of a fire starting or to reduce its effects if one does start. This can be accomplished by eliminating fire causes biologically, mechanically or chemically through reduction of available fuel loads, improving access for fire apparatus, increasing water resources available on site, adjusting target placement, and providing buffer or safety zones.

Engineering activities include the construction of fuel breaks and firebreaks and recognized fuel modification programs (i.e., prescribed burns, mechanical/chemical treatments and mowing) to minimize the threat of fires. Engineering activities will be coordinated among all the Army's land and fire managers to include appropriate National Environmental Policy Act documentation, and Section 7 and Section 106 consultation, as required.

Coordination is essential as engineering activities may result in restricted operations and total or partial closure of the training ranges. A work plan, identifying engineering projects by priority, will be developed. This process will ensure that engineering projects can be completed and will eliminate any conflicts between the required maintenance of the ranges and military training activities. The Range Planner and the Wildland Fire Program Manager shall collaborate to develop an annul work plan facilitating maintenance of all required wildland fire infrastructure.

C2.2.3.2.5 Fire Danger Rating System

Limiting military activities according to fire danger reduces the likelihood of starting a fire. Certain military activities are restricted when thresholds of risk are reached. The USAG-AK Fire Department collects weather readings during fire season from remote weather stations located in the training areas. Weather readings, along with other fire danger parameters, are used to calculate the fire danger rating. The fire danger rating is used on USAG-AK lands to reduce the risk of wildfire. The fire department provides the rating to Range Control, which restricts the use of munitions and pyrotechnics as the fire danger increases.

The Fire Danger Rating System is outlined in U.S. Army Alaska Range Regulation 350-2. The system follows the Canadian Forest Fire Danger Rating System and utilizes the Fire Weather Index. Fire Weather Index is calculated and translated into low, moderate, high or extreme by the fire department. Each level on the scale corresponds to training restrictions. The Directorate of Plans, Training, Mobilization and Security Range Control is responsible for conveying and implementing the Fire Danger Rating System to the Soldiers. Fire Weather Index calculations are based on weather observations from Remote Automated Weather Stations established in all of the major training areas. The Fire Weather Index is calculated May through September. Waivers for training restrictions established by the Fire Weather Index are granted by Range Control after consulting with the USAG-AK Fire Chief and the Bureau of Land Management, Alaska Fire Service Military Zone Fire Management Officer. Interpretation of the indices is necessary as no single index gives a complete picture of the fire danger.

The Canadian Forest Fire Weather Index System consists of six components that account for the effects of fuel moisture and wind on fire behavior. The first three components, the fuel moisture codes, are numeric ratings of the moisture content of litter and other fine fuels, the average moisture content of loosely compacted organic layers of moderate depth, and the average moisture content of deep, compact organic layers. The remaining three components are fire behavior indices, which represent the rate of fire spread, the fuel available for combustion, and the frontal fire intensity; their values rise as the fire danger increases.

Calculation of the components is based on consecutive daily observations of temperature, relative humidity, wind speed, and 24-hour rainfall. The six standard components provide numeric ratings of relative potential for wildland fire. The Fine Fuel Moisture Code is a numeric rating of the moisture content of litter and other cured fine fuels. This code is an indicator of the relative ease of ignition and the flammability of fine fuel. The Duff Moisture Code is a numeric rating of the average moisture content of loosely compacted organic layers of moderate depth. This code gives an indication of fuel consumption in moderate duff layers and medium-size woody material. The Drought Code is a numeric rating of the average moisture content of deep, compact organic layers. This code is a useful indicator of seasonal drought effects on forest fuels and the amount of smoldering in deep duff layers and large logs. The Initial Spread Index is a numeric rating of the expected rate of fire spread. It combines the effects of wind and the Fine Fuel Moisture Code on rate of spread without the influence of variable quantities of fuel. The Buildup Index is a numeric rating of the total amount of fuel available for combustion. It combines the Duff Moisture Code and the Drought Code. The Fire Weather Index is a numeric rating of fire intensity. It combines the Initial Spread Index and the Buildup Index. It is suitable as a general index of fire danger throughout the forested areas of Canada and Alaska. Table C2-11 is used to guide the fire manager to make accurate determinations.

Table C2-11. Fire Danger Rating Parameters for Military Ranges.

	LOW	MODERATE	HIGH	EXTREME
Fine Fuel Moisture Code	<77	77-86	86-94	>94
Duff Moisture Code	<70	70-80	80-90	>90
Drought Code	<150	150-300	300-400	>400
Initial Spread Index	<2	2-5	5-10	>10
Buildup Index	<60	60-70	70-80	>80
Fire Weather Index	<3	3-12	12-22	>22

NOTE: These are only guidelines and an informed determination will take interpretation. Example: Drought Code may be extreme while Fine Fuel Moisture Content is low and Duff Moisture Code is moderate. It would be logical to place the fire danger at moderate, if the weather trend is toward warm and dry, because Fine Fuel Moisture Content will change quickly to moderate and perhaps even high.

The fire chief has the responsibility for the computation and dissemination of the fire index on a daily basis during fire season. It is disseminated to each post Range office daily, is applicable to that particular area, and is valid for 24 hours. The Bureau of Land Management, Alaska Fire Service provides the fire chief with the information used for computation of the fire index. This information is provided by a series of remote sensors located in each of the respective range areas and provides timely, accurate information regarding the index conditions. Range Control is responsible for obtaining the daily index and

disseminating that information to units using the range. The specific methodology for computation of the fire index and other technical aspects of this program will be coordinated annually in a Memorandum of Agreement between USAG-AK Installation Range Office, the Bureau of Land Management, Alaska Fire Service, the USAG-AK Fire Chief and the United States Air Force. The instigation for this Memorandum of Agreement has an annual suspense of 1 April.

Seasonal fire hazards caused by dry weather may restrict use of tracer and other potentially incendiary ammunition. Units using ranges, training facilities, and training areas are responsible for knowing the daily fire danger rating and adhering to the restrictions in U.S. Army Range Regulation 350-2. This information is available from each Range Control office. Regardless of the season, trainers must ensure that flame-producing pyrotechnics are not used on or near fuels that may start a forest or range fire. Throwing away cigarettes, matches, or other burning materials is prohibited.

Table C2-12. Fire Danger Rating Restrictions.

Fire Danger Rating	Restriction
Low	• No restrictions.
Moderate	• Ball and blank ammunition may be used without restrictions. • Pyrotechnics, including smoke, trip flares, and tracers are prohibited in training areas, unless the pyrotechnics are used in a container that completely contains all burning elements of the device. An example of this would be using a cut-off drum to contain a smoke grenade. Any device used will be observed until the pyrotechnic is completely burned to ensure no fire is ignited outside of the container. • No restrictions in Stuart Creek Impact Area. • No restrictions in the Delta Creek Impact Area. • Air Force restrictions: (1) Flares or foreign equivalent will be deployed above 1,500 feet above ground level, and (2) Inert ordnance, cold spot BDU-33s, or foreign equivalent will be used on the Oklahoma, Washington, and Mississippi impact areas at Donnelly Training Area and Blair Lakes.
High	• Ball and blank ammunition may be used without restriction. • Non-aerial pyrotechnics permitted on the small arms complex only. All other use of pyrotechnics is restricted. • No pyrotechnic ammunition may be used Stuart Creek and Delta impact areas. • Ground units will carry required firefighting equipment. • Air Force restrictions. (1) Flares or foreign equivalent will be deployed above 5,000 feet above ground level, and (2) Inert ordnance, cold spot BDU-33s, or foreign equivalent will be used on the Oklahoma, Washington, and Mississippi impact areas at Donnelly Training Area, Stuart Creek Impact Area at YTA, and Blair Lakes.
Extreme	• Ball and blank ammunition used is restricted to the small arms complex. • Use of any pyrotechnics is prohibited. • No pyrotechnic ammunition may be used Stuart Creek and Delta impact areas. • Ground units will carry required firefighting equipment. • Air Force restrictions. (1) Flares or foreign equivalent will be deployed above 5,000 feet above ground level, and (2) Inert ordnance, cold spot BDU-33s in all

	impact areas.

Only in rare circumstances may units request a waiver to these restrictions. Waivers to this portion of U.S. Army Alaska Regulation 350-2 represent a direct liability to the Command in terms of the cost for fighting any fire that results from a waived condition. Due the extremely high cost in terms of operations/training dollars, all requests for waiver will be carefully evaluated before approval is granted. Only those training activities that significantly impact the overall readiness of the command will be considered for waiver. Authority for waivers of fire-index restrictions rests with the commanding general of U.S. Army Alaska and has been delegated to the U.S. Army Alaska Deputy Chief of Staff for Operations and Training G-3. The local range manager will provide a staff recommendation to the Installation Range Office for G-3 consideration in approving any waivers. Units requesting waivers are primarily liable for costs associated with any fire that results under a waiver. USARAK is ultimately responsible for all costs associated with fighting fires resulting from waived conditions.

C2.2.3.2.6 Remote Automated Weather Stations

Currently there are five fire weather stations located across USAG-AK training areas: Fort Richardson Small Arms Complex, Fort Wainwright Small Arms Complex, Manchu Range in the Yukon Training Area, Bolio Lake in Donnelly Training Area, and Donnelly Drop Zone in Donnelly Training Area. There are also fire weather stations located on the cantonment areas at Fort Richardson, Fort Wainwright, Fort Greely, and Eielson Air Force Base. Two additional weather stations are planned for Oklahoma Impact Area in Donnelly Training Area and Stuart Creek Impact Area in the Yukon Training Area. Data from the weather stations are used to calculate the fire danger rating.

C2.2.3.2.7 Ignition Control

Ignition control is accomplished primarily through the enforcement of the fire danger rating system by controlling the use of classes of ammunition and pyrotechnics that have higher fire hazards associated with their use. The fire danger rating is provided to Range Control, which restricts the use of munitions and pyrotechnics as fire danger increase. Open burning requires a permit, except for small warming fires (Army Environmental Handbook 2000). All fires may be prohibited during extreme fire danger conditions, check with Range Control for any restrictions. These restrictions apply to both Army and Air Force units.

C2.2.3.3 Fuels Management

Wildfire danger can be reduced through the management of fuels. USAG-AK conducts fuel management by conducting fuel hazard assessments and by constructing and maintaining a combination of fuel breaks and firebreaks through the mechanical removal of fuels and through prescribed burning.

C2.2.3.3.1 Fuel Hazard Assessments

Wildfire fuel hazard assessments for structures are performed to standards set by the FireWise program (FireWise 2002). All vegetation should be actively managed to reduce fire risk within 30 feet of a structure. Trees should be pruned and spaced at least 10 feet apart out to 100 feet from a structure. Standard assessment forms are used to survey structures. The forms were developed by the Bureau of Land Management, Alaska Fire Service and look at vegetation, building material, location and hazardous material storage. Assessments are updated annually with new structures. Structures are visited on a five-year rotation system. Assessment data is stored in a database that is linked to a Geographic Information System with aerial and ground photos of the structures.

Fuel assessments at a landscape scale look at vegetation flammability, weather, historical fire patterns, fire behavior and proximity to values at risk. Areas with continuous black spruce leading to high value locations receive the highest concern. Wildfire vegetation fuels maps are updated annually along with

forest stand maps. The fuels maps reside in a Geographic Information System and are updated using wildfire and prescribed fire history data, construction and land clearing overlays, aerial photos, and ground truth plot information. Fuels maps are used for wildfire and prescribe fire planning, military training range location, and hazard fuel assessments. Fuels maps follow the Canadian Fire Behavior Prediction System fuel types (Forestry Canada Fire Danger Group 1992). In fire-prone areas, climate, human activity, and types of vegetation (or fuels) determine the level of wildland fire risk. Common fuels found on USAG-AK include the following (Musitano and Hayes 2002):

Black spruce – These stands are highly flammable and are generally located in wetter and cooler sites. Crown fires are common and typically result in extensive mortality.

White spruce – White spruce is less flammable and located in generally warmer and drier sites. Crown fires may occur during drought conditions.

Mixed spruce/hardwood stands – In these stands the conifers are generally white spruce with black spruce sometimes present. Black spruce is highly flammable and conducive to crown fire. White spruce is less flammable and less conducive to crown fire. The associated hardwoods are generally less flammable and may include birch, aspen, and/or cottonwood. Surface fuels include mosses, lichens, leaf litter, grasses, and shrubs. Fires in these mixed stands are generally of moderate intensity.

Bluejoint Reedgrass (Calamagrostis canadensis) – This species occurs in patches on all USAG-AK lands. It may occur in association with hardwoods, mixed forest stands, or may predominate in clearings. Fires with this grass start easily, spread quickly, and burn intensely when conditions are right.

Tundra – In these areas, very flammable grasses dominate. Dwarf birch and willow may be present and are generally highly flammable, especially if they have a high lichen content. In alpine tundra, short shrubs, mosses and lichens dominate. Vegetation in these areas is moderate to highly flammable.

C2.2.3.3.2 Fuels Modification

Fuels modification is defined as removing and/or modifying an area or wide strip of flammable vegetation. Fuel modification can provide a reduction in radiant and convective heat, thereby providing fire suppression forces a safer area in which to fight the fire.

Fire hazard is managed by changing the vegetation type. The goal is to maintain a fuel condition that makes fires easier to control. Maintenance treatments are necessary because the flammable biomass will grow back over time, thus making fires more difficult to suppress.

The following methods, in order of decreasing effectiveness, are used to achieve lower fuel loading or a more manageable fuel matrix. A mixture of these techniques is often used in fuel management:

Reducing total amount of fuels so that there is not enough or as much to burn is the first method. Examples of reducing total fuels are prescribed burning, mechanical or chemical removal. The second method to achieve lower fuel loading is manipulating the spacing of vegetation (both horizontally and vertically) so that it is difficult for fire to spread. Examples of spacing include mowing, grazing, or masticating. The third method is to decrease the flammability of fuels by increasing the moisture of the vegetation or by changing the vegetation to less flammable species. This can be accomplished by watering, but this technique is only applicable for very small plots of land, such as around an individual house. More often this is accomplished by partially or totally replacing the fuels with fire resistant plants.

There are four categories of fuel modification treatments that can accomplish these objectives, including prescribed burning, mechanical treatments, chemical treatments and biological treatments. The methods

used in fuel modification, fuel breaks, and firebreaks will vary due to terrain and acreage, and the shapes of areas to be treated. In many situations, a combination of these treatments is applied.

Prescribed burning reduces the volume of fuel through combustion. Fuel material can be ignited by hand or by mechanical devices at some distance from the site (i.e., helitorch, aerial firing device, etc.). Burning generally takes place when conditions permit adequate combustion as well as control. Prescribed burning is executed by qualified individuals under precise weather conditions and after extensive precautions are taken, such as installing firebreaks or control lines. Prescribed burning is the fastest, most complete, and most cost-effective fuel removal treatment available. However, it generates many concerns over the chance of escape as well as air quality impacts. Coordination and notification of interested parties are major tasks. The Army has successfully conducted prescribed burns on Army training lands in the past.

Mechanical treatments rip up, bury, flail, or cut down vegetation and rearrange the fuel structure. Mechanical treatments generally involve the use of a bulldozer or tractor with a variety of attachments, such as a blade, large chain, rollers, a cutting (or pushing) blade, or a disker. These attachments scrape or break off the vegetation, beat up and crush or cut the fuel into small pieces, or bury the pieces. It reduces the fuel height and thus reduces the intensity of a grass fire. Mowing is especially effective in increasing the ease of fire control if it takes place just inside the firebreak. Mowing is done by a tractor (usually with a rotary or flail mower attachment) in areas of grass and typically carried out by contract or range maintenance personnel. Hand labor is a subset of mechanical treatment, where human labor is used instead of mechanized equipment. Its primary disadvantage is its labor cost, but in certain situations there is no other viable alternative.

Chemicals such as herbicides and growth retardants can prevent seeds from germinating and kill mature fuels. Chemicals can be applied by hand, with a truck/tractor sprayer, or aerially. Vegetation is not removed, but further growth is stopped. Where plants are killed, the standing vegetation presents a temporarily increased fire hazard until the plant material decays. Thus, the fuel volume is not decreased immediately by this treatment, but will slowly be reduced by decomposition. It is essential that treatment frequency be high enough to prevent significant growth in the interim periods. Chemical treatments that reduce or prevent growth are most desirable. The choice of herbicides depends on the environmental setting, effectiveness on the vegetation in question, and the consequences for native species and human health and safety. While it can be an effective and efficient method, chemical control may not be appropriate in all settings.

Biological treatments are the introduction of a biological control measure to counteract the undesired fuels. These measures can include the deliberate introduction of other plants or insects that will replace, modify or retard the undesired fuels. Simple biological treatments may be the introduction of fire resistant native or alien plants to out-compete undesired fuels. Creating a vegetative fuel break is a common means of a simple biological treatment, though it is not an effective means of fire control in all situations. Another example is the introduction of a species of plant(s) to shade out or out-compete undesired fuels in a controlled area. Grazing is another form of a simple biological control. Livestock such as cattle, goats, horses, and sheep are most commonly used. It is only effective in non-forest fuels where the vegetation is palatable to livestock. The livestock consume the vegetation, thus keeping the amount of fuel in check. Goats prefer forbs and shrubs, but will also eat grass, whereas cattle and horses will eat primarily grass. Sheep will eat both forbs and grass. Steep slopes can be grazed by goats, sheep, and horses, but cattle prefer not to graze slopes over 30%, making them ineffective in mountainous terrain. Livestock control requires extensive enclosures and many times is not cost effective. Complex biological measures involve organisms that will directly destroy the targeted vegetation. Normally these types of treatments are strictly implemented, monitored and tightly controlled and must be coordinated with multiple agencies because they involve the introduction of a non-native biological organism.

C2.2.3.3.3 Fuel Breaks, Firebreaks, and Natural Barrier Systems

USAG-AK maintains a fuel break/firebreak system on locations with the highest wildfire risk to minimize the spread of fires. If a wildfire escapes the initial attack, fuel breaks and other fuel modification areas provide the most logical location for fire containment lines. Well-maintained fuel breaks and fuel modifications provide defensible space that aids in wildfire containment. Incorporating them into wildfire pre-suppression planning, initial attack responses, and resource deployment strategies can enhance the effectiveness of fire suppression. They also provide follow-up resources with a quick alternative attack strategy and a place to assemble that has been designated in advance and is well documented and mapped.

Fuel breaks are defined as strategically located blocks or strips within which vegetation has been manipulated to reduce fuel volume or flammability as an aid to fire control. Fuel breaks are most effective if they are linked to other natural or man-made fire containment barriers. Drivable fuel breaks, or fuel breaks that have periodic access, are an important part of a successful fuel break system. Additionally, a fuel break system encompassing a large area is much more effective than an isolated single fuel break or small segments of fuel breaks. Fuel break widths are determined by fuel type, terrain features, and expected fire weather conditions, especially wind direction and speed. Generally, the wider the fuel break, the higher the probability and safer the task of containing the fire.

Fire fuel break establishment consist of the following procedures. Breaks can be created using hand thinning or tree removal techniques mentioned in the hand thinning section. Hand line/trenches may be dug to mineral soil using hand tools. Fuel breaks created with hand thinning are usually 15 - 120 feet wide. Breaks can be created using dozers with shear-blades and or straight blades. Vegetation is sheared or pushed over and windrowed or pushed into piles. The duff and or organic matter are rolled up into the windrows or piles to expose mineral soil. Piles and windrows are burned following stipulations outlined in a burn plan. The soil may then be disked, creating furrows to enhance hardwood and shrub re-vegetation. Fuel breaks created with dozers are usually 15 - 30 feet wide. Breaks can be created using hydro-axes with masticating and rotary blades. Vegetation is chopped up into pieces. Masticating heads incorporate vegetation with the duff and organic layers of the soil. The soil may then be disked, creating furrows to enhance hardwood and shrub re-vegetation. Fuel breaks created with hydro-axes are usually 15 - 30 feet wide.

Fuel breaks provide safe access for firefighting personnel and equipment. Firefighters can be rapidly positioned along these predetermined fire control lines. The low volume fuels within the fuel break, can be fired out (black lined) quickly to further widen an existing firebreak or quickly create a new one under conditions where backfiring operations would be impossible in the adjacent dense vegetation. In situations where the vegetation within the fuel break is not too dense, the fuel break can be used to anchor a backfire, thus allowing a wide backline to be established between the fire and the fuel break.

Fuel breaks normally will not stop the head of a fast spreading, high intensity wildfire that has the potential for long distance spotting. In this situation, the overall fuel break system aids firefighters in the containment of the flanks, rear of the wildfire, and/or reducing the size of the main fire front. If time permits, they may also provide a location from which to backfire, potentially slowing or stopping the advance of the main fire.

Fuel breaks will only remain effective if they are continually maintained. The condition of the fuel break and vehicle accessibility will be reviewed annually to determine necessary maintenance. Fuel breaks shall be cleared at the end of the growing season, before the grasses dry and add to the dead fuel load in the area.

Firebreaks are defined as cleared-to-mineral-soil fire control lines. Similar to fuel breaks, to be effective, firebreaks must be maintained each year prior to potential use in fire control. Firebreaks will be 6 to 10

meters in width or more, but will sometimes be constrained by terrain. An annual preventive maintenance schedule for all designated firebreaks will be implemented. During construction and maintenance, all berms should be removed to the extent necessary to minimize erosion. Water bars are to be installed at all natural watercourses on firebreaks, except where permanent drainage structures are provided.

Natural fire barriers (i.e., barren lava, rivers, streams, roads, etc.) can be used as a control line to stop the spread of fire. A natural barrier is defined as any area where a lack of flammable material obstructs the spread of wildfires. An indirect attack strategy may involve the withdrawal of fire suppression resources to roads, trails, and other natural fuel breaks. The fuel between these barriers and the fire can be burned out or backfired if necessary.

Fuel management corridors are much wider than fuel breaks but do not include any road infrastructure. These are designed around existing natural fire barriers that may become overgrown with vegetation in the future. The corridor is monitored for encroaching vegetation and management is initiated when it reaches a threshold level. Fuel management corridors are designed to slow or even stop a fire. At a minimum, they provide an area in which fire intensity is much lower than the surrounding vegetation, much the same as a fuel break.

Fire and fuel break effectiveness in the event of a wildfire depends on regular maintenance. Standards will be adhered to wherever terrain permits. In some locations slope, drainages, or other factors may make these standards unreasonable. In these situations, the standards will be met to the greatest extent feasible.

C2.2.3.4 Use of Prescribed Fire

Prescribed burning is defined as the controlled application of fire under specified environmental conditions that allow the fire to be confined to a predetermined area while at the same time producing fire behavior required to attain resource management objectives. Because of the potential for unintended circumstances, extensive planning, coordination, and risk management must be completed prior to ignition of any prescribed burn. Prescribed burns also mimic the important ecosystem functions of wildfire while reducing risk to human environments and other resources. USAG-AK, in cooperation with the Alaska Fire Service, conducts prescribed burns on its installations to improve wildlife habitat, to decrease the potential for ignitions and fire escape from live firing, and to increase the size of military training areas.

The Army recognizes two types of prescribed fires: (1) those ignited by qualified personnel in accordance with an approved prescribed burn plan, and (2) wildfires managed under prescribed conditions as addressed in an approved Integrated Wildland Fire Management Plan.

The opportunity to conduct prescribed burns in Alaska is usually limited to May, between snowmelt and spring growth of plants. Often this period is very wet, which makes burning difficult. Fall is another time of the year when burns can be accomplished, but the burning window in the fall is narrower due to weather and personnel constraints. Another limiting factor is that winds must be low to prevent smoke from entering urban areas. The Alaska Fire Service prepares the burn plans for USAG-AK. These plans are used to evaluate conditions and minimize the risks associated with prescribed burning.

C2.2.3.4.1 General

Prescribed burning is an effective and efficient means to reduce or prevent the accumulation of hazardous fuels, where permitted, and will be used as a recognized land management practice for natural resources management and fire protection. The decision to use prescribed burning will be based on the safety hazard involved, the hazard that will develop if burning is not accomplished, the type of natural habitat

involved, the impact on the areas total ecosystem, and applicable state and local regulations and coordination with installation fire departments (Army Regulation 200-3).

In the process of developing practical fuel reduction programs, fire managers will consider the use of prescribed fire. When applied in a safe, carefully controlled situation, it is often the most cost-effective means of achieving management and natural resource objectives. Consideration will be given to prescribed fire to protect habitats, natural resources, and capital improvements as well as reduce hazardous fuels, construct and reinforce fuel breaks, and control alien plants. Well placed prescribed burning units can help prevent large wildfires or slow their advance.

Prescribed burning on Army training lands will only be executed by qualified individuals. A National Wildland Coordinating Group certified prescribed "Burn Boss" must supervise all prescribed burns. The Burn Boss has the responsibility to make the on-site, tactical "go, no-go" decisions and ensures all prescription, staffing, equipment, and other prescribed burn requirements are met before and during the burn.

Individual prescribed burns are required to have plans and appropriate National Environmental Policy Act documentation prepared after coordination between the Bureau of Land Management/NFO, the Natural Resources Branch, and the Fort Wainwright Fire Department occurs. Alaska Fire Service prepares the burn plans for USAG-AK. Burn plans are used to evaluate and minimize risks associated with prescribed burning and include how the fire will be set. At a minimum, burn plans will include the following:

- Burn objectives.
- Acceptable weather and fuel moisture parameters.
- Required personnel and equipment resources.
- Burn area map.
- Smoke management plan.
- Safety considerations.
- Pre-burn authorization/notification checklist.
- Coordination to consider wildlife, endangered species, cultural resources, and noxious weed effects.
- Alternative plan to cover plan of action if wind direction changes during prescribed burn.
- Plan for analysis of burn success and identification of lessons learned.
- When planning for prescribed fires, and when suppressing wildfire, utilize natural and existing man-made features whenever possible. Firebreaks must be constructed, maintained, or rehabilitated to prevent erosion.

The prescribed burning window is very narrow, particularly during spring between loss of snow cover and green-up, usually occurring in May. Often this period is very wet, which makes burning difficult. Fall burns are another option but the weather window is very narrow and resource availability is limited. In addition, winds must be such that they do not blow smoke into urban areas, which further narrows the window. It is difficult to long-range plan prescribed burning due to weather, military training, and availability of resources. An air permit from the Alaska Department of Environmental Conservation is required for any burning as well as National Environmental Policy Act documentation.

C2.2.3.4.2 Objectives

The primary objective is to use management-ignited or training-ignited prescribed fires in a safe, carefully controlled, and cost-effective manner as means of achieving fire management objectives. Management-ignited prescribed fires, often referred to as simply "prescribed fires," are defined as intentionally set fires used to achieve a resource management objective. Training-ignited prescribed fires are defined as fires

that are unintentionally started during normal military training, but are allowed to burn to achieve a predetermined resource management objective.

Prescribed fire may be used as a management tool to support mission needs and to attain the goals and objectives of the Integrated Natural Resource Management Plan, designed to implement the land management policies. Prescribed fires are used for silvicultural treatment of sites, preparation for reforestation, hazard fuel reduction, habitat enhancement, and insect and disease control. Prescribed fires are also used as a tool to reduce fuel loading on ranges where the risk of wildfire limits military training opportunities. Wildland fire escapement from impact areas are reduced through prescribed fires and mechanical treatments along the boundaries of impact areas. Burning often opens areas to additional military training options, particularly maneuvers that are hampered by dense cover.

C2.2.3.4.3 Procedures

Prescribed burning consists of the following procedures. A management-ignited prescribed fire burn plan must be completed for all prescribed burning projects in advance of ignition. A training-ignited prescribed fire burn plan must be in place prior to any declaration of any training-ignited fire as a training-ignited prescribed fire. In the prescribed fire/training-ignited prescribed fire burn plans, appropriate actions to take must be addressed if on-site conditions change and cause one or more prescription parameters to exceed acceptable limits. A prescribed fire that exceeds, or is anticipated to exceed, one or more prescription parameters and/or line holding capability must be declared a wildfire and cannot be re-delegated as a prescribed fire. At this point, appropriate suppression action must be taken.

Each prescribed fire must be conducted in compliance with the approved burned plan. Only trained and qualified personnel may be used to execute each prescribed burn plan. The number of resources required to safely achieve prescribed fire objectives must be based on the size and complexity of each project. Minimum manning will vary with the size and complexity of each prescribed burn. The Wildland Fire Program Manager must personally approve the prescribed fire/prescribed natural fire burn plan and any changes. Only in the absence of the Wildland Fire Program Manager may this responsibility be re-delegated.

When planning for prescribed fires and when suppressing wildfire, utilize natural and existing man-made features whenever possible. Firebreaks must be constructed, maintained, or rehabilitated to prevent erosion. When the burn prescription window is open, crews assemble at the burn unit. The edge of the burn unit is lit using hand lighting or aerial lighting techniques. Roads, trails or changes in vegetation types surround burn units and these features are utilized as fire lines. Next the interior of the unit is lit using hand lighting or aerial lighting techniques. The interior is lit using a systematic grid pattern. The mop-up process starts after the entire unit is lit. Mop-up consists of extinguishing all hot spots within a specified distance from the burn perimeter. During mop-up, burning trees and shrubs are cut down and extinguished. Smoldering sites are dug up with hand tools and extinguished. Water is applied on an as-needed basis during mop-up, either by backpack pumps, draft pumps, fire engines, or helicopter buckets. The final process involves monitoring the burn unit until the fire is completely out; this process can take anywhere from several days to several months. The Bureau of Land Management, Alaska Fire Service, State of Alaska, Division of Forestry, or the USAG-AK Fire Department working with the USAG-AK Natural Resource Office prepare burn plans and implement prescribed fires.

C2.2.3.4.4 Prescribed Fire Ignitions

Two types of ignitions are recognized on USAG-AK lands: management ignition, resulting in a management (deliberate) ignited prescribed fire and training ignitions, resulting in training-ignited prescribed fire.

Determination of prescribed fire complexity shall be based on an assessment of technical difficulty and potential consequences. Complexity shall be used to delegate approval authority, set standards for personnel staffing and skill requirements, and to determine the level of burn plan detail. Prescribed fire projects should be classified as Complex, Intermediate, or Basic. Burn complexity will be determined by the Wildland Fire Program Manager and shall be made in the context of existing or potential social, political, economic, biological, and/or legal consequences.

Complex prescribed fire is defined as those where prescribed burning occurs under particularly challenging conditions and/or constraints. This classification includes prescribed fires where the difficulty of achieving resource management objectives is high or where the consequences of project failure may be serious. All training-ignited prescribed fires shall be classified as complex fires. Intermediate classification includes prescribed fires where the difficulty of achieving resource management objectives is not particularly high or complicated and where the consequences of project failure are less serious and can be mitigated. Prescribed fires of basic complexity are defined as those where few constraints, other than the normal prescription parameters, exist. This classification includes prescribed fires where achieving resource management objectives is routine and the probable consequences of project failure are low.

C2.2.3.4.5 Prescribed Fire Burn Plan Requirements

A prescribed fire burn plan shall be completed for each management-ignited prescribed fire. Prescribed burn plans describe expected results and the conditions necessary to achieve them as part of a vegetation management program. It shall include all items outlined below. The detail needed should be commensurate with project complexity. If a given item is not applicable, it should be so indicated in the plan.

- A description of the burn unit's physical location, including a map.
- Identification of resource management objectives to be accomplished by the prescribed fire.
- Desired effects and tolerable deviations.
- Prescribed fire management of vegetation on Army training lands requires an understanding of the type, age class, condition, availability, and arrangement of the fuel that can impact the natural resources, structures, and soils. All prescribed burns must have measurable objectives. Monitoring must occur before and after each prescribed fire to document and verify that the stated objectives have been met.
- Project area description that includes unit and fuel descriptors.
- A fire prescription containing those key parameters needed to achieve desired results (i.e., acceptable fire behavior, acceptable limits of environmental elements) and provisions to record on-site conditions.
- The range of acceptable results expected, expressed in quantifiable terms.
- Prescribed burn plans shall include the following smoke management components: Actions to minimize prescribed fire emissions, evaluate smoke dispersion, public notification, air quality monitoring, and exposure reduction precautions. The Army fully supports the Clean Air Act (1967) and amendments to the Act (1972, 1977) to protect and enhance the quality of national air resources and to protect public health and welfare. The Army will comply with all applicable State of Alaska and local laws pertaining to prescribed burning and the acquisition of appropriate burning permit(s).
- Provisions for weather data collection, acceptable parameters, and forecasts.
- Provisions for public safety and protection of sensitive features.
- Provisions for inter/intra agency pre-burn coordination and, where applicable, public involvement and burn day notification to appropriate individuals, agencies, and the public. Prescribed burn plans will be coordinated with directorates to include: Bureau of Land

Management, Alaska Fire Service; Directorate of Public Works; USAG-AK Fire Department; Staff Judge Advocate; the Assistant Chief of Staff, G3, Directorate of Plans, Training, & Mobilization; and Installation Range Office. Technical experts from outside agencies (i.e., U.S. Forest Service, National Park Service, and State of Alaska, Division of Forestry) may review the Army's prescribed burn plans.

- Identification of the level of complexity of the fire and the appropriate organization needed. No less than the organization described in the approved plan shall be used to execute the burn. Minimum requirements for skill/knowledge element ratings of all elements of each position listed shall be stated. Describe the duties and responsibilities of positions within the organization.
- A communication plan.
- Provisions for line construction, pretreatment, and holding actions to keep the fire within prescription. Firing techniques, containment, patrols, and mop-up procedures are required. Holding actions must be defined in the prescribed burn plan. The burn plan will allow the Burn Boss to take limited holding actions on fires outside the planned perimeter. However, there must be defined limits in the amount and kind of holding that can be done before any fire is determined to have exceeded the approved plan and must be declared a wildfire. The limits of acceptable holding actions must be clearly stated in the prescribed burn plan. These limits must be defined as specific actions that can be taken, not general terms. If a prescribed burn accidentally crosses the prescribed perimeter, immediate action by the holding crews must be taken to control it.
- Identification of contingency actions to be taken if the fire exceeds prescription parameters and/or line holding capabilities and cannot be returned to prescription with project resources. If the fire exceeds the predetermined and pre-approved constraints on holding actions, the fire must be declared a wildfire and appropriate fire suppression action taken. If a single spot fire escapes, it may be designated as a separate fire. If additional suppression forces are needed, the spot fire is declared a wildfire. The prescribed burn may continue as long as adequate holding forces remain on the prescribed burn as specified in the prescribed burn plan, separate from the suppression action on the spot fire, and the burn remains in prescription. In no case should the capability to hold the prescribed burn be jeopardized by moving essential holding forces to fight a spot fire.
- A risk assessment that portrays an estimation of the probabilities and consequences of success/failure to the approving official. A safety plan and a "go, no-go" checklist are required.
- Provisions for fire proximity to endangered species and plant boundaries; consideration of existing and predicted weather, fire behavior, and fuel conditions; and drought evaluation impact and/or effect.
- The source of funding and estimated costs.
- Provisions for a test fire and recording the results.

A site specific training-initiated prescribed fire burn plan is required for each training-ignited prescribed fire. This plan will be developed and approved prior to declaration of any fire as a training-initiated prescribed fire. The only location that training-initiated prescribed fire will be allowed within USAG-AK is within the impact areas. No other locations are suitable for use of this designation. Training-initiated prescribed fire will not be allowed during "Extreme" fire danger. Only the Fire Department Chief or the Bureau of Land Management Wildland Fire coordinator may designate a fire as a training-initiated prescribed fire. Fires must be designated as a training-initiated prescribed fire within four hours of ignition. No more than one training-initiated prescribed fire will be allowed within each impact area at any given time. Once developed, the pre-existing plan will be approved by the Wildland Fire Program

Manager. The programmatic elements of the training-initiated prescribed fire burn plan shall include the following:

- General description of the area, history (including fire history), and map.
- Objectives to be achieved by the training-initiated prescribed fire and identification of acceptable outcomes.
- Required skills, qualifications and organization necessary to implement and manage the training-ignited prescribed fire program.
- Funding requirements.
- Inter/intra-agency coordination, including joint planning and review where fires may cross multi-agency boundaries.
- Program "Inform and Involve" actions both internally and externally. Include program planning as well as execution.
- Potential impacts of plan implementation including environmental, on/off site, socio-economic, and political impacts.
- Analysis and decision process that provides for identification of local approval authority, identification of evaluation criteria for the initial "go/no go" decision, a risk assessment that considers, at a minimum, fire growth predictions; threat to life and property; smoke management concerns; local/regional/nation fire situation, including availability of resources; potential impacts on endangered species and plants; fire proximity to endangered species and plant boundaries; assessment of the amount of training-initiated prescribed fire that is acceptable and manageable; consideration of existing and predicted weather, fire behavior, and fuel conditions; and drought evaluation impact and/or effect, provision for daily revalidation, and timely decision by the Wildland Fire Program Manager.
- Identification of fuel treatment measures needed to reduce hazard fuels in support of the Army's prescribed fire program, including identification of areas or developments that need protection from fire.
- Process for development of a training-initiated prescribed fire plan.
- Process for monitoring and evaluating the training-initiated prescribed fire.
- Escaped Fire Situation Analysis and contingency plan.
- Identification of maximum allowable perimeter.
- Monitoring actions to assure accurate and timely information on fire behavior, location, etc.
- Evaluation Plan for assessing outcome of the fire.

Some information will not be known until a training-initiated prescribed fire actually starts. Individual training-initiated prescribed fire burn plans shall also include holding actions necessary to keep the fire within prescription, fire projections using both "expected" and "most severe" weather scenarios, an estimate of resource needs to manage the fire and cost estimates to manage the fire.

C2.2.3.4.6 Prescribed Fire Organization

A "Burn Boss," experienced with local weather, fire behavior, fuels, and terrain conditions, shall personally supervise the burning operations on each management-ignited prescribed fire. More complex burns may require an "Ignitions Boss" and a "Holding Boss." A Prescribed Fire Manager qualified to manage prescribed management-ignited and training-initiated prescribed fires shall personally supervise operations. Every management-ignited prescribed fire requires the performance of the duties shown in this standard operating procedures. On smaller or less complex projects, one person may perform more than one of the required duties. Larger or more complex projects will require more qualified people to perform necessary duties.

The Prescribed Fire Manager will determine, through the development of the training-initiated prescribed fire burn plan, the organization, expertise, and positions necessary to manage the prescribed natural fire. The organization required varies with the size and complexity of each prescribed fire. In the event of an escape, use personnel qualified under National Interagency Fire Qualification Handbook standards (National Wildfire Coordinating Group Guide 310-1) to accomplish the required suppression activity. The temporary use of personnel who do not meet these qualifications is appropriate for prescribed fires that escape and are declared wildfires.

The Prescribed Fire Planning Specialist develops the prescribed fire burn plan for each management-ignited or training-initiated prescribed fire. The Prescribed Fire Planning Specialist may determine by the complexity or number of prescribed fires that a Prescribed Fire Manager is necessary. On management-ignited prescribed fires, the Burn Boss is responsible directly to the designated Prescribed Fire Manager for implementation and coordination of the assigned prescribed fire activities. The Prescribed Fire Manager shall:

- Coordinate and schedule the ignition and management of two or more management-ignited prescribed fires, or the management of a single training-initiated prescribed fire.
- Develop and implement the training-initiated prescribed fire burn plan on appropriate training-ignited fires.
- Coordinate personnel and equipment requirements, including resources called for holding actions and contingency action section of the burn plan.
- Ensure appropriate public notice is given prior to and during the prescribed fire activity.
- Coordinate prescribed burn projects to avoid exceeding holding and contingency capabilities.
- Monitor prescribed burn projects to ensure that all plan requirements are being met.
- Record and report costs and accomplishments and recommend improvements to the Wildland Fire Program Manager.

The Burn Boss has direct responsibility for on site implementation of specific actions in strict compliance with the approved prescribed burn plan. The Burn Boss is accountable to the Prescribed Fire Manager. The burn boss has the following responsibilities that cannot be re-delegated:

- Ensuring safety of personnel.
- Supervise all operations on the project site.
- Ensure that all prescribed fire burn plan requirements are met and that personnel are briefed before proceeding with ignition.
- To make the decision to proceed, accelerate, defer, or curtail operations based on attainment of the approved prescription criteria or lack thereof, including daily validation of prescribed criteria on multi-day projects.
- Ensure that the fire prescription is met before proceeding with ignition.
- Ensure that the forecast on site weather parameters are within prescription at the time of ignition and predicted to remain so during the expected life of the burn.
- Ensure the availability of suppression resources in the event the prescribed fire escapes and is declared a wildfire.
- Control directly, or through supervision of Ignitions Bosses, the method, rate, and location of firing.
- Maintain immediate and clear communications with the Ignitions Boss and Holding Boss at all times.
- Monitor fire behavior and terminate operations if fire behavior or effects are not according to prescription.

- Accomplish mop-up to predetermined standards in accordance with the prescribed fire burn plan.
- Certify that the fire is out.

The Ignitions Boss reports to the Burn Boss. The Ignitions Boss will maintain control of the ignition sources, including aerial ignition, on the burn project at all times, ensure deployment, sequence, and timing of all ignition sources to meet project objectives, supervise assigned personnel and ensure their safety, maintain immediate and clear communications with the Burn Boss and Holding Boss at all times, and if aerial ignition is used, ensure that the aerial ignition pilot is briefed on the Job Safety and Health Hazard Analysis, with emphasis on aerial flight hazards.

The Holding Boss reports to the Burn Boss on management-ignited prescribed fires. On prescribed natural fires, the Holding Boss may report directly to the Prescribed Fire Manager. The Holding Boss shall confine the prescribed fire within the planned area, take action when fire exceeds, or has the potential to exceed, the planned area, confer with the Ignitions Boss, Burn Boss, Prescribed Fire Manager, as appropriate, to match holding and contingency capability with firing sequence, supervise assigned personnel and ensure their safety and maintain immediate and clear communications with the Burn Boss, Ignitions Boss, or Prescribed Fire Manager, as appropriate, at all times.

C2.2.4 Fire Suppression Actions

The objective of fire suppression is to attack and suppress wildfires at minimum cost while protecting values at risk and minimizing the impacts from suppression activities. For purposes of this fire management plan, a wildfire is defined as a free burning fire requiring suppression action. Wildfire suppression is an emergency operation and takes precedence over all other operations, including training, with the exception of safeguarding human life. In some cases, a wildfire on Army training lands can be controlled with a single attack response vehicle; in others, large numbers of firefighters, fire apparatus, and equipment may be required. Because of this range of resource needs, fire suppression can be relatively simple and straightforward or extremely complex.

C2.2.4.1 Wildfire Incident Coordination

Wildfire suppression follows the incident command system (Fireline Handbook 2004). The Incident Commander is responsible for suppression and management of a wildfire. The military zone of Alaska Fire Service is dedicated to the management of wildfires on USAG-AK lands. The USAG-AK Fire Chief is responsible for all fires and must be informed of the status of new and ongoing wildfires (Support Agreement Alaska Fire Service/U.S. Army Alaska, 1995). Directorate of Plans, Training, Mobilization, and Security Range Control is the land manager and must be informed of the status of new and ongoing wildfires (Support Agreement Alaska Fire Service/ U.S. Army Alaska, 1995). The USAG-AK Installation Forester acts as the resource advisor and is a liaison between the fire management staff, the Fire Chief and G3 Range Control. The Alaska Fire Service maintains incident reports for fires on the lands used by USAG-AK. Data from the reports are used to create maps and tables of fires for each installation. Recordkeeping has varied over the years. Some fires, therefore, have more information available than others.

C2.2.4.2 Fire Suppression Actions

C2.2.4.2.1 Fire Suppression

Wildfire suppression is conducted by the Bureau of Land Management, Alaska Fire Service and/or the military fire department. The State of Alaska, Division of Forestry may be called upon for assistance as well as local fire departments. Alaska Fire Service is responsible for wildfires on USAG-AK lands in

exchange for use of the facilities at Fort Wainwright (Support Agreement Alaska Fire Service/ U.S. Army Alaska 1995). Suppression operations are undertaken on lands with fire management options of critical, full and modified or as requested by the wildfire or land managers. Wildfire on lands with a fire management option of limited are regularly monitored. Suppression actions consist of using the following resources: fire engines, dozers, saws, hand tools, pumps, aircraft and backfiring.

Wildfire suppression is an emergency operation and takes precedence over all other operations with the exception of safeguarding human life. Initial attack operations for fires started on all critical, full, and modified (before conversion to limited) lands is provided by Alaska Fire Service. Wildlife suppression is accomplished by Bureau of Land Management, Alaska Fire Service. USAG-AK contributes to fire detection and is available to help as needed. Fire suppression priorities are grouped into four categories: critical, full, modified, and limited management options.

C2.2.4.2.2 Fire Management Strategies

The Wildland Fire Situation Analysis is a systematic and documented decision process employed to determine the most appropriate suppression strategy for a particular situation. A Wildland Fire Situation Analysis is prepared when a fire: (1) escapes initial attack, (2) threatens to escape a fire management option into a higher management option, (3) warrants suppression actions but was not initial attacked due to resource shortages, (4) is beyond the capabilities of initial attack forces, or (5) fire and/or resource management objectives are not being met and a significant change in strategy/action is required (Alaska Interagency Wildland Fire Management Plan 1998).

A Wildland Fire Situation Analysis is jointly prepared by the land managers and suppression organization. The land manager approves the Wildland Fire Situation Analysis and any revisions with concurrence of the suppression organization. It is incumbent upon both the land managers and the suppression organization ensures that knowledgeable and qualified representatives are available to assist with preparing and reviewing the Wildland Fire Situation Analysis.

A Wildland Fire Situation Analysis identifies several alternative suppression strategies/actions within the constraints of the selected management option, which may range from commitment of resources until a fire is extinguished to routine surveillance. The alternatives are analyzed in terms of probability of success, environmental consequences, social and political considerations, consequences of failure and cost. The selected suppression alternative must clearly identify the suppression objectives. The assigned Incident Commander and the land managers must validate the Wildland Fire Situation Analysis to insure that the selected alternative is still achievable. When the selected alternative or fire/resource management objectives are not met, the Wildland Fire Situation Analysis must be re-written to determine new suppression strategy/action.

Escaped wildland fires may be placed under the management control of an appropriate level Incident Commander. Transfer of authority to the Incident Commander must be documented in a Limited Delegation of Authority. The need to place a land manager's representative at the Incident Command Post or the suppression organization's headquarters will be at either the discretion of the affected agency or at the request of the suppression organization. An environmental and/or cultural resource management specialist may be assigned to the Incident Management Team to provide on-site assessment of potential resource impacts. Each agency will furnish expertise as needed (Alaska Interagency Wildland Fire Management Plan 1998).

C2.2.4.3 Special Considerations for Suppression

The Incident Commander needs to select suppression tactics commensurate with the fire's potential or existing behavior, yet leaving minimal environmental impact. Minimum impact suppression is an

increased emphasis on suppressing a wildfire while minimizing the effects of suppression measures on the vegetation, soils, and watershed. Minimum impact suppression tactics will not over-ride considerations for safety or containment or control of the wildfire. However, they will be used to the maximum extent possible within these constraints.

Protection of the local environment will be considered in fire management strategies, particularly in the location of fuel breaks and control lines. Bulldozers are a useful tool in fire suppression efforts but can have a severe impact on natural and cultural resources. The use of dozers to construct fire-lines within pre-established fuel breaks provides for safe dozer operations, enhances ground firefighter safety, and causes the least environmental impact, as these areas are pre-approved for vegetation removal. Dozers are used as a means of last resort in fire suppression because of their potential impact on the environment. Dozer operators will be equipped and trained for wildland fire protection, trained in environmental sensitive issues relating to the use of dozers (i.e., long term effects of physical disturbance, potential introduction of alien plants, erosion control, and location of endangered and threatened species populations), and given natural/cultural resource orientation prior to any work assignment.

Fire managers must be familiar with the long-term effects of physical ground/vegetation disturbance, potential of alien vegetation introduction, through the use of dirty equipment or the creation of invasion routes, creation of erosion problems, protection of cultural sites, limitations on use of fire suppression chemicals (foam and retardant), the aerial use of chemical retardant, fire foam and saltwater will be weighed against the potential for fire damage to sensitive plants.

Use of aerial fire retardant near lakes, wetlands, streams, rivers, sources of human water consumption, and areas adjacent to water sources should be avoided to protect fish habitat and water quality. If feasible in these areas, the use of water rather than retardant is preferred. When the use of retardant is necessary, avoid aerial or ground application of retardant or foam within 300 feet of a waterway; application beyond 500 feet is preferred. Examples of when the use of retardant is authorized are for the protection of:

- Human life.
- Permanent year-round residences.
- National Historic Landmarks.
- Structures on or eligible for the National Register of Historic Places.
- Government facilities.
- High value resources on BLM managed land and those of adjacent land owners.
- Threatened, endangered, and sensitive species habitats as identified by resource specialist.

During fire suppression the Incident Commander will evaluate each and every suppression activity during planning and strategy sessions to see that they meet minimum impact suppression objectives, discuss minimum impact suppression tactics with overhead team during overhead briefings, ensure minimum impact suppression tactics are implemented during line construction as well as other environmentally destructive activities, and consult with environmental staff prior to implementing line construction in sensitive areas, providing time permits and proper personnel are available.

Whenever possible, a red card certified member of the environmental and/or cultural staff shall accompany bulldozers or hand crews constructing fireline in previously undisturbed locations. Minimum impact suppression tactics shall be applied to ensure protection of high valued resources.

C2.2.4.4 Fire Detection and Reporting

All wildfires are to be immediately reported to Range Control. Range Control will then notify the Bureau of Land Management, Alaska Fire Service and/or the military fire department.

Anyone observing a fire in any range area will report it immediately to Range Control by one of the following methods:

- Range Control frequency (FM 38.30).
- Post fire department—dial 911 at all posts.
- Range Control has responsibility for ensuring the fire department and Bureau of Land Management are notified of the fire. Normally, the fire and emergency services will be notified first then they will, in turn, notify the Bureau of Land Management. However, some situations may warrant simultaneous notification.

Monitoring is defined as the systematic process of collecting, recording and mapping of fuels, topography, weather, fire behavior, and fire effects data to provide a basis for evaluating and adjusting wildland fire management programs. Monitoring generally requires both on-the-ground and aerial observations. Although monitoring is usually associated with prescribed fire, land managers may elect to use agency personnel to collect fire effects monitoring data to assess the ecological impacts of the wildland fire.

The plan specifies that fires in limited management areas, and in modified management areas after the conversion to limited management option receive routine surveillance. Surveillance is defined as the systematic process of collecting, recording or mapping the fuels, topography, weather, fire behavior, and location of values to be protected to provide suppression agencies or land managers the information necessary to make the appropriate suppression action decisions on a wildland fire. Surveillance is generally conducted from aerial observations. The information also provides a chronological administrative history of the fire and suppression decisions.

C2.2.4.5 Public Information

Wildfire progress monitoring is conducted by the Bureau of Land Management, Alaska Fire Service. Updates can be obtained on its web site http://fire.ak.blm.gov/. Updates for fires where suppression action is required can also be obtained by contacting the public information officer at Alaska Fire Service. The USAG-AK Installation Forester acts as a liaison with the wildfire incident command staff on an as-needed basis conveying land management concerns and providing institutional knowledge of the land. The USAG-AK Installation Forester also relays information from the wildfire command staff to the various installation directorates. This function is known as a resource advisor in the wildfire incident command system.

C2.2.5 Post Fire Actions

C2.2.5.1 After-Action Review

At the end of each fire season, an interagency review of the fire plan implementation and fire suppression operations will be held with fire suppression personnel and land managers. Land managers and fire suppression personnel will be given the opportunity to identify plan implementation problems and operational concerns. People to be contacted for the end of season plan review include Bureau of Land Management, Alaska Fire Service; Bureau of Land Management, Northern Field Office; Bureau of Land Management, Anchorage Field Office; USAG-AK Environmental Resources Office; State of Alaska Division of Forestry; USAG-AK Fire Chief, Elmendorf Fire Chief; and Donnelly Training Area, Fort Wainwright, and Fort Richardson Range Controls. Examples of topics to be discussed include fire

operation effects on cultural features, natural resources, smoke management, and the notification process during fires. In addition fuels management projects should be discussed and proposals made. Land manager comments on the fire management plan should be made at this time for the yearly update of the fire management plan.

Land managers should evaluate how the suppression organizations responded to the selected fire management options. Instances where actions other than the selected fire management option were initiated will be re-evaluated to determine if the selected fire management option is appropriate. If the land managers determine that an option change is necessary, they will request the change to the Alaska Fire Service, which will initiate the fire management option revision process.

C2.2.5.2 Rehabilitation

Firelines and camp areas will be rehabilitated to stabilize the burn area and to mitigate the effects of suppression activities. The Agency Administrator will ensure that the Incident Commander consults with natural resource managers as needed, regarding any specific rehabilitation needs. When possible, burned areas will be allowed to regenerate naturally. Firelines will be monitored to ensure rehabilitation plans are followed and successful. Invasive species colonization and erosion control are some of the main items monitored after fires.

C2.2.5.3 Fire Research and Monitoring

Wildfires are monitored for several years after a burn to determine vegetation response, identify erosion issues, and to determine if fire suppression actions have been adequately rehabilitated. Monitoring is conducted using a combination of aircraft flyovers, photo points, vegetation plots, and permanent fuel loading sample plots following procedures outlined by Brown (1976). Prescribe fires are monitored to determine if burn objectives are met, determine fuel loading, and identify rotational periods between burns. Prescribe fires are used as a tool to reduce fuel loading on ranges where the risk of wildfire limits military training opportunities. On representative wildfires and prescribed fires, plot-based vegetation sampling will be utilized to analyze vegetation change. Other monitoring projects could entail public response to fuel reduction projects adjacent to residential and urban interface areas.

C2.2.6 Wildland Fire Program Management

C2.2.6.1 Funding

Funding for Integrated Wildland Fire Management Plan implementation, wildland fire prevention, fuel management for hazard reduction, wildland fire suppression, prescribed burning, and other wildland fire management is an installation operations and maintenance responsibility. Wildland fire management activities conducted for the purpose of compliance with environmental laws and regulations will be supported by environmental conservation funds. Integrated training area management funds may no longer be used for construction and maintenance of fire/fuel breaks, or other fuel removal directly associated with ranges/training areas. Proceeds from the sale of forest products may be used for protection of forests on land in forestry reimbursable programs in accord with Memorandum, DAIM-EDN, 17 Aug 99, subject: Army Regulatory Guidance for Reimbursable Agricultural/ Grazing and Forestry Programs. Mission activities, e.g., training and testing, may support wildland fire management and suppression, as required and agreed upon, by the participating organizations. The Garrison Commander or his designee will mediate and organize such arrangements. Wildfire funding also includes a mutual assistance component. Currently, USAG-AK is not billed for suppression activities rendered by Bureau of Land Management, Alaska Fire Service.

C2.2.6.2 Minimum Staffing Requirements

The USAG-AK Fire Department, Fort Greely Fire Department and Bureau of Land Management, Alaska Fire Service shall ensure that proper staffing requirements are in accordance with Department of Defense Instruction 6055.6, *Fire Protection Program*, and established manpower-staffing standards. Minimum staffing is based on the safety and complexity of the firefighting organization during initial attack and extended attack operations. Having a fully qualified and trained firefighting staff is an essential part of an effective suppression program.

USAG-AK Directorate of Plans, Training Mobilization and Security will staff levels of qualified Range Control personnel required to oversee range operations and identify any fire starts on firing ranges and in training areas. USAG-AK Directorate of Public Works Environmental Department will staff sufficient numbers of professionally trained foresters to map fires, coordinate prescribed burns, map fuel loading, and update vegetation mapping.

C2.2.6.3 Firefighter Training

The Fire Chief, in coordination with the Bureau of Land Management, is the proponent for providing introductory training on safety, proper firefighting techniques, and fire behavior. This training is only familiarization and does not fully qualify Soldiers according to Bureau of Land Management and national fire safety standards (normally a 40-hour course). Units are responsible for scheduling and maintaining current proficiency on this training.

C2.2.6.3.1 General

According to the Army Wildland Fire Policy Guidance (2002) all civilian, contractor, and emergency services personnel involved in wildland fire management must possess certifications appropriate for their expected level of involvement in the wildland fire organization. All Army personnel must meet the National Fire Prevention Association or National Wildfire Coordinating Group standards for certification. Personnel in the GS-081 job series, 21M career paths, and contractors will meet the certification standards specified in National Fire Prevention Association Standard 1051–Standard for Wildland Fire Fighter Professional Qualifications and National Fire Prevention Association Standard 1002–Standard for Fire Apparatus Driver/Operator Professional Qualifications. All other Army personnel with jobs requiring wildland fire responsibilities may use the National Wildfire Coordinating Group Wildland Fire Qualification Subsystem Guide (PMS 310-1/NFES 1414) to attain the required National Fire Prevention Association certification. Personnel who have learned skills from sources outside wildfire suppression, such as agency specific training programs or training, and work in prescribed fire, structural fire, law enforcement, search and rescue, etc., may not be required to complete specific courses in order to qualify in a wildfire position. However, position task books must be completed for documentation of certification. Personnel mobilized to participate in wildland fire management activities on properties not under Department of Defense jurisdiction, either through mutual aid agreement or other means, must be certified for the expected level of involvement under National Wildfire Coordinating Group standards. A measurable and objective evaluation test (medical exam, step-test, pack test, etc.) will be used to establish physical fitness standards for personnel that participate in wildland fire management activities. Personnel whose job description requires participation in wildland fire management activities as a primary or secondary firefighter on Army installations will meet the pre-employment medical and physical criteria contained in National Fire Prevention Association 1500 – Standard on Fire Department Occupational Safety and Health Program and receive a physical examination as specified in National Fire Prevention Association 1582–Standard on Medical Requirements for Fire Fighters. Medical and physical requirements for personnel not classified as primary/secondary wildland firefighters adhere to the same qualifications as primary/secondary wildland firefighters (U.S. Army Wildland Fire Policy Guidance 2004).

C2.2.6.3.2 Description of Program

Courses of instruction have been developed by the National Wildfire Coordinating Group for each position in the Wildfire Incident Command System. These courses have been designed to teach the basic information required to gain a general understanding of the position and provide technical knowledge required to perform duties required by the job. These courses are similar to college courses in that they start out at a basic level (100 level basic firefighter skills) and work up through higher levels of the Incident Command System (up to 500 level national Incident Command System skills). Courses are to be taught by trained and qualified instructors, experienced in the skill being taught.

Position Task Books are used to document performance demonstrations. Position Task Books are National Wildfire Coordinating Group published booklets that apply to a specific position in the Incident Command System. A Position Task Book contains all critical tasks that are required to perform a given job. These booklets will be used by wildfire managers and supervisors to keep track of an individual's training experience. There will be a Position Task Book for most positions included in the program. The tasks in each Position Task Book have been established by the National Wildfire Coordinating Group. Position Task Books have been designed in a format that allows documentation of a trainee's ability to perform each task. Tasks pertaining to tactical decision-making and safety are flagged and require a position performance on a wildfire. Remaining tasks can be evaluated through other means such as simulation or other emergency and non-emergency work. Successful completion of all tasks required of the position will be the basis for recommending certification for a specific position in the Incident Command System.

C2.2.6.3.3 Certification

Position descriptions for new hires that will participate in wildland fire activities will reflect the expected level of involvement and required certifications. Position descriptions with wildland fire management duties must state if the position qualifies the position holder as a primary or secondary wildland firefighter, as described in Chapter 46 of the Office of Personnel Management Civil Service Retirement System and Federal Employees Retirement System Handbook for Personnel and Payroll Offices. Personnel not classified as a primary or secondary wildland firefighter will perform duty in wildland fire management activities as qualified. Primary and secondary wildland firefighters will be certified, as a minimum requirement, in Cardio-Pulmonary Resuscitation and Standard First Aid by the American Red Cross or comparable certification authority. The Assistant Chief of Staff for Installation Management, Facilities and Housing Directorate, is responsible for maintaining and annually updating a list of National Wildfire Coordinating Group certified wildland firefighters for the Army. The installation Wildland Fire Program Manager is responsible for issuing, signing, maintaining, and tracking of National Wildfire Coordinating Group Qualification Card/Incident Command System (also known as "Red Cards") for installation personnel.

Training certification requirements include completion of all required training courses prior to obtaining a Position Task Book. Use of the training courses is required to prepare the employee to perform in the position. An employee will not be given a position assignment unless they have completed all necessary courses and training and applicable Position Task Books. Required training has been held to the minimum required for safe operations on a wildfire. Certification of qualification for a position in the Incident Command System will be documented and tracked by the Wildland Fire Program Manager. Upon completion of each training course, the Wildland Fire Program Manager or training agency/organization will publish a memo to the Director of Emergency Services identifying personnel who successfully completed each course by name, organization, and Incident Command System position that the individual is authorized to hold. A copy of the memo will be provided to the fire department, the individual who successfully completed the training, and the commander or director of organization that the individual belongs to. The Wildland Fire Program Manager is responsible for maintaining all memos and will

compile a qualification list of all wildland trained personnel. Additionally, the Wildland Fire Program Manager may document training by issuing an incident qualification card. This is for use in identifying to outside agencies that the individual is qualified to perform in a specified position. The quality of experiences gained in a given position will be closely evaluated when making a determination for advancement to the next higher position or to a different position. The quality of experience may relate to the number of assignments in which an individual performed, the size of the incident, and the complexity of operations overseen. This program will not determine the number of times an individual should serve as a trainee or how many times a given position should be filled before advancement. Determination will be made by the supervisor based on task evaluations, position performance evaluations, and their own judgment on the quality of an individual's experience. Supervisors will submit recommendations for advancement or change in positions to the Wildland Fire Program Manager. Personnel will not be assigned any wildland fire duties without proper certification. Personnel that have the basic Firefighter 2 can be assigned a training status to higher level positions provided that they are directly supervised by an individual qualified/certified for that position and have completed the necessary coursework.

Unless otherwise noted, the maximum time allowed for maintaining currency is five years for all positions. For example, the currency requirement for a Task Force Leader is to have functioned in a satisfactory manner in the last five years as a Task Force Leader or above. Currency requirements for positions may be met by performing the particular position or any higher position, and any specified lower or similar duties. This type of position experience will be considered as qualifying only if the individual has previously met all training and prerequisite experience requirements for the position. Serving in a position for which the individual is qualified will maintain the currency of a prerequisite position, providing that the individual was previously qualified in that position. Refresher training is also a way to maintain currency. Refresher training will be arranged at various intervals to keep personnel updated on the requirements for specific positions but also new developments within the given field. Recertification includes evaluation of personnel for recertification in cases where position qualifications have been lost as a result of a lack of current experience. A key component in the certification or recertification process is the subjective evaluation by management of an individual's capability to perform in a position. Managers can request recertification of prior qualified personnel by submitting a memo to the Wildland Fire Program Manager stating the reasons for recertification and any mitigating issues that can show the individual has either maintained or relearned skills necessary to accomplish the job. The Wildland Fire Program Manager may design a specific individual refresher course prior to recertification.

C2.2.6.3.4 Fitness Standards

Personnel whose job description requires participation in wildland fire management activities as a primary or secondary firefighter on Army installations will meet the pre-employment medical and physical criteria contained in NFPA 1500–Standard on Fire Department Occupational Safety and Health Program and receive a physical examination as specified in NFPA 1582–Standard on Medical Requirements for Fire Fighters. Medical and physical requirements for personnel not classified as primary/secondary wildland firefighters shall be as specified in the installation Integrated Wildland Fire Management Plan.

Personnel assigned to wildfire duties are required to meet the following standards for physical fitness. The fitness level that personnel shall meet depends on what Incident Command System position they are assigned. Fitness categories include arduous, moderate, light, and no wildfire duties. Arduous duties involve fieldwork requiring physical performance, over an extended period of time, calling for above-average endurance and superior conditioning. These duties may include a demand for extraordinarily strenuous activities in emergencies under adverse environmental conditions and over extended periods of time. Requirements include running, walking, climbing, jumping, twisting, bending, and lifting more than 50 pounds; the pace of work typically is set by the emergency situation. Moderate duties involve field

work requiring complete control of all physical faculties and may include considerable walking over irregular ground, standing for long periods of time, lifting 25 to 50 pounds, climbing, bending, stooping, squatting, twisting, and reaching. Occasional demands may be required for moderately strenuous activities in emergencies over long periods of time. Individuals usually set their own work pace. Light duties mainly involve office type work with occasional field activity characterized by light physical exertion. Activities may include climbing stairs, standing, operating a vehicle, and long hours of work, as well as some bending, stooping, or light lifting. Individuals almost always can govern the extent and pace of their physical activity. No wildfire fighting duties are normally performed in a controlled environment, such as an incident base or camp.

Four accepted methods of testing physical fitness are (1) a 1 and ½ mile run/walk, (2) the Pack Test, (3) the Army Physical Readiness Test, and (4) the Volume Oxygen Test. For the 1 ½ mile run/walk, the individual, of any age or sex, must run/walk a distance of 1 ½ miles on level terrain within 11 minutes and 40 seconds. The Pack Test is similar to the run/walk, where the individual carries a backpack a prescribed level distance within a prescribed time. For the arduous standard, individuals must carry a 45-lb backpack 3 miles in 45 minutes or less, for moderate, individuals must carry a 25-lb backpack 2 miles in 30 minutes or less, for light, individuals must hike 1 mile in 15 minutes with no pack. The Army Physical Readiness Test is also an accepted method if completed per Army Field Manual 21-20. The Volume Oxygen test determines physical fitness as the measurement of an individual's ability to take in, transport, and use oxygen, which is the most important factor affecting ability to perform sustained arduous work. The best measure for determining health and functional ability is maximal oxygen consumption (Max V02). Max V02 is a measure of the maximum rate that oxygen can be consumed and is expressed in milliliters of oxygen per kilogram of body weight per minute. This ranges from about 20 milliliters for poorly conditioned people to about 80 for endurance athletes such as distance runners and cross-country skiers. Only medical staff may administer the VO2 test. This test requires a clinic with the equipment and trained staff to administer the test. The following Max V02 levels have been set for the four categories of physical fitness:

- Arduous: requires a Max V02 of 45.
- Moderate: requires a Max V02 of 40.
- Light: requires a Max V02 of 35.
- None: no testing is required.

C2.2.6.4 Fire Equipment and Supplies

During critical fire periods (high and extreme), all units using ranges or training areas will carry firefighting materials. Proper firefighting tools include, but are not limited to Pulaskis, beaters, portable water extinguishers, and a water supply such as full water trailers or drums. Units will be prepared to assist in suppressing small range fires (up to 100 square feet) that might occur in the training areas. The requirements for training and having equipment on hand is intended for ground-based units that are at the greatest risk of being involved in a fire situation.

C3 Forestry and Wildfire Proposed Management

C3.1 Policy

C3.1.1 USAG-AK Forest Timber Policy

Forest resources are protected on USAG-AK lands through this Integrated Natural Resources Management Plan (INRMP) as well as through local and Army-wide regulations. This INRMP establishes best management practices (see Volume III, Supplements) during the conduct of timber sales, clearing or construction activities to protect surrounding forest resources, wetlands, surface water and wildlife. If construction activities cannot avoid clearing of forest resources, construction activities must follow correct procedures to minimize impact and effectively utilize forest products as specified in Section C2.1.3

C3.1.2 House Log Harvesting Program

In recent years there has been growing interest from the public to harvest house logs in the Tanana Flats Training Area of Fort Wainwright. USAG-AK has initiated a house log program in response to public request. The program closely follows guidelines set by the State of Alaska Division of Forestry's House Log Program. The USAG-AK house log program procedures are listed under Section C2.1.5.5.

C3.1.3 Integrated Wildland Fire Management Plan

For many years USAG-AK and the Bureau of Land Management, Alaska Fire Service have worked cooperatively to prepare and update a wildfire management plan for USAG-AK lands. This update of the INRMP meets the new Army requirement for an Integrated Wildland Fire Management Plan. The Integrated Wildland Fire Management Plan is found in Section C2.2.

C3.2 Forest and Wildfire Standard Procedures

Table C3-1. New Forestry Standard Procedures.

Category	Standard Practice	Standard Practice Description
Forest Planning	Forestry Management Plan Preparation, Review, and Update	Prepare, review, and update Forestry and Integrated Wildland Fire Management Plans, to include the forestry management plan, wildlife management plan, and interagency fire management plan.
Forest Planning	Burn Plan Preparation, Review, and Update	Prepare, update, and review burn plans and pre-suppression plans.
Forest Planning	Forestry Geographic Information System Planning	Utilize Geographic Information System to conduct landscape scale management of forest resources.
Forest Planning	Forestry National Environmental Policy Act Requirements	Prepare, coordinate, review, and update National Environmental Policy Act documents for forestry and wildfire management projects, programs, policies, and management plans.
Project Management	Plan Forestry Projects	Conduct project planning by inventory and identification of potential sites, project development which is accomplished using the project development worksheet, and project prioritization.
Project Management	Design Forestry Projects	Conduct project design by providing specific project designs for fuel hazard reduction, habitat improvement, cover and concealment, timber stand improvement, invasive species control, wildlife suppression, timber harvest, and firewood projects. Project designs include site plans, cost estimates, scopes of work, and bill of materials required for each project.

Project Management	Coordinate Forestry Activities	Conduct project coordination by coordinating forestry activities by providing project planning and oversight, technical assistance and design; and coordinating National Environmental Policy Act, wetland and cultural activities related to project oversight and management.
Project Management	Forestry Project Site Preparation	Prepare a project site for project implementation by flagging boundaries, marking trees, evaluating site conditions, etc.
Project Management	Forestry Project Oversight	Provide project oversight by monitoring project progress and execution. Report results back to federal project manager and Contracting Officer's representative.
Forest Inventory / Monitoring	Forest Inventory	Conduct forest inventory and monitoring on all Army lands in Alaska. Forest inventory and monitoring include forest cover type mapping and continuous forest inventory.
Forest Inventory / Monitoring	Fuel Hazard and Fire History Mapping	Conduct fuel hazard and fire history mapping. Mapping includes fuel hazard assessments and fire history mapping.
Forest Inventory / Monitoring	Wildfire Monitoring	Conduct monitoring of wildland fires on military lands. Wildfire monitoring includes identification and reporting, monitoring progress as the wildland fire progresses, and wildfire incident coordination.
Wildfire Prevention	Wildfire Prevention Systems Integration	Prepare, update, and review regulations and systems necessary to reduce wildlife risk.
Wildfire Prevention	Wildfire Prevention Outreach	Conduct outreach programs to military, recreational, and adjacent property owners to reduce the risk of uncontrolled wildfire.
Forestry Outreach	Conduct Presentations/Briefings/Training	Prepare, update, coordinate, publish, and distribute forestry training and education materials.
Forestry Outreach	Develop Training/Education Materials	Prepare, coordinate, and conduct forestry presentations, briefings, and training.
Forest Land Improvement	Fuel Hazard Reduction / Fire - Fuel Breaks	Create, upgrade, repair or maintain fire or fuel breaks. Reduce hazard fuels in the training areas. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, vegetation protection, and revegetation.
Forest Land Improvement	Habitat Improvement	Create, upgrade, repair, or maintain habitat improvement for soldiers or wildlife habitat. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, vegetation protection, and revegetation.
Forest Land Improvement	Cover and Concealment	Create, upgrade, repair, protect, or maintain cover and concealment by planting, protecting, and maintaining trees and shrubs or removing vegetation and foliage to accommodate large vehicles. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, vegetation protection, and revegetation.
Forest Land Improvement	Timber Stand Improvement	Conduct timber stand improvement activities to improve area for military training or improve commercial value of timber. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, vegetation protection, and revegetation.

Forest Land Improvement	Invasive Species Control	Conduct invasive species control to control exotic and invasive species from spreading. Control invasive species to protect natural species and improve training realism. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, and biological and chemical controls.
Forest Land Improvement	Wildfire Suppression	Conduct suppression of wildfires to protect valuable training resources and facilities. Utilize Land Rehabilitation and Maintenance standard practices such as fire suppression, fire/fuel breaks and trenches, and vegetation cutting and clearing (mechanical and hand).
Forest Land Improvement	Timber Harvest	Conduct timber harvest in preparation of range facility construction or for commercial timber sales. Offset the cost of land clearing for new facilities by conducting commercial timber sales. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand).
Forest Land Improvement	Firewood	Conduct firewood cutting / firewood sales to offset the cost of clearing timber for range and training area improvement. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand).

C3.3 Forest and Wildfire Management Projects

Table C3-2. Forest and Wildfire Projects 2007-2011.

Project Information				Year				
Priority	Location	Standard Project Category	Project Title	FY07	FY08	FY09	FY10	FY11
High	FWA	Forest Land Improvement	Bolio Lake Training Area Timber Stand Improvement	X	X	X	X	X
High	FWA	Forest Inventory / Monitoring	Forest Stand Mapping	X	X	X	X	X
High	FWA	Forest Land Improvement	Donnelly Training Area Fuel Reduction	X	X	X	X	X
High	FWA	Forest Land Improvement	Jarvis North Training Area Timber and Maneuverability Improvement Project	X	X	X	X	X
High	FWA	Forest Land Improvement	Moose Creek Timber Stand Improvement	X	X	X	X	X
High	FWA	Forest Land Improvement	Stuart Creek Fuels Assessment	X		X		X
Moderate	FWA	Forest Inventory / Monitoring	Continuous Forest Inventory	X	X	X	X	X
Moderate	FWA	Forest Land Improvement	Yukon Training Area Timber and Maneuverability Improvement Project	X	X	X	X	X
Low	FWA	Forest Land Improvement	Donnelly West Fuel Break		X	X		X
Low	FWA	Forest Land Improvement	Hays Lake Fuel Break			X	X	X

Project Information				Year				
Priority	Location	Standard Project Category	Project Title	FY07	FY08	FY09	FY10	FY11
Low	FWA	Forest Land Improvement	Personal use firewood and house log areas	X	X	X	X	X
Low	FWA	Forest Land Improvement	Stuart Creek East Fuel Break	X	X			
Low	FWA	Habitat Improvement	Delta River Bison Range Habitat Enhancement	X		X		X
Low	FWA	Habitat Improvement	Grouse Habitat Enhancement		X		X	
Low	FWA	Habitat Improvement	Tanana Flats Habitat Enhancement		X	X	X	X
High	FWA	Forest Land Improvement	BAX / CACTF	X	X	X	X	X
High	FWA	Forest Land Improvement	Oklahoma Impact Area *AK 316 2823 JM AA88	X	X	X	X	X
High	FWA	Forest Land Improvement	Small Arms Range AK 316 2824 JW AA44	X	X	X	X	X
Moderate	FWA	Forest Land Improvement	Husky DZ AK 316 2823 JM AA70	X		X		X
Moderate	FWA	Forest Land Improvement	Lakes Impact Area		X		X	
Moderate	FWA	Forest Land Improvement	Manchu Range AK 316 2823 JM AA05	X	X	X	X	X
Low	FWA	Forest Land Improvement	Wills Range Complex Buffalo DZ Eddy DZ		X		X	X
Moderate	FWA	Forest Land Improvement	Alpha Impact Area	X	X		X	
Moderate	FWA	Forest Land Improvement	ISBC, IPBC and DMPTR	X	X	X	X	X
High	FRA	Forest Inventory / Monitoring	Forest Stand Mapping	X	X	X	X	X
High	FRA	Forest Improvement	Grezelka Range Area Timber Stand Improvement		X		X	
High	FRA	Forest Improvement	Ft. Richardson Small Arms Complex Fuel Break		X		X	
Moderate	FWA	Forest Land Improvement	Texas Range *AK 316 2823 JM AA85		X		X	
Moderate	FRA	Forest Inventory / Monitoring	Forest Inventory	X	X	X	X	X
Moderate	FRA	Forest Improvement	Waldon Lake Training Area Timber and Maneuverability Improvement Project	X	X			
High	FRA	Forest Land Improvement	Grezelka Rx AK 316 2823 JM AA43	X	X	X	X	X

Project Information				Year				
Priority	Location	Standard Project Category	Project Title	FY07	FY08	FY09	FY10	FY11
Moderate	FRA	Forest Land Improvement	ISBC, IPBC and DMPTR	X	X	X	X	X
Low	FRA	Forest Land Improvement	Malamute DZ AK 316 2823 JM AA43	X		X		X
Moderate	USARAK	Forest Land Improvement	AFS program management	X	X	X	X	X
Moderate	USARAK	Forest Land Improvement	USARAK hazard fuel crew	X	X	X	X	X
Medium	USARAK	Wildland Fire Planning	Develop pre-suppression plans for each of the area units of USAG-AK.		X			
High	USARAK	Wildland Fire Planning	Develop plans for proposed prescribed fires on USAG-AK.	X	X	X	X	X
High	USARAK	Wildland Fire Planning	Develop plans and fuel treatment projects to reduce the threat of fires starting on military lands and impact areas and burning onto adjacent lands of high resource value.		X			
High	USARAK	Wildland Fire Planning	Develop generic burn plan for various military directorates to use for grounds maintenance projects.		x			
High	USARAK	Suppression	Conduct fire suppression activities as necessary.	x	x	x	x	x
High	USARAK	Wildland Fire Planning	Identify and assess fuel management strategies for urban/wildland interface areas.	x	x	x	x	x
High	USARAK	Outreach	Implement FireWise program for private landowners adjacent to military lands.	x	x	x	x	x
High	USARAK	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	x	x	x	x	x
High	USARAK	Wildland Fire Pre-Suppression Activities	Develop more effective means of calculating fire weather indices for localized training areas and implement a program of relaying fire danger ratings to training units.	x	x	x	x	x
High	USARAK	Wildland Fire Management	Develop program of providing assistance to training military units during periods of high fire danger.	x	x	x	x	x
High	USARAK	Wildland Fire Pre-Suppression Activities	Develop and disseminate procedures for detection and reporting of fires.	x	x	x	x	x

Project Information				Year				
Priority	Location	Standard Project Category	Project Title	FY07	FY08	FY09	FY10	FY11
High	USARAK	Wildland Fire Planning	Develop standard operation procedures for each area unit of USAG-AK to assist firefighters and Incident Commanders in establishing priorities, making decisions, dealing with ordnance issues.	x	x	x	x	x
High	USARAK	Wildland Fire Planning	Develop Geographic Information System for military fire management office and for use on incidents with current data, maps, photos, suppression options, and restrictions.	x	x	x	x	x
High	USARAK	Wildland Fire Pre-Suppression	Identify and use fuel reduction treatments to reduce the threat of wildland fire at the urban/wildland interface, military structures, selected training areas, and cultural resources.	x	x	x	x	x
High	USARAK	Wildland Fire Monitoring	Collect fuel loading information as part of the forest inventory.	x	x	x	x	x
High	USARAK	Wildland Fire Monitoring	Delineate and maintain Geographic Information System data layers showing historical fires.	x	x	x	x	x
High	USARAK	Wildland Fire Monitoring	Map past areas where ordnance has been used and develop pre-suppression plans on how to deal with wildland fire suppression in these areas.	x	x	x	x	x
High	USARAK	Wildland Fire Monitoring	Map all known cultural features on suppression maps and develop fire management recommendations for these features.		x			
High	USARAK	Wildland Fire Monitoring	Map all military structures on suppression maps. Assess fire suppression options and recommendations for these structures.		x			
High	USARAK	Wildland Fire Monitoring	Map all known natural resources features and areas of concern from wildland fire suppression and management activities on suppression maps. Develop management strategies to avoid conflicts with these natural resource features and areas of concern.			x		

Project Information				Year				
Priority	**Location**	**Standard Project Category**	**Project Title**	**FY07**	**FY08**	**FY09**	**FY10**	**FY11**
High	USARAK	Wildland Fire Monitoring	Update fuels map of USAG-AK.			x		
High	USARAK	Wildland Fire Monitoring	Update fire history map of USAG-AK.			x		
High	USARAK	Wildland Fire Monitoring	Research causes of fire ignitions on USAG-AK to identify areas of high fire occurrence				x	
High	USARAK	Wildland Fire Monitoring	Map all known non-sensitive structures on USAG-AK.				x	
High	USARAK	Wildland Fire Monitoring	Update fire maps with military special use areas and fire management options for these areas.	x				
High	USARAK	Wildland Fire Monitoring	Research weather patterns influencing fire behavior and historical weather analysis for each land unit of USAG-AK.	x				

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U.S. Army
Garrison
Alaska

2007-2011
Integrated
Natural
Resources
Management
Plan

VOLUME II, Annex D
Fish and Wildlife Management

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D1. Introduction

Historically, fish and wildlife management practices were designed and implemented for the support of hunting, trapping and fishing. In the early 1980s this base broadened, driven by a growing recognition of the importance of non-game species in ecosystem functions. In the mid-1990s, broad-scale fauna and flora inventories were initiated with the goal of implementing a more ecosystem-based approach to natural resource management. The development of formal long-term monitoring programs naturally evolves from the continued support of taxa inventories and therefore will be initiated as the ecosystem approach to management expands. The natural resources staff looks forward to the challenge of developing and implementing a landscape scale ecosystem management program while maintaining high quality game habitat, and of course, continuing to promote use of the land for military training.

The fish and wildlife management program provides for the regulation and conservation of game and non-game populations and their habitats. These management practices are consistent with accepted scientific principles and in compliance with the Endangered Species Act and all other applicable laws and regulations. Further, these goals are in harmony with the total natural resources program. Emphasis is placed on the maintenance and restoration of habitat favorable to the production of indigenous fish and wildlife. Lands and waters suitable for conservation of fish and wildlife resources are managed to conserve fish and wildlife resources. Non-game as well as game species are considered when planning activities.

Army Regulation 200-3 (Feb. 1995) and the Sikes Act drive fish and wildlife management and the development of an Integrated Natural Resources Management Plan (INRMP) on Army installations. This fish and wildlife management plan is mandated by the INRMP and Army Regulation 200-3. This INRMP describes programs, projects and procedures to implement these requirements.

D1.1 Ecosystem Management

U.S. Army Garrison, Alaska's (USAG-AK) natural resources program has traditionally been based on multiple-use management philosophies. However, military training has always been and will continue to be the primary land use. Maintaining functional ecosystems is now the primary goal of the natural resources management program. "Realistic training lands" are often quoted as essential needs by military trainers. This translates into functional ecosystems that can be sustained indefinitely.

Ecosystems that lose their functionality become degraded, and loss of realism for training follows. This is contrary to the commitment to sustain military training lands (or no net loss in the capability of training lands to support the military mission, as required by the Sikes Act). Thus, the future of USAG-AK and its military mission, as well as the communities that depend upon the installation, relies upon maintaining functional ecosystems.

USAG-AK will implement ecosystem management methodologies using the principles of landscape ecology. Multiple use will occur across the landscape, but not every use may occur at every location. Adaptive management will be used to assess and evaluate results of management actions and will recycle the information back into decision-making for further actions.

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USAG-AK will manage for biodiversity by maintaining total numbers of species, managing for varied habitats, and maintaining and restoring natural processes to the landscape. Ecosystem management is a philosophy that will help protect biodiversity and maintain fully functional ecosystems.

USAG-AK will use ecosystem management concepts to guide its fish and wildlife species management practices during the next five years and beyond. This management philosophy enables the installation to conduct military training while protecting natural resources upon which the quality of training ultimately depends. Concurrently, ecosystem management helps ensure compliance with environmental laws and sustainable use of renewable natural resources.

D1.2 Biodiversity Conservation

Biological diversity (biodiversity) refers to the variety and variability among living organisms and the environment in which they occur. Biodiversity has meaning at various levels including ecosystem diversity, species diversity, and genetic diversity (The Keystone Center 1996).

The Department of Defense is developing a policy for biodiversity management that will use the INRMP process as the implementation tool. A first step in this process was the preparation of a Department of Defense Biodiversity Management Strategy (The Keystone Center 1996). This report identifies five reasons to conserve biodiversity on military lands:

(1) Sustain natural landscapes required for the training and testing necessary to maintain military readiness.
(2) Provide the greatest return on the Department of Defense's investment to preserve and protect the environment.
(3) Expedite the compliance process and help avoid conflicts.
(4) Engender public support for the military mission.
(5) Improve the quality of life for military personnel.

The Keystone Center report (1996) notes that the challenge is "*to manage for biodiversity in a way that supports the military mission.*" This strategy identifies the Integrated Natural Resources Management Plan as the primary vehicle to implement biodiversity protection on military installations. The model process developed within the strategy includes the following principles:

- Support the military mission.
- Use joint planning between natural resources managers and military operations personnel.
- Integrate biodiversity conservation into Integrated Natural Resources Management Plan, Integrated Training Area Management, and other planning protocols.
- Involve internal and external stakeholders up front.
- Emphasize the regional (ecosystem) context.
- Use adaptive management.
- Involve scientists and use the best science available.
- Concentrate on results.

Most of the land was relatively undisturbed when it was withdrawn for military use in the late 1930s through early 1940s. Because there are little or no data on most species prior to the last 20 years or so, it is unknown whether the military presence has significantly affected biodiversity. Changes in ecosystems have been localized and may have affected species abundance for short periods, but probably have not affected overall species richness. There is no evidence that Army use has significantly affected any plant or animal species beyond specific locations of construction or military activity. Greatest losses of habitat are associated with the cantonment area due to construction and associated urban development and use.

D1.3 Fish and Wildlife Management Goals

Fish and wildlife management goals all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. The fish and wildlife management goals and objectives are:

Goals:

- Preserve and enhance biodiversity.
- Maintain sustainable numbers of all fish and wildlife species.
- Improve the quality of habitat for game and non-game species.
- Monitor selected mammal and bird populations for long-term trends.
- Produce game on a sustainable basis to support hunting and fishing programs.
- Enhance wildlife, recreation, and military habitat.
- Involve the resource agencies in the planning process for habitat enhancement and the public in review of the plan.

Objectives:

- Use artificial nesting structures to improve productivity for wildlife species.
- Complete annual or biennial monitoring of fish and wildlife to support decision-making and management of the ecosystem.
- Continue existing monitoring programs to evaluate population trends.
- Initiate long-term monitoring programs for selected species not currently monitored.
- Conduct cost-sharing of monitoring, utilizing partnerships with the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service, and the Bureau of Land Management.
- Complete, maintain, and update the planning level fauna surveys.
- Complete, maintain, and update the planning level fauna surveys for threatened, endangered, or species-of-concern animals.
- Identify the requirement for planning level fauna surveys.
- Identify the requirement for planning level fauna surveys for threatened and endangered species of animals.
- Provide an adequate fishery through annual fish stocking.
- Maintain game population levels through hunting and fishing harvests.
- Improve the quality of habitat for game and non-game species.

D1.4 Fish and Wildlife Management Responsibilities

The Alaska Department of Fish and Game has the primary responsibility for managing fish and wildlife game populations. The Alaska Department of Fish and Game sets population goals and carries out fish stocking. The U.S. Fish and Wildlife Service is primarily responsible for migratory birds, anadromous fish, threatened and endangered species, certain marine mammals, and their habitats. The National Marine Fisheries Service is responsible for managing other species protected under the Marine Mammal Protection Act. The U.S. Army Corps of Engineers regulates fill in wetlands. USAG-AK is responsible for working together with these agencies to carry out and implement habitat management practices and goals. Routine grounds maintenance is the responsibility of Roads and Grounds Maintenance, Directorate of Public Works.

The USAG-AK Garrison Commander will:

- Program for funds to conduct an effective program pursuant to the Fish and Wildlife Cooperative Plan required by the Sikes Act.
- Require the optimum use and staffing of professionally trained personnel (for example, wildlife biologist) at installations having fish and wildlife management requirements.
- Authorize and control fish and wildlife related activities in conformance with applicable federal and state laws, Army regulations, and the installation Fish and Wildlife Cooperative Plan.
- Establish a fish and wildlife law enforcement program to address the requirements of the Fish and Wildlife Cooperative Plan.
- Enter all annual requirements into the Reimbursable Program Tracking System.

D2. Fish and Wildlife Management

D2.1 Fish and Wildlife Cooperative Plan

In accordance with 16 USC 670a, the Fish and Wildlife Cooperative Plan is the component of the Integrated Natural Resources Management Plan (INRMP) that describes how the fish and wildlife resources at an installation will be managed. It is a tripartite agreement between the Sikes Act's required partners: USAG-AK, the U.S. Fish and Wildlife Service, and the Alaska Department of Fish and Game. The cooperative plan provides a program of planning for, and developing, maintaining, and coordinating wildlife, fish, and game conservation. The Fish and Wildlife Cooperative Plan provides for:

- Fish and wildlife habitat improvements or modifications.
- Wildlife considerations in all range rehabilitation.
- Control of off-road vehicle traffic.
- Use and protection of fish and wildlife resources, to include both consumptive and non-consumptive use, and natural resources law enforcement requirements.
- Designated responsibilities for the control and disposal of feral animals.

The cooperative plan will be adopted by the Garrison Commander only after ensuring its compatibility with the rest of the INRMP, the Endangered Species Act and other applicable federal, state, and local laws and regulations. Agreement by all three parties regarding the fish and wildlife management plan for an installation makes that plan a cooperative plan pursuant to 16 USC 670a and the exclusive fish and wildlife component of the INRMP. Cooperative plans will be reviewed and updated annually to incorporate new findings, and revised at least every five years. Specific items of cooperation are outlined in Volume II, Annex A, Implementation.

D2.2 Fish and Wildlife Monitoring

D2.2.1 Fauna Planning Level Survey

Fauna planning level survey includes fish and wildlife surveys of large mammals, furbearers, birds, fish and small mammals. These surveys identify neotropical, shorebird, upland gamebird, waterfowl, and raptor avian species; salmon, grayling, other fish species; amphibians and small and large mammal species. The Department of Defense is a major participant in the nationwide Partners in Flight program. Raptors are important components of the ecosystem, and many are vulnerable to human impacts as evidenced by their listing either in Alaska or in other areas of the United States. There is also considerable concern in North America over declining numbers of many neotropical migratory birds. Data on the status of neotropical migratory birds are required to manage and protect these declining species, as mandated by

the Sikes Act and Army Regulation 200-3. Fish, amphibians and small mammals play important ecological roles as secondary consumers and as prey for a variety of predators.

These planning level surveys focus on neotropical migrants, raptors, upland gamebirds, waterfowl, and raptors, salmon, trout, other fish species, amphibians and small mammals. These surveys each represent a ten-year update to determine trends in faunal diversity and to improve the accuracy of the faunal database. Accurate planning level fauna surveys are required by Army Regulation 200-3 and are required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act).

D2.2.1.1 Avian Surveys

Migratory birds are of great ecological and economic value and are an important international resource. They are a key ecological component of the environment as prey and predators, and they also provide immense enjoyment to millions of Americans who study, watch, feed, or hunt them. Recognizing their importance, the United States has been an active participant in the internationally coordinated management and conservation of migratory birds. The Migratory Bird Treaty Act (16 U.S.C. 703—712) is the primary legislation in the United States established to conserve migratory birds. The U.S. Fish and Wildlife Service is the federal agency within the United States responsible for administering and enforcing the statute.

The Migratory Bird Treaty Act, originally passed in 1918, implements the United States' commitment to four bilateral treaties, or conventions, for the protection of a shared migratory bird resource. The original treaty upon which the Migratory Bird Treaty Act was based was the Convention for the Protection of Migratory Birds signed with Great Britain in 1916 on behalf of Canada for the protection ''of the many species of birds that traverse certain parts of the United States and Canada in their annual migration.'' The Migratory Bird Treaty Act was subsequently amended after treaties were signed with Mexico (1936, amended 1972, 1995), Japan (1972), and Russia (1976), and the amendment of the treaty with Canada (1999).

The National Defense Authorization Act of FY 03 (Pub. L 107-314, 116 Stat.2458, Dec 2, 2002, 16 USC 703 note), Section 315, amended the Migratory Bird Treaty Act to allow authorization of "take/taking" incidental to military readiness activities if the military complies with certain conditions related to the management of effects on migratory birds. The "Authorization Act" further requires the Secretary of the Interior to promulgate such regulations with the concurrence of the Secretary of Defense.

The treaties and subsequent amendments impose substantive obligations on the United States for the conservation of migratory birds and their habitats, including, but not limited to, the following conservation principles:

- To conserve and manage migratory birds internationally.
- To sustain healthy migratory bird populations for consumptive and nonconsumptive uses.
- To provide for, maintain, and protect habitat necessary for the conservation of migratory birds.
- To restore depleted populations of migratory birds.

Each of the treaties protects selected species of birds and specifies closed seasons for hunting game birds. The list of the species protected by the Migratory Bird Treaty Act appears in title 50, section 10.13, of the Code of Federal Regulations (50 CFR 10.13).

D2.2.1.1.1 Fort Wainwright

A survey of cliff and tree nesting raptors on Fort Wainwright was conducted in 1998 by ABR, Inc (Anderson et al. 2000). This survey evaluated areas on Tanana Flats Training Area and Yukon Training Area, particularly on the Salcha and Tanana rivers. A pre-leaf-out (mid-May) aerial survey was used to identify and map large stick nests constructed and utilized by species including bald eagles (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), owls, ravens (*Corvis corax*), and other tree-nesting species. An early to mid-incubation period survey (late May-early June) was used to identify large stick nest platforms and/or occupancy of cliff sites by raptors. In addition, cliffs were evaluated for their potential use by nesting raptors. Raptor nest sites and habitat data were digitized into ArcInfo Geographic Information System databases. Significant sites (nest locations, cliff areas) were classified to habitat types based on ecological land survey maps.

Five potential cliff sites were found in the Yukon Training Area, but the habitat value for these were judged poor to fair. The small number and size of streams in the Yukon Training Area limits the potential for tree nesting bald eagles. A federally listed threatened species in the lower 48, the bald eagle is locally common. Nest have been located in Granite Tors within the Chena River State Recreation Area just north of Yukon Training Area, and along the Salcha and Tanana Rivers (Ritchie and Rose 1998).

The American peregrine falcon (*Falco peregrinus anatum*) was recently delisted from endangered species status. Though not known to nest on Fort Wainwright, it is an infrequent migrant. Potential peregrine falcon habitat for feeding or nesting can be found in the Salcha Bluff area (Ritchie and Rose 1998). Although this raptor has been recently delisted, the U.S. Fish and Wildlife Service requests that USAG-AK continue consultation on any projects taking place in the Yukon Training Area that may hinder their recovery. The golden eagle (*Aquila chrysaetos*) is a resident of forest and alpine habitats of the installation (Nakata Planning Group 1987).

Fall waterfowl surveys were conducted in the Yukon Training Area in 1998 to determine the extent and importance of staging areas. The western portion of the Yukon Training Area, with its lakes, ponds and sloughs, provide a variety of foraging and staging habitats for waterfowl during fall migration (Anderson et al. 2000). There is widespread use of these areas by waterfowl throughout the breeding season, including fall migration. Tanana Flats Training Area may also provide important staging and breeding sites for many migrating shorebirds, but relatively little is known about the occurrence or use of this area.

The Alaska Bird Observatory (Benson 1999) collected basic information on the distribution of landbirds in various habitat types using the Ecological Land Classification for the Yukon Training Area and Tanana Flats Training Area. Some habitats were selected or avoided by particular species of landbirds. Other landbirds were classified as generalists and found over a variety of habitats on Fort Wainwright.

Avian surveys have not identified any threatened or endangered species on Fort Wainwright. The Tanana Flats Training Area most likely does not have the habitat for cliff-nesting raptors. Seven birds are listed as state sensitive (U.S. Army Alaska and Center for Ecological Management of Military Lands 1999): the gray-cheeked thrush (*Catharus minimus*), blackpoll warbler (*Dendroica striata*), American peregrine falcon, golden eagle, olive-sided flycatcher (*Contropus borealis*), arctic peregrine falcon (*Falco peregrinus tundrius),* and Townsend's warbler (*D. townsendii)*. All but the arctic peregrine falcon have been confirmed on Fort Wainwright (U.S. Army Alaska and Center for Environmental Management of Military Lands 1999). The gray-cheeked thrush was commonly noted in surveys (Bureau of Land Management and U.S. Army 1994b).Two species found during the breeding season on Fort Wainwright are considered sensitive by the U.S. Forest Service: the osprey and trumpeter swan (*Cygnus buccinator*). Further, a number of species confirmed on Fort Wainwright during the breeding season, have been identified and included by the 2005 Boreal Partners in Flight Working Group watchlist (discussed at its

2005 conference meeting) as target or priority species for monitoring because of declines in populations noted across the Americas.

On Fort Wainwright, spruce grouse (*Dendragapus canadensis*), ruffed grouse (*Bonasa umbellus*) and sharp-tailed grouse (*Tympanuchus phasianellus*) are popular game birds. Willow ptarmigan (*Lagopus lagopus)* occur in small numbers on Fort Wainwright. Hunting is permitted, but hunting effort and harvest are relatively low because ptarmigan habitat on Fort Wainwright is difficult to access. Currently ptarmigan populations are not being monitored on Fort Wainwright. Ruffed and spruce grouse are the most harvested small game species on Fort Wainwright. Increased surveying is necessary to improve management for ruffed grouse. Little is documented regarding the distribution and relative population size of ptarmigan on the post.

Upland gamebirds including spruce grouse, ruffed grouse and sharp-tailed grouse are popular among the hunting and birding populace of Fairbanks, Fort Wainwright and Eielson Air Force Base. Willow ptarmigan also occur in small numbers on Fort Wainwright. Hunting is permitted; however, effort and harvest are relatively low because ptarmigan habitat on Fort Wainwright is difficult to access. Currently ptarmigan populations are not being monitored on Fort Wainwright. Ruffed and spruce grouse are thought to be the most harvested small game species on Fort Wainwright. Increased surveying is necessary to improve management for ruffed grouse. Little is documented regarding the distribution and relative population size of ptarmigan on the post.

D2.2.1.1.2 Donnelly Training Area

A survey of cliff and tree-nesting raptors on Donnelly Training Area was conducted in 1998 by ABR, Inc. (Anderson et al. 2000). This project located and mapped active and inactive nest structures for three sensitive raptor species–peregrine falcon, golden eagle, and bald eagle–and collected incidental information on other cliff-nesting (e.g., gyrfalcon (*Falco rusticolus*) and tree-nesting (e.g., northern goshawk (*Accipiter gentilis*) and great grey owl (*Strix nebulosa*)) species. The area is well within the breeding range of peregrine falcons, gyrfalcons, golden eagles and red-tailed hawks (*Buteo jamaicensis*). A pre-leaf-out (mid-May) aerial survey was used to identify and map large stick nests (bald eagles) as well as incidental nest sites for other tree-nesting species. Survey crews (pilot and two observers) used a Cessna 185 (Anderson et al. 2000). An early to mid-incubation period survey (late May-early June) was used to identify large stick nest platforms and/or occupancy of cliff sites by raptors (golden eagles and peregrines). The golden eagle is the most commonly occurring cliff-nester in the study area, and three golden eagle nests were found. Unoccupied golden eagle nests were observed near Molybdenum Ridge and on Ptarmigan Creek. No bald eagle nests were identified. Cliffs were evaluated for their potential use by nesting raptors, and several suitable sites were identified (Anderson et al. 2000). Whitewash found along the cliff areas of Molybdenum Ridge was characteristic of gyrfalcons, although no gyrfalcon or peregrine falcon nests were recorded. Cliff sites along Molybdenum Ridge and the Little Delta River seem to offer the best habitat for peregrine falcons (Anderson et al. 2000). An active peregrine falcon nest was located on a bluff above the Delta River by USAG-AK natural resource personnel in July of 2004.

Anderson et al. (2000) used point count methodology to conduct landbird surveys in 1998 on Donnelly Training Area. Nine of ten birds listed as priority species by the Western Working Group, Partners in Flight (1998) were found. These surveys were part of an avian planning level survey and were conducted to develop Geographic Information System databases, bird-habitat models, and status reports. A follow-up survey was conducted in 2003 by the Alaska Bird Observatory to better define habitat selection of landbirds and to focus especially on previously documented species of concern.

Two species confirmed on Donnelly Training Area are considered sensitive by the U.S. Forest Service: the osprey and trumpeter swan. No osprey nests have been found on Donnelly Training Area, but ospreys have been observed during migration.

USAG-AK natural resource personnel have conducted aerial trumpeter swan brood surveys on Donnelly Training Area. Results suggest swans are increasing their range and use of Donnelly Training Area lakes for nesting. The U.S. Fish and Wildlife Service began conducting statewide trumpeter swan surveys in the 1960s but did not include Donnelly Training Area because habitat was considered marginal. A U.S. Fish and Wildlife Service survey did include some portions of Donnelly Training Area in 1995, but in 2000, swan surveys were taken over by USAG-AK. Aerial brood surveys were conducted on Donnelly Training Area in 2001 and 2003 and as many as 60 swans were observed. All but one brood was located on Donnelly Training Area West.

A number of species confirmed on Donnelly Training Area are included on the Boreal Partners in Flight Working Group (1999) list of priority species for monitoring because of declines in populations noted across the Americas. There are no legal requirements to manage these species, although all migratory bird species are afforded some protection under the Migratory Bird Treaty Act.

During migration periods, more than 300,000 cranes (up to half the world's population) and 20,000 geese, ducks, and swans pass through the Greely/Delta area. The quality of Donnelly Training Area wetlands could be a significant contribution to their importance to fall-staging waterfowl. In spring, the majority of the migrating sandhill cranes (*Grus Canadensis*) pass through Donnelly Training Area between 27 April and 15 May (Anderson et al. 2000).

Donnelly Training Area supports healthy populations of spruce grouse, ruffed grouse and sharp-tailed grouse. All three species can be abundant during peaks in their natural population cycles. The Delta Junction area, including Donnelly Training Area, has some of the highest densities of sharp-tailed grouse in Alaska and grouse hunting is popular. Donnelly Training Area was identified as important winter habitat for sharp-tailed grouse during an Alaska Department of Fish and Game funded study that assessed movements and habitat use of sharp-tailed grouse in the Delta area (Raymond 1999).

Additional bird surveys conducted annually on Donnelly Training Area by USAG-AK personnel include a Breeding Bird Survey route, ruffed grouse drumming surveys and sharp-tailed grouse lek surveys. In 2006 and 2007, plots to monitor long-term trends in Alaska landbird populations are planned for establishment. These plots will follow the Alaska Landbird Monitoring Survey Protocols designed by Boreal Partners in Flight.

D2.2.1.1.3 Fort Richardson

The U.S. Fish and Wildlife Service conducted the first systematic waterfowl surveys on Fort Richardson in 1996 and 1997 as part of a Legacy project. Lakes and ponds were surveyed for the presence of loons, grebes and other waterfowl during the spring migration. Results of this survey will be used to determine additional monitoring needs for waterbirds.

The Eagle River Flats contamination issue resulted in a great increase in survey efforts, particularly for waterfowl, shorebirds, bald eagles and other avian species associated with Eagle River Flats. Surveys of this important area on Fort Richardson will continue, as required for monitoring and remediation efforts on Eagle River Flats. Results will be recorded in memoranda and electronic databases.

A 1994 U.S. Fish and Wildlife Service raptor inventory on Fort Richardson (Schempf 1995) identified six different types of raptors: bald eagle, golden eagle, northern harrier (*Circus cyaneus*), red-tailed hawk, Harlan's hawk (dark phase of red-tailed hawk), and sharp-shinned hawk (*Accipiter striatus*). Although no goshawks were found during this inventory, they are known to inhabit the forested areas of the post. The 1998 vegetation map will be used to pinpoint likely habitat for goshawks and intensive ground surveys will be conducted in those locations.

The U.S. Fish and Wildlife Service conducted the first intensive owl surveys on Fort Richardson in 1997 (Browne and Andres 1998). Three species of owls were identified: great-horned (*Bubo virginianus*), saw-whet (*Aegolius acadicus*) and boreal (*Aegolius funereus*). The boreal owl was the most common species with nine birds recorded. Seven great-horned and six saw-whet owls also were recorded.

Fort Richardson has abundant spruce grouse populations. Ruffed grouse have been introduced to south-central Alaska recently and some huntable populations have become established. Ruffed grouse have been documented on Fort Richardson but not in substantial numbers and harvest is unknown. An average of about 250 spruce grouse are harvested on Fort Richardson each year, with most being killed soon after the opening of the season. Ptarmigan harvest is insignificant, with an average of about 50 per year.

Three species of ptarmigan occur on Fort Richardson, but populations are not being monitored and hunting is somewhat limited because ptarmigan generally inhabit areas in the mountains that are far from the road system on post.

Because the three projects outlined above are limited in their coverage of potential bird habitats on Fort Richardson, a specific bird checklist survey (atlas survey) was also completed. This atlas survey is designed to determine species distribution and abundance on a base-wide scale. In this survey, biologists systematically search the post for bird species throughout the months of June and July, following the methods of Andres (1995). Almost all areas of the base were visited in multiple years between 1994 and 1999. A total of 122 species were recorded during the breeding season (Andres 2005).

D2.2.1.2 Moose Surveys

Comprehensive planning level surveys for Alaskan moose (*Alces alces gigas*) have not been conducted because moose are found everywhere on USAG-AK lands. Thus, efforts for moose are focused on annual monitoring.

D2.2.1.2.1 Fort Wainwright

Fort Wainwright is included in the Alaska Department of Fish and Game's Game Management Unit 20, which supports the state's largest moose harvest. Although not considered good winter moose habitat compared to the foothills portion of Game Management Unit 20A, the Tanana Flats Training Area supports year-round resident moose population at moderate to high densities, with the highest numbers during spring and early summer. Moose also concentrate along the South Fork Chena River in the Yukon Training Area during fall and winter months. The moose population is estimated to be growing, at 4-6% annually due to the cessation of antlerless hunts in 2004. Moose populations are nutritionally stressed, resulting in low productivity; however, survival rates are relatively high due to relatively low predation rates. There is no evidence in the last decade that predator numbers have been increasing (Young 2006)

D2.2.1.2.2 Donnelly Training Area

Moose is the most visible and economically important wildlife species on Donnelly Training Area. The Alaska Department of Fish and Game's Game Management Unit 20A has one of the state's largest moose harvests, which encompasses the western portion of Donnelly Training Area. The south-central and northeastern portion of the Donnelly West Training Area and the far southern portion of the Donnelly East Training Area see concentrations of moose during the fall season. Spring and summer concentrations are found in the north-central portion of the Donnelly West Training Area. Winter concentrations are found in the northeastern portion of the Donnelly West Training Area, as well as the northern portion of the Donnelly East Training Area (Bonito 1980).

D2.2.1.2.3 Fort Richardson

The moose population on Fort Richardson was relatively stable during the period from 1986 to 1994 (Quirk 1996). This stability was due mainly to excellent summer feeding ranges, mild winters with light snowpack, and few predators in calving areas to affect productivity. Although winter habitat created by hydro-axing has generally helped to increase the food supply, in some areas it has been limited and in others, overbrowsed. A dramatic decline in the moose population occurred in the winter of 1994–1995 when a deep snowpack persisted for the longest duration in over 25 years in south-central Alaska. Results from the November 1996 aerial moose survey indicated a 26% loss in the total number of moose on Fort Richardson since the previous survey in 1994.

The target population size for the Fort Richardson moose herd (including Elmendorf Air Force Base and Ship Creek) has fluctuated over the years but is currently set at 500 animals. This is a reduction from years past and is based on concerns such as moose-auto collisions, conflicts with people and pets, loss of considerable acreage of former moose habitat to construction and development, declining productivity of the herd, and excessive pressure on remaining winter habitat on Fort Richardson. Declining productivity of the herd is indicated by a significant decrease in calf:cow ratios from 60 and 58 calves/100 cows in 1986 and 1987 to 28–38 calves/100 cows in all subsequent surveys beginning in 1988. Although natural fluctuations occur in the environment, such large differences over several years of surveys are indicative of other confounding problems.

During 1996 and 1997, a study was conducted to develop a diameter-mass relationship model to measure and predict utilization of willows by moose. The model was used to estimate utilization of the two most common willow species browsed by moose. These site specific estimates of browse utilization enabled USAG-AK biologists to identify discrete areas to be targeted for habitat rehabilitation. The application of the browse utilization model in the USAG-AK Geographic Information System, in combination with other data layers (vegetation map, soils, and topography), provided a powerful tool for the management of moose habitat and the planning of habitat improvement projects.

D2.2.1.3 Bison Surveys

The Delta bison herd is located in the Delta Junction/Donnelly Training Area. There are no bison on Fort Wainwright or Fort Richardson. The bison on Donnelly Training Area migrate between private, state and USAG-AK lands. The following section is taken from Ajmi and Payne (2005).

Archeological evidence indicates ancestors of modern bison colonized North America via Asia, by crossing over the Bering Land Bridge (Reynolds et al. 1982). Two subspecies, the wood bison (*Bison bison athabascae*) and plains bison (*B. bison*), developed from the original migrants, occupying different parts of North America. Wood bison are thought to have thrived in Alaska, including along the Delta River, until about 200 to 300 years ago when they became extinct most likely due to a combination of changing habitat and overhunting (Skinner and Kaisen 1947; Stephenson et al. 2001).

Plains bison were introduced into the Delta area in 1928 by the U.S. Biological Survey/United States Department of Agriculture as part of an experimental wildlife introduction program. The U.S. Department of Agriculture managed the herd until the Alaska Department of Fish and Game took over at statehood, 1959 (Burris and McKnight 1973). At the time, the existence of wood bison in Canada was not known.

The Delta bison herd flourished, increasing 600% to 150 animals by the mid 1930s (Gabrielson 1936). By 1947, the bison herd had increased to approximately 393 individuals, and the Alaska Game Commission began issuing hunting permits in 1951 (Elkins and Nelson 1954). In the 1930s, it was reported that the bison ranged primarily along the streambeds of Jarvis and Granite creeks and the Delta River (Gabrielson 1936). It was further reported that the herd was found along the Delta Clearwater River during the winter,

possibly grazing on the grass made available by the open water system (Anonymous 1929). A 1940 Palmer report provides accounts of sightings along Jarvis Creek, between the Richardson Highway and Delta River from Beales Cache and Donnelly, as well as Delta Creek.

The Alaska Department of Fish and Game reports the Delta bison herd has ranged over an area extending from the hills north of the Tanana River, south to the Alaska Range, as far east as Healy Lake and as far west as the Little Delta River. Currently, according to Alaska Department of Fish and Game surveys, during summer migration to the Delta River, the bison typically make their way to Texas Range, on the Donnelly Training Area, travel south as far as Black Rapids Glacier and the Alaska Range, then slowly make their way back north during June and July feeding along the river and at Texas Range. By August, they begin migrating back to the Delta Junction Bison Range and the Delta Agricultural Project.

Originally, the Delta bison herd migrated from the summer range to the winter range, including the Delta Agricultural Project area, via three routes. The first route crossed Texas Range to 33 Mile Loop Road, across Jarvis Creek and then north across the Alaska Highway into the Clearwater farming district. The second route led from Texas Range north along the river to Alabama Range, crossing to Allen Army Airfield, Buffalo Drop Zone and then north to the agricultural fields. Finally, the route most used by the Delta bison herd, was between the first two routes already described. Moving from the Texas Range along Meadows Road, the bison traveled across the Richardson Highway, north along the pipeline right-of-way, heading east at Fort Greely main gate, or along the Key-Hole Road, Meadows Road Extension, and eventually either traveled north along Jarvis Creek to Buffalo Drop Zone or crossed Jarvis Creek and north into the agricultural area. The animals crossing east at Fort Greely main post fed on lawns and disrupted post operations, especially on Allen Army Airfield (Kiker 1979). Because of recent fencing around Fort Greely, bison have been restricted from these historic migratory routes. The combined effects of the fencing at Fort Greely has been to restrict the Delta bison herd from their historic migration routes. Further fencing across their migratory route may substantially alter their migration patterns in the future (DuBois personal communication 2006).

The question as to when and where bison actually go to calve was an important piece of information necessary for military planning purposes and to limit military impacts to the Delta bison herd. Therefore, in March 2002 after consultation with Alaska Department of Fish and Game, and per regulations stated in the Integrated Natural Resources Management Plan (U.S. Army Alaska 1998), USAG-AK natural resources personnel decided to begin a calving study of the Delta bison herd. Aerial surveys were established to document the location, distribution and time line of bison during the calving season. Surveys, primarily conducted in May of each year, began in 2002 and ended in 2005.

During 2002, 41 – 62 % of all adult bison visible from the air were located. Overall, the survey year began with the detection of all bison south of the Texas and Washington Ranges on the Delta River floodplain. By the second week it appeared that some movement north was taking place as a group of animals was detected in the Washington Impact Area. By the third week, it was apparent that herd composition had split between larger and more numerous groups located in the Washington Range and Impact Area and a herd located south in the Buffalo Dome and Black Rapids Glacier area. By late May, bison were located further north than previously identified, including the first USAG-AK survey sighting of herd activity on Texas Range. Interestingly, the herd here was well off of the Delta River floodplain, located in wet meadows south of Big Lake. Suspecting that a major move had occurred since the last survey, it was believed that the animals had moved out of the areas used earlier in May and had since gone to points further north, leaving the river floodplain for grazing areas off the river. Lower numbers were sighted by the pilot and observer, leading to the assessment that many animals had moved outside the "survey area".

In 2003, 70%- 92% of all adult bison were located. Early in May, the majority of the bison herd appeared to be located north of Texas Range, in the Washington Impact Area. By the second week in May, however, herd composition seemed to be split between the Washington Impact Area and the area south of Texas Range. Bison were found on Texas Range during the month of May. By mid-May, bison were found in a burn area in Michigan Lakes and Impact Area Buffer Zone. It appeared that some of the herd continued its movement into this area throughout the second half of May.

In 2004, 76 – 85% of all adult bison were detected. During 2004, the bison generally seemed to be distributed further south than in 2003. The two most northern sightings this year were seen during the '04 May survey (3 adults), and again on the 19 May survey (22 adults and 2 calves) in the Mississippi Impact Area. These two sightings were isolated from the majority of the bison. No bison were located in the 1999 Donnelly Flats burn, and only two sightings of bison were seen on the Texas Range during the 2004 season. Both of the Texas Range sightings were during the 19 May survey and represented only 5 adults. No calves were seen on Texas Range. More bison than ever were seen west of the Delta River in the Michigan Lakes Impact Area and Buffer Zone, in the burn area. This region appeared to be a popular grazing spot for adults. Popular calving areas appeared to be the Washington Impact Area, Washington Range (river floodplain portion), and the grass meadow area northeast of Buffalo Dome known locally as "Buffalo Flats" on the west side of the Delta River. There did appear to be a large number of adults and calves this year south of the installation boundary with the furthest south sighting near Black Rapids Glacier.

In 2005 the Alaska Department of Fish and Game reported seeing bison on Texas Range on 29 March 2005 and in the Big Lake area on 3 April 2005. Only one USAG-AK survey was flown before the tragic loss of Tony Payne, USAG-AK natural resources specialist and pilot. Therefore calving data is incomplete. However, the April survey was the earliest ever flown by USAG-AK and confirmed earlier Alaska Department of Fish and Game reports of bison migration being completed by April.

USAG-AK Delta bison calving surveys located animals during a small period of annual activity ranging from 13 April – 30 May between 2002 and 2005. Surveys indicate that the bison prefer the Delta River floodplain. The percent of adult animals counted on each survey ranged between 41 – 92% of the entire Delta bison herd (based on Alaska Department of Fish and Game herd goal of 360 animals). The Delta bison herd goal of 360, as put forth by the Alaska Department of Fish and Game, is a pre-calving goal; therefore, calves were not added to the percent counted during the survey. The percent of animals located varied depending on weather and logistical problems, including sightability issues. Bison movement patterns seemed to vary by year.

According to Alaska Department of Fish and Game reports and USAG-AK observations, bison migration from the Delta Junction Bison Range typically begins in February. E. Clark (pers. comm.) reported seeing the bison and numerous tracks along 33 Mile Loop Road in mid- to late-February 2002. During a USAG-AK caribou survey on March 22nd, 2004, the crew noted 128 bison on Texas Range and 4 individuals near 12-Mile Crossing. A great number of tracks oriented from the northeast were also detected. Bison were also observed on the north side of AT&T Hill near Donnelly Dome and in the Dry Lakes area particularly in the 2003 Texas Range burn, and tracks were discovered in the food plots. During a February 12th, 2005 USAG-AK caribou survey, the crew located a radio collared bison with a herd of 45 bison bedded down and/or feeding in an agricultural field near the Gerstle River, north of the Alaska Highway and east of the headwaters of the Delta Clearwater River. During the survey flight, no bison or sign were detected on Donnelly Training Area. On March 5th, 2005, during a USAG-AK caribou survey, the same radio collared bison was tracked and located with approximately 42 other bison on the Tanana River north of the agricultural fields. This group represented approximately 12% of the actual herd. On April 1st, 2001, 50 bison were reported moving across the Richardson Highway in the Donnelly Flats area. A March 6th,

2003 observation stated that 50 bison were located roughly half way to the Delta River, about ½ mile north of Butch Lake (Dubois 2004).

Bison seem to stay in and around the Delta River floodplain into late July and early August. Alaska Department of Fish and Game conducted a bison survey during August 1st, 2002, in which two groups totaling 30 animals were still on the Delta River. In 2003, an Alaska Department of Fish and Game survey conducted on July 20th indicated that bison migration had begun, and animals were still located on the Delta River and on military land further east. An Alaska Department of Fish and Game survey flown August 10th, 2003, located one group of 23 bison along the Delta River on military lands. The band of 23 bison was still present on military land during the Alaska Department of Fish and Game survey on 30 August, but by September 8th had moved to the Delta Junction Bison Range. No bison were found on military land along the Delta River after the 30 August survey (C. Brown ed. 2004; S. DuBois, pers.com 2005).

D2.2.1.4 Caribou Surveys

Fort Wainwright is part of the historic range of the Fortymile (Yukon Training Area) and Delta (Tanana Flats Training Area) caribou herds; however, currently, caribou are rarely found on the installation. The Delta and MaComb herds currently range throughout Donnelly Training Area.

During the early 1900s, the Fortymile herd was the largest in Alaska and one of the largest in the world, ranging over 85,000 square miles. In 1920, the herd was estimated at 568,000, but herd size fell to 10,000-20,000 in the 1930s. The herd grew to perhaps 60,000 in 1956, but it decreased to about 6,500 by 1973. This decline was probably due to over harvesting, unfavorable weather, and wolf predation. By 1990, the herd had increased to about 22,000 caribou, and has remained stable (U.S. Army Alaska 1995). Caribou hunting opportunities are very limited on Fort Wainwright and no caribou have been taken from the installation in recent years.

The Delta caribou herd is one of 32 herds or populations in Alaska (Alaska Department of Fish and Game Wildlife notebook series), and it ranges throughout moist tundra habitat along the Alaska Range between the Delta River and the Nenana River. This relatively small herd used to spend spring and summer on calving grounds in the Trident Glacier foothills. The Alaska Department of Fish and Game conducts regular surveys on both the Delta and Macomb caribou herds. Currently the bulk of calving occurs in other parts of the Alaska Range west of Donnelly Training Area; however, caribou are present in small numbers year-round on Donnelly Training Area West. Since 2000 a significant number of Delta herd animals have spent the winter mixing with Macomb herd animals in the Donnelly Flats area of Donnelly Training Area East and adjacent foothills. The population of this herd was greater than 10,000 in 1989 but since then has declined steadily. Herd size was estimated to be about 2,500 in 2003 (Alaska Department of Fish and Game 2005). The Alaska Department of Fish and Game estimated the 2004 Delta caribou herd population to be 2,168. The Macomb herd was estimated between 500 to 550 animals in 2003.

The following section is taken from Ajmi and Payne (2005). The Delta caribou herd primarily occupies an area in the northern foothills of the central Alaska Range between the Delta and Nenana rivers. During the mid- 1980s, calving areas were primarily located between the Delta and Little Delta rivers. However, as the herd size increased during the mid 1980s, calving began to extend into the Dry Creek area, and by 1993, they were reported as using the upper Wood River, Dick Creek, upper Wells Creek, and upper Nenana and Susitna drainages (Valkenburg et al. 2002; Valkenberg et al. 1988). According to the Alaska Department of Fish and Game, the majority of calving in recent years has been in the upper Susitna and upper Yanert drainages. Some calving has also occurred on the north side of the Alaska Range between the Little Delta and Tatlanika rivers. A few Delta caribou do calve on military lands east of the Little Delta each year (Mark Keech, pers. comm.). The Delta caribou calving area is delineated in the 2002-

2006 Donnelly Training Area, Alaska Integrated Natural Resources Management Plan. During the fall and winter of 2000, the Alaska Department of Fish and Game noted a significant portion of Delta caribou herd located on Donnelly Dome and Flats area.

The Macomb caribou herd utilizes the mountains of the eastern Alaska Range, from the Delta River to the Mentasta highway, concentrating activity between the Robertson River and Jarvis Creek. The Alaska Department of Fish and Game reports that the Macomb caribou herd also utilizes the Tanana River valley lowland for forage during the winter season. Primary calving grounds for the Macomb caribou herd are located on the Macomb plateau. The history and management regarding both the Delta and Macomb caribou herds can be found in the Alaska Department of Fish and Game 2003 management report.

Numerous survey studies concerning the Delta and Macomb caribou herds have been conducted over the years (Dubois 2001; Froehle 1982; Magoun et. al. 2003; Young 2001 & 2005a/b). During a five day period in May 1979, a cooperative project led by Alaska Department Fish & Game and supported by U.S. Army Alaska surveyed calving caribou in a 90 mile^2 area located between Delta Creek and Delta River along the southern boundary of Donnelly Training Area (Alaska Department of Fish and Game 1980). Alaska Biological Research, Inc. and University of Alaska Fairbanks performed noise sensitivity studies on Delta herd animals subjected to over-flights during Air Force training activities on the west side of the Delta River (Maier et. al 1998). The Alaska Department of Fish and Game routinely tracks and monitors collared animals for both the Delta and Macomb herds.

During the late 1990s and early 2000s, it was noted that caribou had begun to use Donnelly Training Area East (in the vicinity of Donnelly Dome and Donnelly Flats). Proposals for military development in this area spurred natural resource staff interest in possible conflicts with caribou and/or caribou habitat. At that time, resource managers did not know the degree of caribou use of Donnelly Training Area East, when activity occurred, or to which herd animals belonged. Both the Macomb and Delta herd's ranges overlap on Donnelly Training Area East and both herds have unique management strategies as put forth by the Alaska Department of Fish and Game. Prior to February 2004, no specific survey concentrated on caribou use for the Eddy Drop Zone, Donnelly Drop Zone, and Texas Range areas. The decision was made to establish aerial surveys specifically designed to study caribou presence in and use of Donnelly Training Area as a whole for management assessment and development purposes.

Survey data suggests that the Delta caribou herd is widely dispersed from the western boundary of Donnelly Training Area at Little Delta River across to the southeastern boundary in the Jarvis and McCumber Creek areas. Data also suggests that the Macomb caribou herd uses the Ober Creek, Granite Creek, Jarvis Creek, Coal mine lakes, and McCumber Creek areas extensively. Although these areas are south of the Donnelly Training Area boundary, they are close enough for caribou to wander across onto Donnelly Training Area quickly and easily. Radio-collared Caribou 079 was detected and confirmed in these areas five times, often accompanying un-collared animals. Herd affiliation for this animal has been difficult to determine due to identical collar frequencies and numbers. This frequency has been detected and tracked to the same relative area on different surveys, and has been accompanied by both Delta (January 8th 2005), and Macomb, (November 26th 2004), collared individuals. Seven surveys detected activity in these areas, documenting herds up to 150 individuals often containing multiple collared individuals. The attraction to this region may be due to vegetative attributes. This area is described as Alder-Willow-Shrub Birch forest type habitat. Caribou consume the leaves of willows, sedges, flowering tundra plants, and mushrooms. They switch to lichens (reindeer moss), dried sedges, and small shrubs (like blueberry) in September (Alaska Department of Fish and Game 1999). Consistently locating caribou in this region may indicate the importance of the habitat to both herds.

Survey information reaffirmed the fact that the Macomb and Delta herds are mixing as documented on Jan 8th 2005. To what extent mixing, immigration, and perhaps breeding, occurs is unknown. Some

confusion has ensued with the difficulty of maintaining individual identification with respect to tracking movement and associations over time.

Caribou prefer treeless tundra and mountains year-round, but may winter in the boreal forest (taiga). Calving areas are usually located in open areas or plateaus. Caribou tend to calve in the same general areas year after year, but migration routes used for many years may suddenly be redirected to new areas with more available or higher quality food (Alaska Department of Fish and Game 1999). No calves were ever detected during the surveys, however, no effort was made to detect all animals on Donnelly Training Area at one time, rather the focus was on radio-collared animals. In 1979, biologists studied a major Delta herd calving area located at the southern boundary of Donnelly Training Area. At the time, calving ratios were very optimistic (Alaska Department of Fish and Game 1980). No current USAG-AK documentation, besides that found in the 2002-2006 Donnelly Training Area Integrated Natural Resources Management Plan, has been discovered concerning recent calving areas on Donnelly Training Area. The Alaska Department of Fish and Game conducts routine parturition surveys and may have possible locations for those few caribou that do calve on Donnelly Training Area.

D2.2.1.5 Bear Surveys

D2.2.1.5.1 Fort Wainwright

Since 1974, the number of black bear (*Ursus americanus*) harvested on Tanana Flats Training Area has varied from 0 (1975) to 25 (1981), and 1 (1979) to 15 (1977) on Yukon Training Area (Hechtel 1991). Since 1974, the bag limit has been three bears annually with no closed season. Hechtel (1991) studied black bears on Fort Wainwright from 1988 through 1991, concentrating on Tanana Flats Training Area. Between 1988 and 1991, 29 radio-collared bears were located 916 times. Mean home range sizes were used to estimate densities of 46-67 bears/1,000 km^2. Forty-seven den sites were located. Fifteen den sites were in spruce habitat types, 9 in birch/aspen stands, 17 in alder/willow shrubs, 6 in heath meadows, and none in marshes. There is no apparent shortage of den sites.

Bear harvest appeared to be directly linked to access, with a mean harvest of 11.2 bears/year from Tanana Flats Training Area and 9.8 from Yukon Training Area during the study period. Overall harvest was judged to be sustainable, although areas in Yukon Training Area may have localized over-harvest. No serious black bear conservation problems were identified related to Fort Wainwright land management.

This study emphasized Tanana Flats Training Area due to difficulty in capturing black bears in Yukon Training Area. Thus, there is little information on this important component of the Unit 20 black bear population. Overall harvest on Fort Wainwright was judged to be sustainable, although the Yukon Training Area may have localized over-harvest. There is little information on the Yukon Training Area component of the Unit 20 black bear population. New and better population estimates for this area will provide information that will enable the Alaska Department of Fish and Game and USAG-AK to maintain black bear harvest sustainability.

Only a few grizzly bears (0-3 annually during past five years) are harvested from Fort Wainwright. In 1995, USAG-AK funded the Alaska Department of Fish and Game to study family relationships and among-population movements (using DNA analysis) and effects of poaching on grizzly bears.

During 1996, the third phase in a long-term investigation of the effects of harvest on grizzly bear (*Ursus arctos horribilis*) population dynamics continued in a 3160-km2 area of the north-central Alaska Range. The total population size declined during the first two phases. Because they are productive and the most stable of any sex and age segment of the population, the change in numbers of adult females (greater than or equal to 6 years of age) was selected as the most representative measure of population status and

recovery. The mean size of the adult female segment of the population was stable at 22 (range = 21-23) from 1981 to 1988 but declined to 15 by 1992. During 1993-1996, human-caused mortality accounted for 9.5% of annual female populations; natural deaths accounted for 1.9%. Even so, the population recovered at an annual rate of 6.3% to 19 adult females by 1996. If this rate persists, recovery will be achieved by 1999. However, these rates should be viewed skeptically and not applied to management without further confirmation because the recovery was also accompanied by the highest measures of reproductive performance recorded during this 16-year study. Mean age at first parturition was 6 years during 1981-1996, initial litter size was 2.1 cubs, and litter size at weaning was 1.9. Mortality rates of offspring under maternal care was 28% for cubs, 13% for yearlings, and 4% for 2-year-olds. Further genetic analysis of this population is being analyzed; these data will be used to compare predictive models with actual grizzly bear population decline and recovery observed in the Alaska Range during 1981-1997. Following further consultation with a biometrician, a model to calculate sustainable mortality rates in Interior grizzly bear population will be completed.

The Alaska Department of Fish and Game was able to determine the genotypes of 78 bears and find that the average number of alleles and average heterozygosity in this population is higher than other brown bears populations. There were no differences between males and females in this population or in the Brooks Range population studied earlier. The average number of alleles and the average heterozygosity suggests that migration or perhaps turnover in this hunted population is increased over other populations for which there is comparable data.

D2.2.1.5.2 Fort Richardson

Starting in 2004, USAG-AK partnered with Alaska Department of Fish and Game and Elmendorf Air Force Base to conduct brown bear (*Ursus arctos*) habitat use and food resource surveys. Brown bears range over most of the state of Alaska. Some regional bear populations, however, may be declining due to increased human-caused mortality, human encroachment, and habitat alteration. Brown bears are frequently found on both Fort Richardson and Elmendorf Air Force Base. Effective management of brown bears on these military lands requires information on bear numbers, habitat use, and movements. These data can best be gathered through development of a joint brown bear research program between the Alaska Department of Fish and Game, Fort Richardson, and Elmendorf Air Force Base. The specific objectives for this work are listed below.

- Characterize the range of brown bear use on Fort Richardson and Elmendorf Air Force Base and identify fine scale (sub 10m) habitat utilization by brown bears on Fort Richardson and Elmendorf Air Force Base and nearby lands.
- Determine a reliable count of the minimum number of individually identified bears using Fort Richardson and Elmendorf Air Force Base lands.
- Determine the foods consumed by brown bears using Fort Richardson and Elmendorf Air Force Base lands.

The Alaska Department of Fish and Game captured 10 adult female brown bears across the greater Anchorage-Eagle river area, including military lands. Each bear was outfitted with a radio collar, equipped with both VHF and Global Positioning System remote download capabilities. Bears were captured either by helicopter darting or in a culvert trap. All captures were conducted according to the Alaska Department of Fish and Game animal care and use policies. Collared bears were monitored periodically by aerial relocation, utilizing the VHF transmitter of the radio collars. Global Positioning System collars collected bear locations approximately once an hour and all data were retained in collar memory. Bears were located by aircraft approximately every two weeks, and archived data stored in the collar was uploaded to the aircraft. The Global Positioning System collars were programmed to collect data for two summers. All collars will be removed at the end of the study unless Alaska Department of Fish and Game priorities require the maintenance of the collars on individual bears.

Biological samples (hair, blood, and scat) were collected from all captured bears and from bears killed by hunters, vehicles or in defense of life or property in the study area. Additional hair and scat samples were collected from transects established in suitable bear habitat. DNA was extracted from all blood and hair samples. Samples of hair and scat collected on the transects were used to determine bear species, gender, and possibly individual identification for un-collared bears. DNA was extracted from blood samples collected from collared bears and bear hair samples gathered from scratching posts established in the study area. Microsatellite and mitochondrial analysis of these samples were combined with previously collected microsatellite and mitochondrial analysis of brown bears in nearby habitats to identify haplotype groupings. Laboratory analysis was conducted by Alaska Department of Fish and Game personnel in their lab. Hair and blood samples were analyzed for stable isotope concentrations of carbon, nitrogen, and sulfur to provide information on bear diet. Samples were prepared in the Alaska Department of Fish and Game lab in Anchorage, and the isotopic analysis was performed in the U.S. Geological Survey stable isotope lab in Denver, Colorado.

D2.2.1.6 Furbearer Surveys

No comprehensive furbearer planning level surveys have been conducted by USAG-AK.

D2.2.1.7 Wolf Surveys

No comprehensive wolf planning level surveys have been conducted by USAG-AK.

D2.2.1.8 Small Mammal Surveys

D2.2.1.8.1 Fort Wainwright

Small mammals play important ecological roles and are prey for a variety of predators. The Alaska tiny shrew (*Sorex yukonicus*) is a newly described and apparently rare species found in small numbers in widely separated parts of Alaska but has not been documented from Fort Wainwright lands. Other small mammals that are potentially rare inhabitants of Fort Wainwright include the long-tailed vole (*Microtus longicaudus*) and water shrew (*Sorex palustris*).

A small mammal survey conducted by ABR on the Yukon Training Area (Anderson et al. 2000; Jorgenson et al. 2000) included small mammal trapping in mid to late summer 1998 with additional trappings targeted at rare species in 1999. This study produced a list of mammal species that occur on the Yukon Training Area and identified small mammal habitat associations. The research also documented the occurrence of rare or poorly known mammals and assessed microtine/habitat associations useful in ecological land evaluations.

D2.2.1.8.2 Donnelly Training Area

Small mammals play important ecological roles as secondary consumers and as prey for a variety of predators. The Alaska tiny shrew is a newly described and apparently rare species, found in small numbers in widely separated parts of Alaska. Small mammals that are potentially rare inhabitants of Donnelly Training Area include the long-tailed vole, Alaska tiny shrew, yellow-cheeked vole (*Microtus xanthognathus*), and water shrew.

Small mammals were surveyed in 1998 and 1999 on Donnelly Training Area (Anderson et al. 2000). This survey produced a list of mammals that occur on Donnelly Training Area and assessed small mammal habitat associations for use in ecological land evaluations. No surveys of the Gerstle River Training Area have been done for small mammals.

Small mammals were surveyed on Donnelly Training Area from June – September, 2002 by USAG-AK personnel to augment the relatively short and small scale survey done previously by ABR, Inc. The goals of the survey were to document species composition and distribution as well as habitat use on Donnelly Training Area East. Snap traps, live traps and pitfall traps were employed. A total of 12,819 trap nights yielded 2,879 small mammal specimens of 10 species. Nearly 75% of the specimens captured were northern red-backed voles (*Clethrionomys rutilus*). Voles are known to be cyclic, but little is understood about this phenomenon. The ABR, Inc. survey found northern red-backed voles to be the third most common species captured with tundra vole (*Microtus oeconomus)* and common shrew (*Sorex cinereus*) being more common. During the USAG-AK survey, tundra vole was the third most common species captured and made up less than 5% of total captures. Four shrew species were captured in the USAG-AK survey. Common shrew was the most common of these, but total shrew captures comprised less than 3% of total captures. Comparatively, ABR, Inc. captured the same four shrew species but total shrew captures made up 33% of the total captures for that survey. The second most common species captured during the USAG-AK survey was meadow vole (*Microtus pennsylvanicus*), which made up almost 16% of the total captures.

Habitat associations were not clearly defined by this survey but several appeared to have high species richness values. Lowland Moist Meadow had the highest species richness values with a total of 8 species captured, followed by Lowland Wet Low Scrub with 7 species captured. Northern red-backed voles are habitat generalists and were common in a variety of habitats. Conversely, yellow-cheeked vole (*Microtus xanthognathus*) was not captured in this survey. It has not been documented on Donnelly Training Area but is expected here. It is relatively common in interior Alaska and its habitat preference is recent burns. Recently burned habitats were sampled on Donnelly Training Area but no yellow-cheeked voles were captured.

This survey was conducted during an apparent high in the red-backed vole cycle. Its presence in extremely high numbers may have been why USAG_AK results varied so markedly from the ABR, Inc. survey (Anderson et al. 2000). Inter-specific competition may have biased “normal” species abundance and distribution.

D2.2.1.8.3 Fort Richardson

An understanding of small mammal occurrence, distribution and abundance on Fort Richardson is an important component of the Range and Training Land Assessment program, the United States Army land inventory and monitoring program. In 1994, the University of Alaska Museum conducted the first inventory of small mammals on Fort Richardson and the first comprehensive inventory of small mammals in the Anchorage area. Protocols for this survey were established in the Range and Training Land Assessment Manual. The survey was not intensive enough to include all important habitats, but did result in a Checklist of the Mammals of Fort Richardson, Alaska, prepared by Cook and Seaton (1995). This survey provided significant information on area fauna. However, the survey period was limited to two weeks in August and species thought to occur in the area were not found in the survey, probably due to its short duration and predetermined sampling methodology.

In 2001, the U.S. Army Alaska Environmental Department at Fort Richardson conducted an inventory of small mammals to fill these voids of information on species occurring on Fort Richardson (Peirce 2002). A total of 11,160 trap nights yielded 1,199 specimens of the common shrew (*Sorex cinereus*), pygmy shrew (*Sorex hoyi*), dusky shrew (*Sorex monticolus*), tundra shrew (*Sorex tundrensis*), tundra vole, meadow jumping mouse (*Zapus hudsonius*), house mouse (*Mus musculus*), red-backed vole, meadow vole, northern water shrew, short-tailed weasel (*Mustela erminea*) and arctic ground squirrel (*Spermophilus parryii*). The captures of the northern water and pygmy shrews in the region represented important scientific specimens due to the lack of these species in museum collections.

Three new species of mammals were added to the checklist of mammals on Fort Richardson. The list was updated and 46 species of mammals are currently known from the post. We now have a well documented baseline of small mammal occurrence and a better understanding of their distribution, abundance and habitat associations on Fort Richardson.

Six species of bats are known to occur in Alaska; however, they are not found in abundance and are primarily limited to southeast Alaska. The little brown bat (*Myotis lucifugus*), the most common and wide ranging bat in the state, is found on Fort Richardson. It roosts in small colonies in abandoned buildings, mine tunnels, and caves, and may be found near a permanent source of water. Use of pesticides, disturbance and/or destruction of roosts, and loss of foraging habitat have resulted in a drastic decline of little brown bats in many areas. Nationwide, over half of all bat species are in trouble. Bats generally produce only one offspring per year, so recovery can be a lengthy process. Little is known about the little brown bat on Fort Richardson. University of Alaska, Anchorage graduate students have expressed an interest in conducting studies on Fort Richardson to determine current bat population and distribution, monitor population trends, identify day and night roosts, and map migration routes. Sources for funding these studies are being sought.

D2.2.1.9 Amphibian Surveys

The wood frog (*Rana sylvatica*) is the only amphibian known to occur on USAG-AK lands. Amphibian population declines and reports of amphibian deformities worldwide over the past decade or more have raised concerns over the status of amphibians in Alaska. Chytrid fungus (*Batrachochytrium dendrobatidis*) has been implicated in amphibian mass mortalities on five continents. It is not understood at this time how this pathogen is transmitted from place to place, how it kills amphibians or where it originated from. It is unknown if chytrid fungus exists in Alaska. Recently an Alaskan interagency team has begun to address amphibian conservation through coordinated surveys, education and information exchange. Annual statewide meetings have been well attended and USAG-AK staff has become involved with some of the coordinated statewide amphibian monitoring efforts. A wood frog survey route was established on Donnelly Training Area in 2001 using North American Amphibian Monitoring Program protocol. No detectable trends have been documented and wood frog populations on Donnelly Training Area appear to be stable. Fort Wainwright established a route on Yukon Training Area in 2006, and Fort Richardson will begin surveying in 2007.

D2.2.1.10 Dall Sheep Surveys

Dall sheep (*Ovis dalli dalli*) are found in the Molybdenum Ridge area in the southwestern portion of the Donnelly West Training Area. The population was estimated at less than 100 animals (Bonito 1980). Spiers and Heimer (1990) studied this herd and found five sub-populations. They noted that movements included lands both on and off Donnelly Training Area. This study found 150 sheep on Donnelly Training Area in winter and 100 in summer.

Dall sheep are also found in alpine and mountainous terrain on Fort Richardson. Wilson (1999) studied population trends and abundance in the Chugach Mountains including those on Fort Richardson.

D2.2.1.11 Fisheries Surveys

D2.2.1.11.1 Fort Wainwright

The Chena River flows directly through Fort Wainwright and supports one of the largest runs of Chinook (king) and chum salmon in the Tanana River drainage. The Chena River also supports a large population of Arctic grayling and smaller populations of northern pike (*Esox lucius*), burbot (*Lota lota*), sheefish (*Stendous leucichthys nelma [Pallas]*), and whitefish. Fewer fish species are found in the mainstream

Tanana River due to its higher silt load (Nakata Planning Group 1987). Species common in the Tanana River include year-round residents such as burbot, sheefish, humpback whitefish (*Coregonus oidschian*), and suckers; over-wintering migrant species such as grayling, round whitefish (*Coregonus nasus*), and northern pike; and migratory species such as salmon and Arctic lamprey (*Lampetra japonica*). Salchaket Slough and Bear, McDonald, and Clear creeks have the best fish habitats in the Tanana Flats drainage.

USAG-AK is currently partnered with the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service and the Yukon River Drainage Fisheries Association to inventory fish streams in Tanana Flats Training Area. Summary of survey results should be available in the fall of 2006.

D2.2.1.11.2 Donnelly Training Area

The Delta River is the most important fall chum salmon (*Oncorhynchus keta*) spawing in the Tanana River drainage and to some extent for coho salmon (*Oncorhychus kisutch*), although the latter are more common in the Delta Clearwater and Salcha rivers. Salmon spawn within two miles of the mouth of the Delta River and do not occur in upstream sections, including Donnelly Training Area. Major streams on Donnelly Training Area are generally silt laden and do not support fisheries. However, those streams are migratory corridors for Arctic grayling. A few clear streams flowing into these larger streams provide summer habitat for grayling, but none are important for spawning (Bureau of Land Management and U.S. Army 1994).

While some lakes and ponds on Donnelly Training Area have naturally occurring populations of lake chub (*Couesius plumbeus*), northern pike, sculpin, and longnose suckers (*Catostomus catostomus*), most are too shallow or oxygen deficient in the winter to support fish.

Baseline planning level surveys for fish have not been conducted on Donnelly Training Area. However, recently USAG-AK partnered with the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service and the Yukon River Drainage Fisheries Association to determine fisheries survey methodology and locations to be surveyed. Work on Donnelly Training Area will include streams flowing from the Oklahoma and Delta River impact areas, and streams flowing into Jarvis and Ober creeks which will meet mitigation requirements set forth in the Land Withdrawal Legislative Environmental Impact Statement (U.S. Army Alaska and Colorado State University 1999). These surveys will help determine which fish species use the various waterways that course through Donnelly Training Area.

D2.2.1.11.3 Fort Richardson

Otter and Clunie lakes attain depths of over 30 feet and may contain warm springs that provide sufficient oxygen levels for supporting fish over winter. Thompson and Waldon lakes are smaller in surface area and not as deep as Otter and Clunie lakes. They are therefore marginal in supporting over-wintering fish stocks. Some years in these lakes are total failures with no fish surviving over winter. Gwen Lake and Dishno Pond are shallow water bodies (eight feet or less) that rarely have fish survive the winter.

Gwen Lake supports a large population of fresh water amphipods in summer that provide a rich food source for fish stocks. The amphipod population is thought to flourish due to the fertilizer effect of the winter-killed fish stocks. Rainbow trout (stocked by Alaska Department of Fish and Game) released in Gwen Lake grow faster and put on weight at higher rates than in any other lake in south-central Alaska. Rainbow trout concentrate along the shores of Fort Richardson lakes in the spring and attempt to spawn, but due to inadequate spawning habitat, no spawning takes place in lakes[1]. Past studies of Fort Richardson lakes have found slow growth for fish in Clunie and Thompson lakes, possibly due to tapeworms that were frequently found in the intestines of fish from these lakes.

[1] There is historical evidence of rainbow trout spawning in Otter Lake (capture of juvenile rainbow trout) but no such observations have been recorded in the last 10 years.

USAG-AK partnered with the United States Geological Survey in 2003 and 2004 to survey water quality and fisheries habitat in upper Chester Creek. A total of 877 fish representing four species were captured during the study. Of this total, 54% were Dolly Varden, 35% were slimy sculpin, 10% were rearing coho salmon and 2% were rainbow trout. Additional foot surveys of the creek found 80 adult coho salmon spawning in the upper reaches of Chester Creek.

D2.2.1.12 Beluga Whale Surveys

USAG-AK partners with the National Marine Fisheries Service to support beluga whale surveys. USAG-AK does not plan on conducting any beluga planning level surveys.

D2.2.2 Fish and Wildlife Monitoring

Fish and wildlife monitoring involves the continuation of existing programs and the creation of new long-term monitoring programs for fish, and wildlife. Monitoring focuses on neotropical migratory birds, waterfowl, raptors, upland game birds, salmon, trout, and other fish species, frogs, small mammals, furbearers, and large mammal species (including beluga whale [*Delphinapterus leucas*]). These monitoring programs are a major component of the ecosystem management program. Raptors are important predators in the ecosystem and many are vulnerable to human impacts. Fish are important in the ecosystem as both predators and prey, and are also important to scavengers, decomposers, and as a source of nutrients in freshwater systems. Small mammals play important ecological roles dispersing seeds and mycorrhizal spores, altering vegetation through herbivory and seed predation, and preying on insects, as well as serving as prey for a variety of predators. There is considerable concern in North America over declining populations of many neotropical migratory birds, and population trend data are required to manage and protect these declining species, as mandated by the Sikes Act and Army Regulation 200-3.

The Alaska Department of Fish and Game (ADF&G) monitors sport fish, big game, small game and furbearers. Monitoring is done to ensure populations are large enough and secure enough for sustainable harvests. USAG-AK will work with ADF&G to insure sustainable harvest of these species on military lands.

The U.S. Fish and Wildlife Service (USFWS) monitors neotropical migratory birds and waterbirds, including game species like waterfowl. USFWS also monitors species considered threatened or endangered and works with land managers to stabilize and increase populations of these listed species.

Fish and wildlife monitoring entails the investigation of ecologically important and sensitive species. Game and furbearer monitoring will emphasize species including moose, grouse, black and brown bears, lynx, and snowshoe hare. Moose are monitored by ADF&G to ensure harvest levels are optimal for both utilization and protection of the species. Ruffed grouse are monitored to determine population trends and the success of habitat improvement practices. Monitoring data are digitally stored in the USAG-AK Geographic Information System. Conducting fish and wildlife monitoring is required by Public Law 86-797 (Sikes Act) to implement the Integrated Natural Resources Management Plan.

Caribou are monitored annually to avoid conflicts between military training and caribou calving. Fishery appraisal and scrutiny is conducted through user success surveys and stream and lake surveys. Harvest information for fish is collected by Alaska Department of Fish and Game's biologists through a statewide harvest survey. The survey, however, may not represent actual harvest, as youths (less than 16 years of age) are not included (Barry Stratton, personal communication).

Fort Wainwright and Donnelly Training Area also participate in the North American Amphibian Monitoring Program and the Alaska Wood Frog Monitoring Project co-managed by the Alaska Natural Heritage Program and the ADF&G, consisting of annual survey routes run one to two evenings during the wood frog breeding season.

D2.2.2.1 Avian Monitoring

There is considerable concern in North America regarding declining numbers of many neotropical migratory birds. The Department of Defense is a major participant in the nationwide Partners in Flight program. A USAG-AK biologist is part of a Boreal Partners in Flight working group that has developed a list of species of concern for interior Alaska. This effort will continue during the next five years.

Data on the status of neotropical migratory birds are required to manage and protect these declining species. Avian monitoring includes annual or periodic checks to evaluate trends in populations. USAG-AK is collecting information to help determine the status of neotropical migratory birds, using Breeding Bird Surveys and off post Monitoring Avian Productivity and Survivorship programs. Natural resource personnel are initiating the Alaska Landbird Monitoring Survey program in collaboration with USFWS, the National Park Service, ADF&G, and the U.S. Geological Service. The Alaska Landbird Monitoring Survey is a statewide program designed to quantify demographic patterns in migratory bird populations. This information will aid USAG-AK in determining its needs for a neotropical bird management plan. Aerial monitoring is also used to evaluate populations of waterfowl.

Since the early 1940s, radar has been used to monitor bird migration. The newest weather surveillance radar, or Next Generation Radar, is ideal for studies of bird movements in the atmosphere. This sophisticated radar system can be used to map geographical areas of high bird activity (e.g., stopover, roosting and feeding, and colonial breeding areas). It also provides information on the quantity, general direction, and altitudinal distribution of birds aloft. Currently, the United States Air Force is using Next Generation Radar, via the U.S. Avian Hazard Advisory System, to provide bird hazard advisories to all pilots, military and civilian in an attempt to warn air traffic of significant bird activity. The information is publicly available for the contiguous United States online at http:// www.usahas.com and will soon be available for the state of Alaska.

The Next Generation Radar information is critically important for the protection of habitats used by migratory birds during stopover periods. This information is vital to the Department of Defense land managers who protect stopover areas on military land. The data is also particularly important to land managers of military air stations where bird/aircraft collisions threaten lives and cost millions of dollars in damages every year. The Department of Defense established a partnership with the Department of Biological Sciences at Clemson University to collect, analyze, and use the biological information from the Next Generation Radar network to identify important stopover habitat in relation to the Department of Defense installations. Initial efforts were concentrated in the Southeast to complement existing radar data from the Gulf Coast. This partnership has enabled the collection and transfer of radar data from all Next Generation Radar sites, via modem, to one remote station at Clemson University where the data can be archived and analyzed.

The Department of Defense incorporates bird inventory and survey information when preparing Integrated Natural Resources Management Plans. The Department of Defense also uses bird inventory and survey information when undertaking environmental analyses required under the National Environmental Policy Act. An environmental assessment or an environmental impact statement is used to determine the potential effects of any new, planned activity on natural resources, including migratory birds.

The Department of Defense Partners In Flight program is currently developing a ‘‘Birds of Conservation Concern’’ database that includes species likely to occur on each of the installations. This database will be valuable in initially evaluating what species may potentially be affected by military readiness activities.

D2.2.2.1.1 Fort Wainwright

Landbirds

Breeding bird checklists, point counts, and constant effort mist-netting stations (off-post at Creamer’s Field) have been conducted to monitor avian species on Fort Wainwright. Data collected from a neotropical migratory bird monitoring project was used to augment the baseline fauna planning level survey. Trumpeter swan surveys have been conducted in Tanana Flats Training Area.

The Creamers Field Migratory Banding Station, operated by the Alaska Bird Observatory, incorporates a Monitoring Avian Productivity and Survivorship program and operates within ten miles of the Main Post. Due to its close proximity, there is no need to establish either program on Fort Wainwright. The U.S. Fish and Wildlife Service is monitoring birds on Eielson Air Force Base as part of actions regarding military aircraft operations, so there are possibilities of using that data to supplement ongoing Fort Wainwright data collection. Eielson Air Force Base’s location between the more rugged areas of Yukon Training Area and the open Tanana Flats Training Area makes it ideal for surveys. A Fort Wainwright biologist currently operates a Breeding Bird Survey Route in the Yukon Training Area. The route has been active since 1982.

Raptors are increasingly becoming a priority for inventory and monitoring. Owl surveys have been initiated and are planned to expand along various routes on Fort Wainwright. The Birch Hill Boreal Owl nest box project was reinstated on main post Fort Wainwright during the spring 2006. Owl nesting platforms are planned for Tanana Flats Training Area in the near future.

Plans are currently underway to establish long-term off-road point counts to monitor landbird population trends at Fort Wainwright. These surveys will follow the Alaska Landbird Monitoring Survey protocol developed by Handel and Cady 2004. The Alaska Landbird Monitoring Survey is designed to complement Bird Breeding Survey routes and to provide additional information on landbird abundance by habitat. Alaska Landbird Monitoring Survey is a collaborative program whereby agencies participate by conducting standardized surveys of breeding birds and their habitats on their resource lands and contributing the data to the U.S. Geological Survey’s Alaska Science Center for storage and analysis. This data will contribute to a broader understanding of landbird distribution across the state of Alaska.

Grouse

On Fort Wainwright spruce grouse, ruffed grouse and sharp-tailed grouse are popular game birds. Willow ptarmigan occur in small numbers on Fort Wainwright. Hunting is permitted, but hunting effort and harvest are relatively low because ptarmigan habitat on Fort Wainwright is difficult to access. Currently ptarmigan populations are not being monitored on Fort Wainwright. Ruffed and spruce grouse are the most harvested small game species on Fort Wainwright. Increased surveying is necessary to improve management for ruffed grouse. Little is documented regarding the distribution and relative population size of ptarmigan on the post.

Trumpeter Swans

Nesting trumpeter swan surveys have been conducted annually on the Tanana Flats since 1978, with the exception of 1991, as part of a U.S. Fish and Wildlife Service national monitoring program. Surveys were completed using Army aircraft and personnel until 1993, when the Army combined efforts with the U.S. Fish and Wildlife Service. Flights are now conducted during June for swan nesting information and in August and September for cygnet counts. Surveys were flown for trumpeter swans in the Yukon Training

Area during the summer of 1998, none were found. However, three were sighted during the fall migration (Anderson et al. 2000). There are considerable fluctuations in both adult and cygnet counts among years, but the long-term trend is clearly toward increases in both adults and cygnets, consistent with the Interior and the state of Alaska as a whole. Many of these areas are also used by airboats. Airboat use data will be correlated with the swan survey information to determine effects of airboats on trumpeter swan distribution and within-year comparisons of densities, both inside and outside airboat use areas.

Bird Air Strike Hazard

USAG-AK monitors birds in the cantonment area on an opportunistic basis and as part of the Bird Air Strike Hazard program. Bird Air Strike Hazard observations will involve various areas around the airfield, such as the Chena River, landfill, hangers, sod areas, cooling pond, Old Badger Road gravel pit, and golf course. Bird Air Strike Hazard surveys will be done intermittently during spring through fall.

D2.2.2.1.2 Donnelly Training Area

Landbirds

Breeding Bird Surveys are used to monitor avian species, and one route has been established on Donnelly Training Area. A late winter, nocturnal survey route for breeding owls has also been established. USAG-AK will continue aerial swan surveys on a biannual basis, utilizing standardized U.S. Fish and Wildlife Service survey techniques. USAG-AK staff is collecting information on installations to help determine the status of neotropical migratory birds, using Breeding Bird Surveys. Breeding Bird Survey routes are also run by agency personnel and volunteers at a number of other locations in interior Alaska. Additionally, three Measuring Avian Productivity and Survival stations are operated within 100 miles of Donnelly Training Area (Denali National Park; Tetlin National Wildlife Refuge; and Creamers Field, Fairbanks). Bird surveys on USAG-AK installations combined with other ongoing bird monitoring projects in interior AK provide valuable information about landbird trends and contribute to conservation efforts nationwide.

A Breeding Bird Survey route was set up on Donnelly Training Area in June of 2000. It begins approximately 1 mile south of Jarvis creek on the Richardson Highway, turns onto Beales Range Road, goes back to the Richardson Hwy and then follows Meadows Road to Windy Ridge Road and ends on Dome Road. There are 50 stops, 1/2 mile between each. At each stop all birds are listed that are seen or heard. The survey generally takes 5 hours to complete, starting at 3 am. Final information goes to the U.S. Fish and Wildlife Service, Maryland where it is compiled with data from around the country. The U.S. Fish and Wildlife Service uses these data to determine trends in bird numbers. This route is monitored annually by USAG-AK natural resources staff and is generally done on or around June 15.

The road-based North American Breeding Bird Survey provides some data on population trends in Alaska but most northern species are inadequately monitored because of a paucity of roads. Plans are currently underway to establish long-term off-road point counts to monitor landbird population trends at Donnelly Training Area. These surveys will follow the Alaska Landbird Monitoring Survey protocol developed by Handel and Cady 2004. The Alaska Landbird Monitoring Survey is designed to complement Breeding Bird Survey routes and to provide additional information on landbird abundance by habitat. The Alaska Landbird Monitoring Survey is a collaborative program whereby agencies participate by conducting standardized surveys of breeding birds and their habitats on their resource lands and contributing the data to the U.S. Geological Survey's Alaska Science Center for storage and analysis. This data will contribute to a broader understanding of landbird distribution across the state of Alaska.

Trumpeter Swans

Aerial nesting trumpeter swan surveys have been conducted on Donnelly Training Area by the U.S. Fish and Wildlife Service (USFWS) division of migratory bird management on a five year basis starting in 1990. USFWS surveyed trumpeter swans every five years since 1980 in the Donnelly Training Area.

Anderson et al. (2000) also surveyed for trumpeter swans during the 1998 summer season. They deduce that the number of swans breeding on Donnelly Training Area appears to have increased since 1990. Nesting trumpeter swan surveys have been conducted every five years on Donnelly Training Area since 1980 as part of a USFWS national monitoring program. Flights are now conducted on May 31 and June 1 for swan nesting information and in August for cygnet counts. Surveys were flown for trumpeter swans on Donnelly Training Area during the summer of 1998 and were determined to be increasing in number (Anderson et al. 2000).

Grouse

Donnelly Training Area supports healthy populations of spruce grouse, ruffed grouse and sharp-tailed grouse. All three species can be abundant during peaks in their natural population cycles. The Delta Junction area including Donnelly Training Area has some of the highest densities of sharp-tailed grouse in Alaska and grouse hunting is popular. Donnelly Training Area was identified as important winter habitat for sharp-tailed grouse during an Alaska Department of Fish and Game funded study that assessed movements and habitat use of sharp-tailed grouse in the Delta area (Raymond 1999).

Grouse populations were monitored via spring breeding surveys on Donnelly Training Area in the late 70s and 1980s, but data are not available or were lost during Base Realignment and Closure. Donnelly Training Area staff conducted informal surveys of sharp-tailed grouse leks in late April and early May since 2001. Eight leks are known on Donnelly Training Area and there are certainly many more undocumented. Currently USAG-AK is partnered with the University of Alaska Fairbanks to develop a habitat prediction model for sharp-tailed grouse. This model will help predict likely areas of undocumented lek sites. Lek attendance in Alaska is inconsistent and is poorly understood. No standardized or widely accepted protocol exists to accurately and confidently survey breeding sharp-tailed grouse in Alaska. Monitoring at leks is common for other leking species such as sage grouse (*Centrocercus urophasianus*), prairie chickens (*Tymphanuchus cupido*) and southern subspecies of sharp-tailed grouse. On Donnelly Training Area, leks are visited at sunrise and all birds are counted and sexed if possible. Numbers of males attending leks on Donnelly Training Area has been relatively low since surveys were initiated and average attendance is one male/lek. The 2005 survey however found an average of 4 males per lek. This implies an increase in the population, but no statistical confidence can be placed on these data.

In 1994 the Alaska Department of Fish and Game established a ruffed grouse drumming survey at Donnelly Training Area on Beales Range Road, between the Alabama Range to Lampkin Range. In 2006 a second grouse drumming survey route was established from the beginning of the 33 Mile Loop Road continuing down the road and ending at Eddy Drop Zone. Established protocol requires routes to have twelve 4-minute stops a minimum of ½ mile apart. At each stop an observer records all grouse heard drumming, including direction and distance to each bird. In Alaska, routes are usually surveyed once each May. This route was discontinued about 2000 when an old Delta River slough became active and washed out the trail. Another ruffed grouse drumming survey has since been established on Meadows Road and has been run annually since 2003 by USAG-AK staff. All data are submitted to the Alaska Department of Fish and Game.

Waterbirds

Fall waterbird surveys were conducted on Donnelly Training Area in 1998 to determine the importance of staging areas. Donnelly Training Area, with its lakes and ponds, provides a variety of foraging and staging habitats for waterfowl during fall migration (Anderson et al. 2000).USAG-AK will do waterfowl productivity and staging area surveys every five years in the remote areas of Donnelly Training Area. Gerstle River Training Area will also be evaluated.

The U.S. Fish and Wildlife Service was consulted during the development of the Donnelly Training Area Wetlands Management Plan. Habitat assessments of wetlands were done on post, primarily to categorize bird usage of different wetland classifications. Riverine, permanent, and semi-permanent emergent vegetation was identified as sensitive areas and has been incorporated into the environmental pre-approval overlays used to plan for training.

D2.2.2.1.3 Fort Richardson

Landbirds

USAG-AK has used three techniques to monitor neotropical migrant and resident landbirds on Fort Richardson: Land Condition Training Area plots, Breeding Bird Survey, and Measuring Avian Productivity and Survival. Surveys were conducted by the U.S. Fish and Wildlife Service (Roush and Andres 1994; Andres 1995), Center for Environmental Management of Military Lands, and volunteers. Breeding Bird Surveys and point count stations are currently used to monitor landbird species.

Two Breeding Bird Survey routes were established in 1994: a 50-stop route on the north post and a 30-stop route on the south post, including the Arctic Valley area. Both routes were surveyed each year, from 1994 to 1997. The Breeding Bird Survey routes have been surveyed by U.S. Fish and Wildlife Service personnel and volunteers, and are always conducted between 10 through June 20. The standard of using 60 Range and Training Land Assessment plots for breeding bird surveys was modified to 40 plots for use at Fort Richardson. In 1994, 20 of these plots were surveyed. In 1995, 35 plots were surveyed, and in 1996 and 1997, 39 plots were surveyed. All surveys were conducted by U.S. Fish and Wildlife Service personnel with the bulk of the work being conducted in the month of June.

In 1994, two Measuring Avian Productivity and Survival stations were established, one on the south post at Bunker Hill, and one on the north post along the northeastern shore of Otter Lake. The station at Bunker Hill was abandoned in 1995 due to vandalism, but the station at Otter Lake has been monitored each year since 1994. The final year of study was 1998, satisfying the criteria of five consecutive years of data. At Measuring Avian Productivity and Survival stations in Alaska, mist-netting and point counts are conducted during June and July to monitor productivity and survivorship in the local breeding bird populations.

Grouse

Grouse are popular game species in Alaska. Three species of grouse occur on USAG-AK lands. Fort Richardson has abundant spruce grouse populations. Ruffed grouse have been introduced to south-central Alaska recently and some huntable populations have become established. Ruffed grouse have been documented on Fort Richardson but not in substantial numbers, and harvest is unknown. An average of 250 spruce grouse is harvested on Fort Richardson each year, with most being killed soon after the opening of the season. Ptarmigan harvest is insignificant, with an average of about 50 per year.

Three species of ptarmigan occur on Fort Richardson, but populations are not being monitored and hunting is somewhat limited because ptarmigan generally inhabit areas in the mountains that are far from the road system on post.

Waterbirds

Waterbirds are monitored on Eagle River Flats in association with the cleanup of white phosphorus from the area.

D2.2.2.2 Moose

USAG-AK partners with the Alaska Department of Fish and Game to monitor moose populations annually on Fort Wainwright, Donnelly Training Area, Gerstle River, and Fort Richardson.

D2.2.2.2.1 Fort Wainwright and West Donnelly Training Area

The Alaska Department of Fish and Game (ADF&G) has been collecting moose population surveys in Unit 20A, including Fort Wainwright, since 1978. The Military Police game wardens set up check stations each September during 1993-1996 to monitor moose harvest on Fort Wainwright, including Yukon Training Area, and Eielson Air Force Base. Check stations were used to monitor hunter use and harvest, and serve as base camps for enforcement patrols, centers for emergency assistance, and information centers. Harvest information was provided to ADF&G to supplement their data collection efforts.

USAG-AK partners with ADF&G to conduct annual moose monitoring on Fort Wainwright and the West Donnelly Training Area. Considerable hunting pressure on these training lands requires that moose populations and their harvest be monitored to ensure sustainability of the population.

USAG-AK partners with ADF&G to conduct annual moose twinning surveys on Tanana Flats Training Area. Surveys include annual monitoring of cow moose for birth of twins in the Tanana Flats. This is usually an indicator of habitat quality. When habitat quality is high there is a correlation with higher numbers of twins. Current twinning rates are declining. ADF&G will be proposing a 10-year plan to burn various parts of the Tanana Flats. Twinning surveys will be one indicator that burning is effective in providing better habitat for moose. ADF&G will continue to survey Tanana Flats and the Yukon Training Area for moose using random transects annually. Moose will be monitored during late fall, usually mid-October through mid December by ADF&G. Data collected will include number of bulls (yearlings, two-year olds, and older), cows, and calves.

USAG-AK also partners with ADF&G to monitor use of wildfire burn areas on the Tanana Flats Training Area to determine long-term moose usage trends. This baseline monitoring assesses long-term response of moose population to recent burns (115,000-acre Survey Line Fire on Tanana Flats Training Area and the 85,000-acre Fish Creek Fire) in the southern Tanana Flats. The habitat stratification techniques used are the same as those described above. This methodology will provide statistically defensible estimates of the moose population in the burn area. This information will help ADF&G document the response of the local moose population in terms of density, productivity/survival and sex distribution relative to the burn over time.

D2.2.2.2.2 Donnelly Training Area and Gerstle River Training Area

Moose are the most visible and economically important wildlife species on Donnelly Training Area. The ADF&G's Game Management Unit 20A has one of the state's largest moose harvests, which encompasses the western portion of Donnelly Training Area. The south-central and northeastern portion of the Donnelly West Training Area and the far southern portion of the Donnelly East Training Area are fall concentration areas for moose. Spring and summer concentrations are found in the north-central portion of the Donnelly West Training Area. Winter concentrations are found in the northeastern portion of the Donnelly West Training Area, as well as the northern portion of the Donnelly East Training Area (Bonito 1980).

Moose have been surveyed on Donnelly Training Area by the ADF&G since the 1960s. Surveys are conducted during late fall, usually from mid-October through early December to calculate a moose population estimate and sex and age composition

USAG-AK partners with ADF&G to conduct moose population monitoring on Donnelly East and Gerstle River Training Areas. Considerable hunting pressure on these training lands requires that moose populations and their harvest be monitored to ensure sustainability of the population. ADF&G conducts annual aerial surveys during November to calculate a moose population estimate and calculate sex and

age composition for moose within Game Management Unit 20D, which includes Donnelly East and the Gerstle River Training Areas. Data will be used for establishing moose hunting regulatory proposals for the Alaska Board of Game. Data collected include number of bulls, cows, and calves.

USAG-AK also partners with ADF&G to conduct moose twinning survey on Donnelly Training Area. Moose twinning monitoring is conducted annually to help ascertain habitat quality. ADF&G conducts aerial surveys during May–June to calculate moose twinning rates as an indicator of habitat quality in southwest Game Management Unit 20D, including portions of the Donnelly East and Gerstle River Training Areas. This data is pooled with survey data collected concurrently in other portions of southwest Game Management Unit 20D and combined with moose browse use data to assess condition of moose habitat quality. Results are used for establishing moose hunting regulatory proposals for the Alaska Board of Game. The level of precision and accuracy of the population estimate will be dependent on the level of funding provided.

D2.2.2.2.3 Fort Richardson

Surveys on Fort Richardson, Elmendorf Air Force Base, and Ship Creek were initiated in the 1960s, but comprehensive written reports have been compiled only since the 1980s. Typically, moose surveys are conducted in early winter (usually November) when snow cover is complete and light conditions are optimal. Surveys during past years were conducted from Army helicopters, later from helicopters flown by contracted pilots, and recently from two Super Cub fixed-wing aircraft flown by experienced commercial pilots under contract. One Super Cub carries a biologist/observer from USAG-AK and the other carried a biologist/observer from ADF&G.

Approximately 90,000 acres are surveyed annually, requiring about 18 hours of combined flying time. Data was collected from intensive aerial observations in 14 survey units on Fort Richardson, Elmendorf Air Force Base, and the Ship Creek drainage in Chugach State Park. Data gathered include the number and size of bulls observed (small, medium, and large as determined by antler size), the number of cows, the number of cows with calves, and the number of lone calves.

Productivity, survivorship, and recruitment of moose populations are determined based on the number of calves per 100 cows. The November census data for healthy, productive moose herds in Alaska with normal mortality rates typically shows 20–40 calves per 100 cows. Herds with 40–60 calves per 100 cows not only indicated highly productive herds, but also low mortality rates during the first six months of the calves' lives (calving on Fort Richardson takes place within a short period of time during mid to late May). The Fort Richardson moose herd has shown relatively high numbers of calves per 100 cows in 1986 and 1987 (60 and 58 respectively) and substantially lower numbers during 1988 through 1993 (average of 35).

Relative herd size is determined by using a Sightability Correction Factor based on an Intensive Plot Computer Model provided by ADF&G, which corrects for unsighted animals. Bull/cow and calf/cow ratios are calculated, as are percentages of cows without calves, cows with a single calf, and cows with twins. Annual reports (Quirk 1993, 1994 and 1996) are prepared, and these data are used to establish harvest limits that USAG-AK and ADF&G personnel develop jointly. Data analysis follows procedures outlined in Gasaway et al. (1986).

D2.2.2.3 Bison Monitoring

USAG-AK partners with ADF&G to monitor annual bison migration on Donnelly East Training Area. Annual monitoring includes population estimates for the Delta bison herd on their summer range along the Delta River and on Texas and Washington ranges. Monitoring also delineates seasonal movement patterns, habitat association, and duration of use for Donnelly East Training Area. Radio collars are

attached to bison to assist with locating and collecting herd size and movement data. Information is used to assist with setting hunting bag limits and better understanding bison habitat requirements and use of military lands.

D2.2.2.4 Caribou Monitoring

USAG-AK partners with ADF&G to conduct annual caribou monitoring on Donnelly Training Area. Two herds occur on Donnelly Training Area, the Delta caribou herd and the Macomb caribou herd. The Delta caribou herd ranges throughout moist tundra habitat along the Alaska Range between the Delta River and the Nenana River. The Delta caribou herd used to spend spring and summer on calving grounds in the Trident Glacier foothills. Currently the bulk of calving occurs in other parts of the Alaska Range west of Donnelly Training Area; however, caribou are present in small numbers year-round on Donnelly Training Area West. Since 2000, a minor number of Delta herd animals have spent the winter mixing with Macomb herd animals in the Donnelly Flats area of Donnelly Training Area East and adjacent foothills. The population of the Delta caribou herd was greater than 10,000 in 1989 but since then has declined steadily. Herd size was estimated to be about 2,500 in 2003 (Alaska Department of Fish and Game 2005). Alaska Department of Fish and Game conducts aerial surveys to estimate herd size and composition. Caribou are counted and categorized as follows: cows, calves, and bulls (small, medium, large). These figures allow ADF&G to estimate calf:cow ratios, bull:cow ratios, and large bull:cow ratios. Also during this survey crews capture, weigh and radio-collar calves to determine annual survival rates. From these data, ADF&G estimates annual productivity and survival rates for use in setting harvest quotas. These same survey methods are applied to the much smaller Macomb caribou herd. The Macomb caribou herd herd size was estimated to be between 500 and 550 animals in 2003. Its main range and calving area is east of Donnelly Training Area.

USAG-AK staff undertook aerial caribou surveys of Donnelly Training Area lands during 2004 and 2005 to better document timing, habitat utilization and extent of use of Donnelly Training Area lands. Surveys were designed with the help of ADF&G. Caribou radio frequencies were used to find individuals and herds. Caribou were counted and locations were mapped. Data were used to help make land use and planning decisions. Details of this survey effort are included in Ajmi and Payne 2005.

D2.2.2.5 Bear Monitoring

There are no efforts to annually monitor brown or black bears on USAG-AK lands by ADF&G beyond collecting harvest results. Black bear bait stations are required to be registered with both ADF&G and USAG-AK natural resources. Harvest information and hunter effort is tracked by ADF&G to insure sustainable populations and harvest goals are met.

D2.2.2.6 Furbearer and Small Game Monitoring

Many Alaskan mammal species are listed as furbearers by the ADF&G. Seasons and bag limits are set by ADF&G for these species. Trappers on Fort Wainwright and Donnelly Training Area are required to register their traplines and submit annual harvest reports. Furbearers have been monitored using trapping harvest reports. These data are not a good indicator of furbearer populations, however. Harvest levels can vary depending on furbearer populations but harvest data more closely reflects trapping effort. Trapping effort can be influenced by a number of factors including fur prices and winter weather conditions. Currently USAG-AK does not survey furbearers populations directly.

Harvest information on furbearers has been collected from Fort Richardson hunters through a system requiring either sign-out at the main gate or a mail-in of harvest data by the end of each year. At the time of sign-out, harvest information is recorded. Furbearer harvest data is not very useful due to the mail-in

provision, which is often ignored or inaccurate. Beginning in 1998, hunters were required to physically return their checkout sheet to the main gate with harvest data recorded at the end of each hunting day.

Historically, snowshoe hare harvest at Fort Richardson has been very small with an average of about 100 per year. Coyote harvest information is unavailable. Studies on these and other furbearing animals are needed to more accurately understand population sizes and dynamics. Fort Wainwright and Donnelly Training Area small game and fur animal seasons and bag limits are identified in the current Alaska Hunting Regulation Booklet. Fort Richardson small game and fur animal seasons and bag limits are identified in the current "Summary of Small Game and Fur Animal Hunting Seasons in 14C," available from ADF&G. Immediate closures or bag reductions may occur at the discretion of USAG-AK biologists.

In 2006, USAG-AK personnel implemented a winter tracking study primarily aimed at furbearers. This study will be ongoing through 2011, and the data collected will aid in identifying travel corridors, habitat selection, population trends, and seasonal distribution.

D2.2.2.7 Wolf Monitoring

Wolves are currently monitored by the Alaska Department of Fish and Game (ADF&G) on Fort Wainwright and Donnelly Training Area to determine pack size, home range, and effects on prey species.

Several wolf packs inhabit the Tanana Flats and Yukon Training Area as part of their territories. It is assumed that wolf populations are stable. Hunting is allowed during the normal state season for Unit 20 from August through April with a bag limit of five. Trappers may take an unlimited number of wolves during the trapping season. ADF&G is currently conducting a wolf/louse research study.

According to the ADF&G, there are three wolf packs whose range may include Army lands on Donnelly Training Area. Wolf populations on Fort Richardson will be monitored as part of the above-mentioned winter tracking study.

D2.2.2.8 Small Mammal Monitoring

Microtines and small mammals are important to the plant community in that herbivory influences vegetation communities and densities. They also serve as important prey items for predators which include mammal and avian species. Small mammal inventories are being initiated at Fort Wainwright and Donnelly Training Area, using established protocols.

D2.2.2.9 Amphibian Monitoring

The wood frog (*Rana sylvatica*) is the only amphibian known to occur on USAG-AK lands. Amphibian population declines and reports of amphibian deformities worldwide over the past decade or more have raised concerns over the status of amphibians in Alaska. Chytrid fungus (*Batrachochytrium dendrobatidis*) has been implicated in amphibian mass mortalities on five continents. It is not understood at this time how this pathogen is transmitted from place to place, how it kills amphibians or where it originated from. In 2005 chytrid fungus was documented in boreal toads (*Bufo Boreas*) near Hains, Alaska, it is unknown, however, if chytrid fungus exists throughout the rest of Alaska. Recently an Alaskan interagency team has begun to address amphibian conservation through coordinated surveys, education and information exchange. Annual statewide meetings have been well attended, and USAG-AK staff has become involved with some of the coordinated statewide amphibian monitoring efforts. A wood frog survey route was established on Donnelly Training Area in 2001 using North American Amphibian Monitoring Program protocol. No detectable trends have been documented and wood frog populations on

Donnelly Training Area appear to be stable. Fort Wainwright plans to initiate wood frog monitoring in 2006. USAG-AK plans to initiate wood frog monitoring on Fort Richardson in 2007.

D2.2.2.10 Dall Sheep Monitoring

Currently there are no ongoing efforts to monitor Dall sheep on USAG-AK lands.

D2.2.2.11 Fisheries Monitoring

Fish monitoring is conducted through stream and lake surveys, interviewing anglers and collecting data from the ADF&G statewide mail-in survey. The statewide harvest survey estimates angler effort (measured in angler-days), catch (number of fish caught, includes catch and release fish), and harvest (number of fish caught and kept) by species. Survey estimates rely on a high number of responses to obtain reliable estimates. For smaller systems, fisheries utilized heavily by youth, or other fisheries with low response rates, survey estimates serve as an index to monitor change in the fishery over time.

Clunie, Gwen and Otter lakes, all stocked by ADF&G, are the most popular lakes on Fort Richardson accounting for nearly 20% of the total angler effort on lakes in the Anchorage Management Area from 1995-2004 (Matt Miller, ADF&G, personal communication). In 2005, anglers fishing lakes on Fort Richardson reported catching lake trout, Arctic char, landlocked salmon, and rainbow trout. Rainbow trout were caught in most Fort Richardson lakes and accounted for 89% of the catch. Arctic char and landlocked salmon were reported from Clunie Lake and each accounted for 5% of the total fish caught on Fort Richardson in 2005. Although some level of catch and harvest of Arctic grayling, Dolly Varden, and Chinook salmon likely occurs in the flowing waters of Fort Richardson, the data for these species is unavailable for the post and is likely minimal.

Historically various small lakes and ponds have been stocked with rainbow trout, Arctic grayling, landlocked salmon and/or Arctic char on Fort Wainwright. Depending on fish availability and accessibility, lakes are stocked on a rotating basis. Much of the fishing effort on Fort Wainwright is likely targeted towards the Chena River as it flows through the post and provides access to various fish species (Chinook and chum salmon, Arctic grayling, northern pike, burbot, sheefish and whitefish) throughout the entire flowing water season. The statewide harvest survey cannot separate out fishing effort from the post or by post personnel; however, it is thought to be high (Audra Brase, ADF&G, personnel communication).

D2.2.2.12 Beluga Monitoring

USAG-AK will conduct weekly beluga whale monitoring during the summer to detect beluga presence or absence in Eagle River and Eagle Bay if possible.

D2.3 Fish and Wildlife Management

Fish and wildlife actions fall into two categories: population management and habitat management. Fish and wildlife population management is accomplished through actions directly affecting wildlife species. Setting population goals and managing harvests are the primary actions used in population management. Habitat management, on the other hand, affects wildlife populations indirectly by manipulating their habitat.

D2.3.1 Fish and Wildlife Population Management

Population management includes working with ADF&G, which establishes hunting, trapping and fishing regulations and harvest objectives, stocks fish in post lakes, controls nuisance animals, conducts habitat enhancement, and coordinates other projects to conserve and enhance game and non-game populations. Wildlife populations will be managed in accordance with the objectives set forth in this Integrated Natural Resources Management Plan (detailed under items of specific cooperation between USAG-AK, USFWS, and ADF&G). Wildlife population management objectives include:

- Conserve, protect, and enhance threatened and endangered species and their habitats.
- Maintain healthy, sustainable wildlife populations within the carrying capacity of the installation's habitat.
- Prevent health and safety hazards.
- Provide for wildlife related recreation.
- Conduct and coordinate animal damage control.

D2.3.1.1 Fish Stocking

D2.3.1.1.1 Fort Wainwright

Depending on fish availability, the Alaska Department of Fish and Game stocks Fort Wainwright according to the Statewide Stocking Plan for Recreational Fisheries (ADF&G 2006). Table D-1 describes the proposed stocking plan for Fort Wainwright lakes through 2010.

Table D-1. Stocking in Fort Wainwright Area Lakes during 2006-2010 (ADF&G 2006).

Location	Species	Size	2006	2007	2008	2009	2010
Monterey Lake	Chinook	Catchable	500	500	500	500	500
Monterey Lake	Rainbow	Broodstock	25	25	25	25	25
Monterey Lake	Rainbow	Catchable	0	1000	1000	1000	1000
Wainwright #6	Rainbow	Catchable	0	500	500	500	500

D2.3.1.1.2 Donnelly Training Area

Alaska Department of Fish and Game has utilized lakes on Donnelly Training Area that are suitable for fish stocking for many years. Donnelly Training Area has numerous lakes that provide opportunities for recreational fishing. In the past, USAG-AK provided helicopter support for stocking remote lakes, both on and off the post.

Fish stocking is an important aspect of fisheries management in Alaska, since fishing opportunities in some areas would be very limited without stocking. According to the ADF&G's Statewide Stocking Plan (ADF&G 2006), stocking diverts angling pressure away from sensitive native stocks while maintaining fishing opportunities. Fish stocking directly supports quality of life for the Delta-Greely community.

ADF&G stocks fish in 16 lakes on Donnelly Training Area under the Statewide Stocking Plan, which is updated annually. Stocking information on Donnelly Training Area lakes can be found at http://www.sf.adfg.state.ak.us/statewide/hatchery/stockingplan.cfm . ADF&G plans to continue stocking during 2006-2010 as shown in Table D-2.

Table D-2. Proposed Stocking Effort for Donnelly Training Area Lakes during 2006-2010 (ADF&G 2006).

Location	Species	Size	2006	2007	2008	2009	2010
Koole	Rainbow	Fingerling	24,500	0	24,500	0	24,500
Koole	Coho	Fingerling	0	5000	0	5000	0
Koole	Grayling	Fingerling	1000	0	1000	0	1000
Bolio	Rainbow	Catchable	0	2500	2500	2500	2500
Bolio	Chinook	Catchable	5000	5000	5000	5000	5000
Bolio	Grayling	Fingerling	0	0	4000	0	4000
Mark	Rainbow	Brood / Fingerling	85/3600	85/0	85/3600	85/0	4000
Mark	Coho	Fingerling	0	3000	0	3000	0
Mark	Arctic Char	Subadult	200	0	200	0	200
Weasel	Rainbouw	Fingerling	800	0	800	0	800
Bullwinkle	Rainbow	Fingerling	800	0	800	0	800
Chet	Rainbow	Fingerling	1600	0	1600	0	1600
Chet	Arctic Char	Subadult	250	0	250	0	250
Ghost	Rainbow	Fingerling	1000	0	1000	0	1000
Ghost	Arctic Char	Subadult	300	0	300	0	300
South Twin	Rainbow	Brood / Catchable	0/0	100/500	0/500	100/500	0/500
Rockhoud	Rainbow	Fingerling	600	0	600	0	600
No Mercy	Rainbow	Fingerling	600	0	600	0	600
Nickel	Rainbow	Fingerling	1000	0	1000	0	1000
Nickel	Grayling	Fingerling	900	0	1000	0	1000
Nickel	Arctic Char	Subadult	100	0	100	0	100
North Twin	Rainbow	Brood / Fingerling	65/200	0	65/2000	0	65/2000
J	Arctic Char	Subadult	150	0	150	0	150
J	Grayling	Fingerling	0	2000	0	2000	0
Doc Lake	Rainbow	Fingerling	500	0	500	0	500
Luke	Grayling	Fingerling	900	0	1000	0	1000
Sheefish	Arctic Char	Subadult	700	0	700	0	700
Total			44850	18185	53850	18185	54165

In the past, USAG-AK has provided helicopter support for stocking remote lakes, both on and off the post. Most of Donnelly Training Area's lakes are readily accessible from the Richardson Highway. Koole Lake is west of the Delta River and is inaccessible by road. Many anglers have fished the 16 lakes that the

Alaska Department of Fish and Game (ADF&G) has stocked with silver salmon, Chinook salmon, Arctic grayling, Arctic char, and rainbow trout.

D2.3.1.1.3 Fort Richardson

Fort Richardson is part of the ADF&G Anchorage Management Area for sport fisheries. There are 30 stocked lakes in this management area with four currently on Fort Richardson. Although past stocking programs released Arctic char, Arctic grayling, lake trout, and steelhead trout, the program currently stocks rainbow trout and landlocked salmon in Clunie Lake, and rainbow trout in Otter, Waldon, and Gwen lakes. These four lakes accounted for nearly 20% of the total angler effort in the Anchorage Management Area from 1995-2004.

Table D-3. Proposed Stocking Effort for Fort Richardson Lakes during 2006-2010 (ADF&G 2006).

Location	Species	Size	2006	2007	2008	2009	2010
Clunie	Chinook Salmon	Catchable	2,040	3,000	3,000	3,000	3,000
Clunie	Rainbow Trout	Catchable	2,040	6,000	6,000	6,000	6,000
Otter	Rainbow Trout	Catchable	2040	6,000	4,800	4,800	4,800
Waldon	Rainbow Trout	Catchable	340	1,000	1,000	1,000	1,000
Gwen	Rainbow Trout	Catchable	1360	4000	4000	4000	4000
Total			8,780	20,000	18,800	18,800	18,800

Fish are stocked in Fort Richardson's lakes throughout the year, but most commonly between mid May and September. Stocking levels in Otter Lake have been drastically reduced due to the discovery of northern pike in that lake. Stocking levels in other Fort Richardson lakes for 2006-2011 are expected to remain at current levels, although they may be adjusted to reflect current angler use trends or fish availability.

The average number of rainbow trout stocked in Fort Richardson's lakes annually from 1999-2005 was just over 23,500 fish. Included in these totals are an additional 1,000 trout that Otter Lake receives annually to support a kid's fishing derby. For this same time period, the average annual number of landlocked salmon stocked in Clunie Lake (the only Fort Richardson lake to receive landlocked salmon during this period) was approximately 1,430 fish.

Stocking rainbow trout on Fort Richardson is largely considered a "put and take" fishery. Ice in the winter often locks up a large percentage of the available oxygen in the post's shallow lakes. The ice cover also prevents free oxygen exchange at the surface. Both of these factors contribute to an oxygen deficient environment that can result in 100% mortality of salmonid species in the lake. Gwen and Waldon lakes experience such total winter loss of all stocked fish nearly every year while Clunie and Otter lakes are thought to successfully over-winter a large percentage of fish annually.

D2.3.1.2 Fish and Wildlife Transplanting

USAG-AK is committed to preserving and enhancing biodiversity on military lands. Prior to any introduction of a new species to the post, there will be complete National Environmental Policy Act documentation and consultation with partners of this Integrated Natural Resources Management Plan. There are no plans for transplanting wildlife onto or from USAG-AK lands at this time.

All proposed introduction or reintroduction of wildlife species will be thoroughly assessed in accordance with the National Environmental Policy Act and associated U.S. Fish and Wildlife Service requirements to determine the impact on existing flora and fauna and the installation mission. Introduction of species of fish and wildlife foreign or native to the United States or reintroduction of formerly indigenous species will be accomplished only upon the approval of the U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, the Installation Management Agency, and Headquarters Department of the Army (U.S. Army Directorate of Environmental Programs, Conservation Division, Department of the Army Installation Management, Environmental Division), and will be made a part of the installation Fish and Wildlife Cooperative Plan.

D2.3.1.3 Nuisance Fish and Wildlife Control

D2.3.1.3.1 Birds

Under the Migratory Bird Treaty Act it is unlawful "by any means or manner, to purse, hunt, take, capture or kill" any migratory bird except as permitted by regulation (16 U.S.C. 703-704). Regulation (50 CFR 21.11) prohibits the take, possession, import, export, transport, sale, purchase, barter, or offering of these activities, except under a valid permit or as permitted in the implementing regulations. Army guidance is as follows:

Where the purpose of an installation action is to intentionally and directly take any migratory bird species (e.g., eradicate nuisance birds; clear nesting, adding eggs), the installation must:

- Apply for and obtain a depredation, special purpose, or scientific collection and education permit or other regulatory authorization form the U.S. Fish and Wildlife Service prior to taking action(s).
- Record any birds purposefully and intentionally taken under the permit and provide an annual report to the U.S. Fish and Wildlife Service.

D2.3.1.3.2 Furbearers, Small Mammals and Large Mammals

Removal of nuisance small mammals and furbearers on USAG-AK lands is the responsibility of the USAG-AK Pest Control section, in coordination with Military Police conservation officers and Environmental Department personnel. Removal of larger game animals is the responsibility of the Alaska Department of Fish and Game in coordination with Military Police conservation officers and Environmental Department personnel.

The trapping of furbearers is prohibited on Fort Richardson, with exception of nuisance beavers that may be removed by USAG-AK Pest Control personnel with special State of Alaska depredation permits.

Predator control of furbearers on Army lands in Alaska will not be authorized without the appropriate National Environmental Policy Act documentation, public meetings, and concurrence through Army staff channels to the Secretary of Defense.

D2.3.1.4 Invasive Species Management

Executive Order (EO) 13112 requires all federal agencies to prevent the introduction of invasive species, to provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species may cause. Invasive species can be a threat to natural resources, impact local economies,

and adversely affect the military mission. Invasive species are defined as an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Alien species are further defined as any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem.

USAG-AK will:

- Monitor invasive species populations and track the presence and status of invasive species over time to determine when control measures are necessary and to evaluate the effectiveness of prevention, control/eradication, and restoration measures.
- Give priority to invasive species management actions, including actions to restore native species habitat conditions in ecosystems that have been invaded that support the installation's primary military mission.
- Use fauna planning level surveys to detect and identify invasive species. As existing planning level surveys are updated they should include invasive species information if it is not currently included.
- Plan actions to address invasive species that are consistent with management objectives in this Integrated Natural Resources Management Plan and undertaken only after appropriate review under National Environmental Policy Act as implemented by 32 CFR 561.
- Take no actions that are likely to cause or promote the introduction or spread of invasive species.

D2.3.1.5 Harvest

Fish and wildlife harvest is the most commonly used form of population management. Hunting, trapping, and fishing are forms of outdoor recreation that help the Alaska Department of Fish and Game (ADF&G) maintain population goals. Hunting, fishing, and trapping are conducted under regulations promulgated by ADF&G to ensure that population numbers can be supported by the available habitat as well as being able to sustain meeting the recreational demand. USAG-AK collects data on the harvest of furbearers on the post and provides these data to ADF&G to assist the agency in promulgating harvest regulations. USAG-AK manages hunting, trapping, and fishing in terms of areas available, dates within ADF&G seasons, safety requirements, permit and reporting requirements, and other parameters to avoid conflicts with the military mission and provide safe, high quality recreational experiences.

D2.3.1.6 Wildlife Protection and Conflict Avoidance

It is USAG-AK's intention to avoid conflicts between military training and wildlife. Wildlife is protected under a number of statutes, such as the Endangered Species Act, Migratory Bird Treaty Act, State of Alaska fish and game laws, Eagle Protection Act, etc. As a result, U.S. Army Alaska Regulation 350-2 prohibits Soldiers from intentionally targeting wildlife when conducting firing activities, and from intentionally harassing wildlife during their maneuver activities. Historically, animal/military conflicts have not been an obstacle to accomplishing the military mission.

Other best management practices put in place to protect wildlife and avoid conflicts through various agreements include:

- Human/Bear Conflicts –Memorandum of Agreement between USAG-AK, U.S. Air Force, Alaska Department of Fish and Game and the U.S. Departement of Agriculture: "Joint Management of Bear/Human Conflicts on Military Lands near Anchorage, Alaska.
- Urban Wildlife – Alaska Department of Fish and Game: Living with Wildlife in Anchorage: A Cooperative Planning Effort.

- Avoid bison during calving.
- The U.S. Air Force is required to shut down exercises on the Oklahoma/Delta Creek Impact Area if large numbers of the Delta caribou herd are calving there.
- Limit spring firing into Lakes and Oklahoma impact areas during caribou calving.
- Avoid potential peregrine falcon nesting areas and caribou calving areas during spring and summer.
- Restrict helicopter flight zones to a minimum 500-foot flight level to avoid inadvertent harassment of wildlife.
- Restrict spring use of the southern boundary of the Mississippi/Washington impact areas to avoid conflicts with bison calving and spring grizzly bear use.
- Restrict Washington and Texas ranges to small arms fire in spring and summer, allowing heavy weapons use only during winter.

Few of these restrictions cause significant effects on the military mission. The following Table D-4 lists the current language in the range regulation (U.S. Army Alaska Regulation 350-2) that protects wildlife.

Table D-4. USARAK Regulation 350-2, Fish and Wildlife Protection Measures.

Chapter	Section	Sub-Section	Protections
Chapter 2. Protection of Environmental Resources During Training	2-9. Environmental Considerations	f. Fish and Wildlife	(1) Harassment of fish and wildlife is prohibited. Any action that disturbs fish and wildlife is considered harassment by federal and Alaska state law. Harassment includes such things as pursuit with vehicles or aircraft, feeding, and shooting of wildlife. Individuals who harass fish and wildlife are subject to prosecution.
			(2) Dedicated impact areas are permanently off-limits and training areas may be temporarily closed during periods of significant wildlife use (i.e., calving). Range Control will advise units of closures.
Chapter 3. Scheduling	3-11. Hunting and Fishing		a. Hunting and fishing activities are administered by the Department of Public Works, Environmental Resources Division and the Alaska Department of Fish and Game. These programs are described and regulated through Alaska state hunting and fishing regulations and USARAK Regulation 190-13. Training areas may be blocked as necessary to ensure proper game management during hunting and trapping seasons per instruction from the Department of Public Works, Natural Resource Branch managers and Alaska Department of Fish and Game.
			b. Seasons and license requirements are published by the Alaska Department of Fish and Game. USARTRAK is the single point of contact for daily information on available hunting, fishing, and recreational areas on post and for sportsman check in and check out.
Chapter 5. Impact Areas.	5-9. Firing Limitations		a. There will be no firing across or into: (6) Navigable waters unless listed in the National Register, (7) White phosphorous will not be fired into wetlands.
Chapter 6. Direct Fire Ranges	6-8. Wildlife on the Range		Units discovering wildlife in training areas during training will make all attempts to avoid that portion of the training area and report the location and number of animals to Range Control Fire Desk Operator. If units observe wildlife in the firing fan on a range or in a training area during live-fire exercises immediately cease firing and report the location and number of animals to

Chapter	Section	Sub-Section	Protections
			Range Control Fire Desk Operator. a. Extreme care must be taken to prevent the harassment of wildlife. Range Control Fire Desk Operator will request the Post Conservation Officer be dispatched to the area for assistance. b. Wildlife may not be intentionally targeted during firing. If any animal is wounded during firing, the range officer in charge will immediately cease fire and notify range operations. Range Control Fire Desk Operator will contact the Post Conservation Officer be dispatched to the area for assistance. c. Vehicles and aircraft, including helicopters, may not be used to herd/chase wildlife off the ranges or training areas. d. After the area is clear and permission is granted from the Range Control Fire Desk Operator, firing may resume.

D2.3.1.6.1 Bison

USAG-AK will minimize disturbance to bison calving areas on Donnelly Training Area during 15 April – 31 May if bison are present. USAG-AK will minimize disturbance to bison pre-migration areas 1 July -31 August if bison are present. USAG-AK will not conduct indirect fire operations within 2000 meters of bison in the impact area during any time of the year. USAG-AK will not conduct activities or operations within 500 meters of any bison during any time of year to minimize the impacts on bison.

D2.3.1.6.2 Caribou

USAG-AK will minimize activities or operations in Oklahoma Impact Area or Delta Creek Impact Area from 1-31 May for caribou pre-calving, calving, and post calving if caribou are present in significant numbers. USAG-AK will not conduct indirect fire or bombing operations within 8000 meters of caribou from 1-31 May.

D2.3.1.6.3 Beluga Whales

USAG-AK will not intentionally fire into the open waters of Eagle River at any time. USAG-AK will not fire into Eagle River or a 100-meter buffer zone around Eagle River when belugas are present in Eagle River.

D2.3.1.6.4 Migratory Birds

USAG-AK will also limit activities or operations in or near unique or sensitive habitats (high function wetlands, Eagle River Flats) during time periods or seasons (spring migration, nesting) that are likely to have a significant adverse effect on fish and wildlife. For instance, USAG-AK will limit military operations and outdoor recreational activities in high function wetlands from 1 May – 15 July for migratory bird protection during nesting seasons and will limit indirect fire activities and operations into Eagle River Flats during spring and fall migratory periods.

Under the Migratory Bird Treaty Act (16 U.S.C. 703), unless permitted by regulation (i.e., waterfowl hunting, incidental taking during Department of Defense training and testing), it is illegal to "take" migratory birds, their eggs, feathers or nests. “Take” includes by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing or transporting any migratory bird, nest, egg, or part thereof. The Migratory Bird Treaty Act originally did not distinguish between intentional and unintentional take. In Alaska, all native birds except grouse and ptarmigan (which are protected by the State of Alaska) are protected under the Migratory Bird Treaty Act.

Vegetation clearing, site preparation, or other construction activities that may result in the destruction of active bird nests or nestlings would violate the Migratory Bird Treaty Act. In both south-central and

interior Alaska, U.S. Fish and Wildlife Service recommended these activities not be conducted during 1 May – 15 July each year. The timing guidelines are not regulations, but are intended as recommendations to help comply with Migratory Bird Treaty Act. Some species and their nests have additional protections under other federal laws, including those listed under the Endangered Species Act, and bald and golden eagles (protected under the Bald and Golden Eagle Protection Act).

Table D-5. Recommended Time Periods for Avoiding Vegetation Clearing in Alaska in order to Protect Migratory Birds (from U.S. Fish and Wildlife Service 2005).

HABITAT TYPE → REGION ↓	Forest or woodland[1] *(i.e., trees present)*	Shrub or Open *(i.e., shrub cover or marsh, pond, tundra, gravel, or other treeless/ shrubless ground habitat)*	Seabird colonies *(including cliff and burrow colonies)*	Raptor and raven cliffs
South-central *(Includes Fort Richardson)*	May 1 – July 15[2]		April 15 – September 7[3]	April 10 – Aug 10
Interior *(Includes Fort Wainwright Main Post, Yukon Training Area, Tanana Flats Training Area, Donnelly Training Area, Gerstle River Training Area, and Black Rapids Training Area)*	May 1 – July 15		May 1 – July 20[4]	April 15 – August 1

[1]Owl species may begin to nest two or more months earlier than other forest birds, and are common breeders in most forested areas of Alaska. You may wish to survey for nesting owls prior to tree-cutting. It is your responsibility to protect active owl nests from destruction.
[2]Canada geese and swan habitat: begin April 20
[3]Storm petrel burrow habitat: April 1 – October 15
[4]Seabird colonies in Interior refer to terns and gulls

USAG-AK will minimize the unintentional take of migratory birds during military readiness activities. As stated at the beginning of this section, the Migratory Bird Treaty Act prohibits "take" of migratory birds. However, the Department of Defense has been granted an exemption for military operational readiness activities that allows "unintentional take." This rule authorizes the Department of Defense to take migratory birds associated with military readiness activities, subject to certain limitations and subject to withdrawal of the authorization to ensure consistency with the provisions of the migratory bird treaties. The 2003 National Defense Authorization Act (Pub. L. 107-314, 116 Stat. 2458, Dec. 2, 2002, 16 U.S.C. 703 note) (hereinafter ''Authorization Act'') required the Secretary of Defense, in consultation with the Secretary of the Interior, to identify ways to minimize, mitigate, and monitor take of migratory birds during military readiness activities and required the Secretary to prescribe, with the concurrence of the Secretary of Defense, a regulation that exempts such activities from the Migratory Bird Treaty Act's prohibitions against take of migratory birds. With this language, Congress signaled that the Department of Defense should give appropriate consideration to the protection of migratory birds when planning and executing military readiness activities, but not at the expense of diminishing the effectiveness of such activities. Any diminishment in effectiveness could impair the Department of Defense's ability to fulfill its national security mission. Diminishment could occur when military training or testing is modified in ways that do not allow the full range of training methods to be explored. This Integrated Natural Resources Management Plan further clarifies military readiness activities to include (1) air and ground maneuver training, (2) live fire demolition, direct and indirect fire activities, (3) range construction, range upgrade and range maintenance activities which are required for military operational readiness, and (4) those vegetation management activities which directly support readiness activities and Soldier safety such as prescribed burning and mechanical or hand thinning to reduce fire danger in range training areas.

The rule authorizes the Department of Defense to take migratory birds as an incidental result of military readiness activities. The Department of Defense must continue to apply for and receive a Migratory Bird Treaty Act permit for scientific collecting, control of birds causing damage to Department of Defense property, or any other activity that is addressed by our existing permit regulations. These activities could not be conducted under the authority of this rule. If any Department of Defense activity falls within the scope of our existing regulations, we will consider, when processing the application, the specific take requested as well as any other take authorized by this proposed rule that may occur.

Authorization of takes under this proposed rule would apply to take of migratory birds incidental to military readiness activities, including (a) all training and operations of the Armed Forces that relate to combat, and (b) the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Authorization of take would not apply to: (a) Routine operation of installation operating support functions, such as administrative offices, military exchanges, commissaries, water treatment facilities, storage facilities, schools, housing, motor pools, laundries, morale, welfare, and recreation activities, shops, and mess halls; (b) operation of industrial activities; or (c) construction or demolition of facilities relating to these routine operations.

As the basis for this proposed rule, under the authority of the Migratory Bird Treaty Act and in accordance with Section 315 of the Authorization Act, the Department of Defense consulted with the U.S. Fish and Wildlife Service to identify measures to minimize and mitigate adverse impacts of authorized military readiness activities on migratory birds and to identified techniques and protocols to monitor impacts of such activities. The inventory, avoidance, habitat enhancement, partnerships, and monitoring efforts described below illustrate the efforts currently undertaken by the Department of Defense to minimize adverse impacts to migratory birds from testing and training activities to maintain a ready defense. Additional conservation measures, designed to minimize and mitigate adverse impacts of authorized military readiness activities on affected migratory bird species, with emphasis on species of concern, will be developed in joint coordination with the U.S. Fish and Wildlife Service when specific military readiness activities suggest the need for additional measures.

Bird Conservation Planning. Under the Sikes Act, the Department of Defense must provide for the conservation and rehabilitation of natural resources on military installations. The resulting Integrated Natural Resources Management Plan (INRMP) must reflect the mutual agreement of the military department, the U.S. Fish and Wildlife Service, and the appropriate State fish and wildlife agency on conservation, protection, and management of fish and wildlife resources. INRMPs incorporate conservation measures addressed in Regional or State Bird Conservation Plans to ensure that the Department of Defense does its part in landscape-level management efforts. INRMPs are a significant source of baseline conservation information and conservation initiatives used to develop National Environmental Policy Act documents for military readiness activities. This linkage helps to ensure that appropriate conservation measures are incorporated into mitigation actions, where needed, which will protect migratory birds and their habitats.

Bird Inventories. The most important factor in minimizing and mitigating takes of migratory birds is an understanding of when and where such takes are likely to occur. This means developing knowledge of migratory bird habits and life histories, including their migratory paths and stopovers as well as their feeding, breeding, and nesting habits.

Avoidance. Avoidance is the most effective means of minimizing takes of migratory birds. Where practicable, the Department of Defense avoids potentially harmful use of nesting sites during the breeding and nesting seasons and of resting sites on migratory pathways during migration seasons. Avoidance sometimes involves using one area of a range rather than another. On some sites in which bombing, strafing, or other activities involving the use of live military munitions could impact birds in the area, the

Department of Defense may conduct an initial, benign sweep of the site to ensure that any migratory birds in the area are dispersed before live ordnance is used.

Pesticide Reduction. Reducing or eliminating pesticide use also benefits migratory birds. The Department of Defense maintains an integrated pest management program that is designed to reduce the use of pesticides to the minimum necessary. The Department of Defense policy requires all operations, activities, and installations worldwide to establish and maintain safe, effective, and environmentally sound integrated pest management programs. Integrated pest management is defined as a planned program, incorporating continuous monitoring, education, record-keeping, and communication to prevent pests and disease vectors from causing unacceptable damage to operations, people, property, material, or the environment. Integrated pest management uses targeted, sustainable (i.e., effective, economical, and environmentally sound) methods, including education, habitat modification, biological control, genetic control, cultural control, mechanical control, physical control, regulatory control, and the judicious use of least- hazardous pesticides. The Department of Defense policy mandates incorporation of sustainable integrated pest management philosophy, strategies, and techniques in all aspects of the Department of Defense pest management planning, training, and operations, including installation pest management plans and other written guidance to reduce pesticide risk and prevent pollution.

Habitat Conservation and Enhancement. Habitat conservation and enhancement generally involve improvements to existing habitat, the creation of new habitat for migratory birds, and enhancing degraded habitats. Improvements to existing habitat include wetland protection, maintenance and enhancement of forest buffers, elimination of feral animals (in particular, feral cats) that may be a threat to migratory birds, and elimination of invasive species that crowd out other species necessary to migratory bird survival.

Sandhill crane roosting areas on the Delta River must be surveyed prior to certain military firing activities to ensure cranes are not present.

Beluga Whale Protection. U.S. Army Alaska Regulation 350-2 prohibits directly targeting or harassing wildlife during training or other management activities on USAG-AK lands. As such, beluga whales are protected from being fired at during live-fire exercises in Eagle River Flats Impact Area. In addition, as of 22 December 2008, Cook Inlet beluga whales are listed as endangered under the Endangered Species Act, which provides this species with greater protective measures.

D2.3.1.7 Regional Population Management Cooperative Efforts

D2.3.1.7.1 Wildlife

USAG-AK participates in a regional cooperative effort to manage wildlife in the Anchorage Bowl. Offering a broad vision for wildlife management in Anchorage, the plan is a pioneering attempt to coordinate and integrate decisions by local, state and federal government. Initiated by Alaska Department of Fish and Game (ADF&G), the cooperative plan has been developed by a team of people from a variety of local, state, and federal agencies with wildlife responsibilities, as well as people from other wildlife-related interest groups and the general public. The cooperative plan outlines general wildlife management goals for the Municipality of Anchorage, and then identifies actions and policies that may help residents enjoy and minimize problems with the city's wildlife.

D2.3.1.7.2 Caribou

USAG-AK works cooperatively with ADF&G to monitor and manage caribou populations on USAG-AK lands.

D2.3.1.7.3 Bison
USAG-AK works cooperatively with ADF&G to manage the Delta Junction bison herd. USAG-AK shares in the primary goals of the bison herd management, which includes maintaining bison habitat on Donnelly Training Area and devising ways to slow the herd movement every summer off post into the Delta Junction bison range and then on into private agriculture fields.

D2.3.1.7.4 Birds
USAG-AK supports ADF&G efforts to attract birds to Creamers Field in Fairbanks and away from the military airfield on Fort Wainwright. This effort supports USAG-AK Bird Air Strike Hazard initiatives by farming additional acreage at Creamer's Refuge to attract problem geese away from the Fort Wainwright Airfield.

The Armed Forces have entered into a number of conservation partnerships with non-military partners to improve habitats and protect avian species. In 1991, the Department of Defense, through each of the military services, joined the Partners in Flight initiative. The Department of Defense developed a Partners in Flight Strategic Plan in 1994 and revised it in 2002. The Department of Defense Partners in Flight program is recognized as a model conservation partnership program. Through the Partners in Flight initiative, the Department of Defense works in partnership with over 300 federal and state agencies and nongovernmental organizations for the conservation of neotropical migratory and resident birds and enhancing migratory bird survival. For example, bases have worked with non-governmental organizations to develop management plans that address such issues as grazing and the conversion of wastewater treatment ponds to wetlands and suitable habitat. Universities use the Department of Defense lands for migratory bird research and, on occasion, re-establish nesting pairs to take advantage of an installation's hospitable habitat. The Department of Defense Partners in Flight program tracks this research and provides links between complementary research on different installations and service branches.

D2.3.1.7.5 Bear
USAG-AK, along with ADF&G and Elmendorf Air Force Base, jointly manage bear populations on multi-jurisdictional lands, within the Anchorage Bowl. The ultimate goal is to further public safety and education while maintaining black and brown bear populations and their natural habitats within this area.

A Memorandum of Agreement established a plan of coordination and cooperation between the Alaska Department of Fish & Game, U.S. Army Garrison Alaska, Fort Richardson and U.S. Air Force, Elmendorf Air Force Base for management of bear/human encounters on military lands that may lead to public health and safety problems or to situations which may become controversial. This agreement is necessary due to these military lands being surrounded by the largest urban population in the state of Alaska, i.e., the city of Anchorage on the south and the communities of Eagle River, Chugiak, Birchwood, and Peters Creek on the north.

D2.3.1.7.6 Moose
USAG-AK works cooperatively with ADF&G to monitor and manage moose populations on USAG-AK lands.

D2.3.1.7.6 Beluga Whales
USAG-AK works cooperatively with the National Marine Fisheries Service on beluga whale monitoring, habitat protection, and population management.

D2.3.2 Fish and Wildlife Habitat Management

Habitat management efforts will be accomplished in a manner to conserve and enhance existing flora and fauna consistent with the Army goal to conserve, protect, and sustain biological diversity while

supporting the accomplishment of the military mission. Activities will be directed towards management to maintain healthy ecosystems, and to restore degraded ecosystems to their historic functions and values. Primary management consideration will be given to the management of indigenous listed, proposed, and candidate species habitats. Also, consideration of other environmentally sensitive areas and other areas of special concern (for example, riparian zones, wetlands, highly erodible areas) is identified below.

The goals of the Habitat Management Program are as follows:

- Improve and maintain the quality of habitat for all species, both game and non-game.
- Maintain or enhance wildlife-related recreation opportunities in an area close to human population centers in Alaska.
- Use ecosystem management philosophies to protect, conserve, and enhance native fauna and flora with an emphasis on biodiversity enhancement.
- Create habitat improvements for game species that will support sustainable hunting, trapping, and fishing programs.
- Establish multifunctional riparian management zones.
- Use procedures within the National Environmental Policy Act to make informed decisions that include natural resources considerations and mitigation.
- Enhance and maintain the ecosystem integrity to support the military mission.

D2.3.2.1 Habitat Enhancement

Habitat enhancement primarily includes the development and improvement of habitat for bison, moose, fish, ruffed grouse, and other landbird species, furbearers, and small mammals. Some habitat improvement may also be undertaken for fish and waterfowl.

The objectives for meeting the Habitat Management Program goals are as follows:

- Use prescribed burning and/or mechanical means to increase the quantity and/or quality of forage, nesting, and cover conditions for a variety of wildlife (particularly large herbivores) in selected areas while maintaining a diversity of vegetative types and age classes at the landscape scale.
- Manage military ranges, such as drop zones, firing points, landing zones and strips, and firing ranges in a way that benefits wildlife species that utilize open habitats with little or no woody vegetation.
- Establish riparian buffers to improve and protect aquatic habitat.
- Construct and maintain nesting boxes and platforms for several species of birds (ducks, owls, raptors, etc.).
- Improve fish habitat.
- Use the ecosystem management program to ensure projects do not negatively impact species of concern.

USAG-AK utilizes two primary methods of manipulating habitat, prescribed burning and mechanical removal of vegetation. USAG-AK also utilizes herbaceous and woody vegetation plantings in the cantonment area to improve habitat.

Prescribed Burning: Prescribed burning is beneficial to ecosystem maintenance because fire is an important component of the ecosystem's development. Prescribed burning is also favored by the Bureau of Land Management (BLM). It is less complicated and a more natural means of vegetation removal, than using timber harvest or other mechanical means.

Mechanical Removal and Revegetation: Mechanical means of habitat manipulation are the second primary way to accomplish habitat management. Mechanical tools used to accomplish habitat management include commercial timber sales, timber stand improvement, firewood cutting, hydro-axe or shearblade and military maneuver training. Some habitat improvement areas are then planted with desired herbaceous species.

Wildlife Habitat Improvement Plantings: This component of habitat improvement includes management in the training areas and management of the cantonment area that directly affects natural resources management. Routine ground maintenance is accomplished primarily by Grounds Maintenance, DPW. The *Installation Design Guide* (Higginbotham/Briggs & Associates 1991) and the *Landscape Design Plan* (Baxter 2005) provide information on using trees and shrubs for landscaping. Both documents provide lists of plant materials appropriate for use on USAG-AK lands.

This INRMP does not include routine ground maintenance unless it is specifically designed for the benefit of natural resources. Natural resources personnel provide professional assistance for landscaping, particularly regarding species selection and care of the landscape. Listed below are some habitat enhancement efforts that have occurred for moose, bison, grouse, fisheries, birds, and Soldiers.

D2.3.2.1.1 Moose Habitat Enhancement

USAG-AK enhances moose browse by maintaining vegetation in a primary successional stage. The goal is to create an age class mosaic across the landscape to improve the quality of moose forage. Cutting in large even-aged willow or aspen stands should help produce early successional stages of vegetation. These cuttings will also benefit other species that depend on mixed-aged stands or early successional vegetation. This project benefits military training by creating openings in the landscape that might otherwise hinder vehicle maneuvers. Also these openings usually enhance military use, which could minimize damage to nearby wetlands and sensitive areas.

The primary method used to achieve high quality/high biomass winter moose browse is centered around enhancing over-mature moose habitat. As favored winter browse species mature, they grow out of the reach of moose. All these species respond favorably to cutting and quickly regenerate into high energy and accessible browse. Enhancement of over-mature habitat is accomplished primarily by mechanically cutting woody plants using a hydro-ax™ or bulldozer equipped with a shearblade during the dormant season.

Removal of trees for forest management or military purposes also can improve moose habitat in some cases. Treatments include timber and firewood sales and salvage operations as well as construction and clearing for rights-of-way.

Another important option for improving moose habitat is the use of controlled burns. This is probably the best alterative in terms of the quality of habitat produced but is also the most difficult to perform from a logistical standpoint. Controlled burns have been used on the Tanana Flats by ADF&G and BLM Alaska Fire Service specifically for wildlife habitat enhancement. Small scale controlled burns have also been used successfully at Donnelly Training Area. The primary goal at Donnelly Training Area was to reduce fuel levels in heavily used training ranges, but moose and bison habitat was also enhanced

Shearblading was used on Donnelly Training Area to enhance 200 acres of moose habitat in 2003. Eight treatment units ranging from 9 to 36 acres were cleared in February and March. ADF&G had been conducting browse surveys in a regenerating burn that occurred in 1987 on Donnelly Training Area East. Data showed that moose browse was declining. ADF&G management and habitat biologists contributed to a plan to enhance moose habitat and browse in this area on Donnelly Training Area. Nearby areas off post had been treated successfully by ADF&G with a shearblade.

D2.3.2.1.2 Bison Habitat Enhancement

There is a long history of bison habitat surveys and management on Donnelly Training Area (Ajmi and Payne 2006). Bison spend the summer on Donnelly Training Area and migrate to winter range in the Delta Agricultural Project each fall. Crop depredation by bison on farms in the Delta Agricultural Project has been a serious management issue since the creation of the Delta Agricultural Project. Farmers lose thousands of dollars annually with no means of compensation. Crop depredation insurance, common in the lower 48 states, does not exist in Alaska. USAG-AK has cooperated with ADF&G and Delta Agricultural Project farmers to attempt to keep bison on Donnelly Training Area until after the fall harvest with limited success. It is believed that bison migrate to the Delta Agricultural Project in response to declining forage quality as the summer progresses on Donnelly Training Area. Range surveys of the Delta River and Donnelly Training Area began in the 1980s to address concerns of declining habitat quality (Swanson 1981; Boyer 1982, 1983). A bison management plan by Kiker (1979) led to the creation of bison habitat in the hopes of altering the direction and timing of bison migration to the Delta Agricultural Project. This effort failed and the habitat enhancement areas were abandoned to succession. Meanwhile, range quality on the Delta River continued to decline and bison began moving to the Delta Agricultural Project earlier in the summer. Bison range on the Delta River was succeeding to woody vegetation. Aerial spraying of fertilizer in 1981 may have improved forage quality temporarily, but follow-up surveys were not performed and the project was discontinued due to cost. Berger (1996) conducted a thorough investigation of bison food habits and range quality in the Delta River floodplain and made several management recommendations. Controlled burning was one of those and several burns have been conducted since then. Bison use of burns has been unpredictable and relatively short-term, however. USAG-AK Directorate of Public Works created 50 acres of bison food plots in the mid 1980s that were planted to favored grass species. These plots were rejuvenated in 1999 and again in 2003. They are used by bison during the summer but don't seem to be keeping bison on Donnelly Training Area through the entire summer. Controlled burns continue to be a viable management option, but coordination and spring weather prevent this method from being used with regularity. Current food plot management, including use of salt blocks has been successful in creating favorable bison habitat but has yet to deter bison from a mid-summer migration to the Delta Agricultural Project.

The 1982 Donnelly Training Area Fish and Wildlife Plan stated that bison calving grounds on the west bank of the Delta River were being overgrown by woody species. About 50 acres of the area were aerial fertilized during the summer of 1981. The fertilizer was purchased using Army funds, while ADF&G contracted the aircraft. An appendix to this plan included *A Bison Management Plan for Fort Greely and Donnelly Training Area, Alaska* (Kiker and Fielder 1980) with two supplements: *A Management Plan to Reroute the Migration Pattern of the Delta Bison Herd* (Fielder 1980) and *A General Plan for Expanding and Rehabilitating the Summer Range of the Delta Bison Herd* (Spiers 1981).

Bison use of the Texas and Washington ranges, (on the eastern side of the Delta River) for calving has increased in recent years. USAG-AK rehabilitated six forage plots (2-30 acres each) closest to Texas Range in 1999, which had overgrown with aspen and other hardwoods, and they were in an area where prescribed burning was difficult to accomplish. The rehabilitation included the use of brush hogging to remove the shrub overstory, followed by minimal disking, seeding with grass mix, and fertilizing.

Crop damage caused by bison in the Delta Agricultural Project are is an ever-present problem for farmers. One project that should help includes creating and maintaining forage plots on Donnelly Training Area in an effort to delay their annual movement from summer to winter ranges. Fertilizing bison summer ranges increases plant production, and could delay the bison from moving into farming areas until after crops are harvested. A buffer zone with planted pastures and salt blocks established between summer and winter ranges might also delay movement. The Alaska State Legislature passed a bill in 1979 to develop bison

grazing lands and study the results. As a result, the ADF&G Bison Range, located between the Donnelly East Training Area and the Gerstle River Training Area, was established.

Conflicts between military training and bison have occurred, causing interference with military missions, and resulting in some bison mortality. Conflicts involving bison were discussed by Kiker and Fielder (1980), Fielder (1980), and Spiers (1981). These conflicts may increase as the bison population and (possibly) military use increase or bison change land use patterns. Bison use in the Texas Range has increased in recent years. Therefore one objective of the Donnelly Training Area bison habitat management plan is to enhance bison habitat outside of the Texas and Washington ranges, by renovating old forage plots and conducting other habitat enhancements along Delta River, in the vicinity of Buffalo Dome. There is no plan to use habitat management to increase the size of the bison herd on Donnelly Training Area.

Burning has mixed results for attracting bison. The 1990 burn, west of the Delta River in the Buffalo Dome area, has not been used extensively by bison, but other area burns have been. Generally, burning improves bison habitat for one to four years. Prescribed burning is expensive because fire crews must be on standby during burning operations; however, burning is substantially less expensive than programs such as annual fertilizing. Also, the knowledge on how vegetation responds to burning at any given site is limited.

The Delta Bison Working Group and the Alaska Department of Fish and Game (Dubois and Rogers 2000) have two habitat objectives for reducing conflicts between bison and the public in the Delta Junction area. Manage bison and summer range so at least 75% of the herd remains west of the Richardson Highway (between Black Rapids Glacier and the Tanana River) until August 20 each year. Keep the bison herd out of the Delta Agricultural Project until October 1 each year.

A study by Berger (1996) indicated that prescribed burning, or a “let-burn” policy might be an effective bison management strategy. Fertilization doubled the forage available during this study, but costs were high. The study also found that bison grazing has no effect on graminoid meadow productivity, but it did increase nitrogen concentration of graminoids.

Forage plots can be planted and will attract bison. Forage plot crops should include brome, fescue, or perennial grasses. Fertilization is needed.

The placement of salt blocks can entice bison to an area or delay their movements from an area for several weeks in some cases. Delta Alaska Department of Fish and Game has traditionally placed salt blocks in the bison forage areas along Meadows Road.

Grass production on old gravel bars responds well to fertilization. In some cases, herbicides or burning is needed to remove woody vegetation prior to fertilization.

Bison appear to be calving more on the Texas and Washington ranges, (on the eastern side of the Delta River), in recent years.

Five old bison forage plots were rehabilitated in 1999 and 2000. According to available records, no work had been done with these after their initial creation in the early 1980s. Sixty two acres were hydro-axed in summer 1999, removing the woody vegetation component (mostly small birch trees) which shaded and competed with the grasses and sedges. In summer 2000, 57 of those acres were also disked once, seeded and fertilized. The work done on these forage plots seem to have been successful. Visual comparison of fertilized vs. non-fertilized showed more green and lush vegetation. Bison or their sign have been seen within these plots.

D2.3.2.1.3 Grouse Habitat Enhancement

Grouse habitat enhancement primarily consists of managing vegetation, especially aspen, in an age class diversification across the landscape. Ruffed grouse rely on various age classes of aspen during different seasons and stages of their own lives (see Gullion 1984 for information on ruffed grouse). Aspen is a primary successional species in the boreal forest. It is a sun-loving, shade intolerant species. Mature aspen stands on USAG-AK lands are slowly dying out and being replaced by white spruce and paper birch because of aggressive fire fighting. Cutting or burning plots of mature aspen will induce root sprouting; thus species that depend on various life stages of the aspen forest (including aspen) will benefit.

Aspen stands are critical to successful populations of ruffed grouse. Aspen regenerate by root-sprouting, which is stimulated by removal of overstory. Since entire clones must be cut to optimize regrowth, USAG-AK will often cut entire stands of aspen. Moose and grouse can compete for the same habitat; thus, cut areas must be large enough to keep moose from removing regrowth.

Ruffed grouse prefer a combination of mature aspen stands and recently cut-over stands with a proliferation of young saplings (up to 50,000-100,000 stems per acre) to support nesting, rearing, and forage needs (Mowry 1998). The objective is to have a minimum of 3,000-4,000 stems per acre at ages 10-20 years with an optimum of 8,000-10,000 stems per acre during this age period (Dessecker, personal communication). Maintaining a good age mix requires knowledge of aspen growth rates. It appears that a 60-80-year rotation might work, but the rotation age may need adjustment based on results on Fort Richardson (Dessecker and Steen, personal communication). Mature stands produce catkins (dormant male flower buds), which are critical for ruffed grouse winter food; thus, rotations must not be too short (Dessecker, personal communication).

Benefits of ruffed grouse management (Modified from Van den Huevel 1995) include the following:

- Maintain/increase ruffed grouse populations.
- Maintain/diversify aspen age classes in fire suppression areas.
- Improve/increase hunter/recreational opportunities.
- Improve inter-agency cooperation.
- Integrate multiple-use practices.
- Positive public relations opportunity for USAG-AK and Bureau of Land Management.
- Fulfill land stewardship and management responsibilities.
- Possible recognition and support from the Ruffed Grouse Society.
- Create additional troop training areas.
- Provide firewood to the local community.
- Potential to implement prescribed burning practices.

Species that benefit from grouse habitat enhancement include:

- Moose: Using young aspen for summer/winter browse. Bedding sites are found throughout the 1995 plots.
- Black bears: Numerous scat sites are found throughout sites. Sun loving, berry-producing plants such as low bush cranberry, raspberry, rose, high bush cranberry etc. are providing a food source not available in mature aspen areas.
- White crowned sparrows and dark eyed juncos
- Snowshoe hares: feed on young aspen shoots
- Marten: Will use horizontal structure of fallen trees to prey on birds, hares and other small mammals.

- Aspen: These trees are shade intolerant and will eventually be replaced by paper birch and white spruce if fire or other disturbances do not open closed canopies. Large areas of sspen can be expected to be lost over time in the Yukon Training Area due to fire suppression. This will also mean a habitat loss for a number of species dependent on them for all or part of their life cycles.
- Raptors: Standing dead trees within each site will provide perching and nesting sites for raptors such as bald eagles.
- Woodpeckers and cavity nesters: Standing dead trees will provide a food source and sites for cavity nesting.

Grouse habitat enhancement has occurred on Fort Wainwright's Yukon Training Area and Fort Richardson's North Post. In 1995, twelve mature aspen sites near the intersection of Manchu and Quarry roads on Yukon Training Area were cut in order to start a rotational cutting program to benefit ruffed grouse. These original cuttings were considered to be the first of five 50-acre tracts that would be cut every five years to provide enhanced habitat for the ruffed grouse (Van den Huevel 1995). This would provide for one 5-acre site cut every five years in each tract for 50 years.

The 1999 projects combined three of the 1995 sites into one larger 5-acre site. Four more sites approximately 5 acres each were also cut so that five 50-acre tracts were created within a 25-square kilometer area. This project is a concentrated effort in the uplands of the Yukon Training Area to provide better habitat for ruffed grouse, black bears, moose, small mammals and their predators.

Prescribed fire may be used after cutting to either reduce the volume of woody debris left on the sites or to reduce competing species such as *Calamagrostis canadensis* (a sod forming perennial grass) to allow better aspen growth. Cut trees left on site do not need to be removed to produce aspen shoots; however, it probably would increase density of new shoots if the wood were removed. Over the 50-year life of each tract cycle a considerable amount of downed wood will accumulate. Although single sites will not pose a fire hazard, the accumulation of debris in the combined five tracts may present concerns.

Cut sites should be rectangular in shape, with orientation in a north-south direction to reduce shading. This will increase aspen shoot growth and heat the soil faster. Future sites should always work south to north within the tract to continue to provide for maximum sunshine.

Methods for regeneration of aspen throughout this project consist of tree cutting or prescribed fire. When using prescribed fire, USAG-AK will work with the Alaska Fire Service. The Alaska Fire Service will burn areas in a manner that will kill the standing boles, and induce root suckering. Dead trees will be left standing. Burn plans will be developed by the Alaska Fire Service, and areas to be burned may be larger than the 5-acre plots done by chainsaw.

In 1998, the Natural Resources office and Alaska Fire Service teamed up to plan a burn on one site in tract A that had overgrown with grasses. The Alaska Fire Service wished to study the effect of the fire to determine if future objectives were met. The Bureau of Land Management offered assistance and meetings were held with their field biologists, a summer intern, the Alaska Fire Service and Army representatives. The purpose of the study is to determine if grass cover decreases and desirable species (aspen, birch, non-grasses) increase. In 1998, ten 40-meter lines were placed along a 90-meter transect to determine vegetative cover, fuel cover, and species composition. These plots were revisited in the summer of 2000 and will be surveyed again during the summer of the burn.

Annual surveys were conducted afterwards to monitor long-term growth trends. Range and Training Land Assessment also monitored many of the plots to determine vegetative changes. Visual inspections and photos were taken annually to determine if growth of aspen is continuing. Any future areas designated to be cut are candidates for vegetative studies to determine pre and post-vegetative communities.

To determine grouse use of plots, drumming counts along the area of treatment should be done in late April/early May. Flushing of the sites (walk through) will determine increases in grouse usage in the beginning years. Hunter harvest reports for the Yukon Training Area can also be used to determine number of hunters and hunter harvest over a number of years.

The Alaska Department of Fish and Game (ADF&G) is currently creating ruffed grouse habitat along the Nenana Ridge south of Fairbanks on the Parks Highway. This project started in 1994 and is described by Lisa Fox (1998a). Fox also has put together a literature review that contains abstracts on aspen, ruffed grouse, fire, clear-cutting, neotropical migrant songbirds and forestry practices, boreal forest, and vegetation sampling methods. Many of the same conditions exist along Nenana Ridge that are found in the Yukon Training Area. Dale Haggstrom (Alaska Department of Fish and Game) and Fox's report (1998b) are excellent sources of information.

D2.3.2.1.4 Streambank Habitat Enhancement

Streambank habitat enhancement is accomplished using multifunctional riparian buffers, along with active streambank restoration. USAG-AK protects riparian buffers by restricting vehicle traffic within 50 feet of all streams (U.S. Army Alaska Regulation 350-2). USAG-AK partnered with ADF&G and the Boy Scouts to improve a length of streambank along Ship Creek in 1999. More recently in 2003, Palmer Soil and Water Conservation District conducted streambank habitat improvement along Ship Creek, also in Cottonwood Park.

Lakes and their surrounding environs are also important to healthy populations of many wildlife species as well as recreation associated with lakes and their fish and wildlife habitats. Some lakes have debris along their shorelines, such as barrels, fallen trees, etc. Off-road vehicle damage has been significant along several lakes. Options available for restoration of quality lake shore habitats include: vegetation restoration, trail maintenance including boardwalks, log removal, debris removal, beaver damage control, and control of vehicle access to wet areas.

The Municipality's Anchorage Bowl Comprehensive Plan (Anchorage 2020) calls for the creation of watershed management plans throughout the municipality to help guide development and water management in all Anchorage watersheds. The Chester Creek Watershed Plan is the first watershed planning effort in the Anchorage Bowl. A preliminary list of potential problem areas include:

- Poor water quality (fecal coliform, sedimentation, contaminants, etc.)
- Flooding and low water events
- Reductions in fish and wildlife habitat
- Uncoordinated and sometimes conflicting land use planning standards and regulations
- Inadequate communication and coordination regarding the watershed

The headwaters of Chester Creek are on Fort Richardson, near the Infantry Squad Battle Course. USAG-AK will participate with the Municipality of Anchorage to address the goals of that watershed. Primary goals for the headwaters of Chester Creek on Fort Richardson include identification of salmon habitat, protection of streambanks, and focus on preventing degradation of water quality from military sources.

D2.3.2.1.5 Nesting Boxes

USAG-AK maintains owl and duck nesting boxes as a way to enhance avian habitat.

Owl Habitat Boxes. Maintain boreal owl (*Aegolius funereus*) nest boxes. Artificial nests are a habitat enhancement option for many wildlife species where nesting habitat is limited. This is the case with the boreal owl. There are 12 boreal owl nest boxes on Birch Hill, which were constructed as an Eagle Scout

project in 1994. Maintenance will include annual monitoring of box condition and use. Owl nest boxes are numbered and entered into a Geographic Information System. A current log book is in use for notes, and Natural Resource staff will inventory owl boxes opportunistically. Equipment and supplies are on hand.

Duck Nesting Boxes. Duck nesting boxes have been erected on Donnelly Training Area and Fort Wainwright to increase nest site availability for cavity nesting ducks. Twenty four boxes are currently up on Donnelly Training Area. Several of these are greater than 20 years old. They were erected by an earlier natural resources department on lakes both east and west of the Delta River. Some are still functional and others have been rehabilitated or re-erected if they've fallen down. Six boxes were donated by the Bureau of Land Management and erected in 2001. Another 12 boxes were built by the Delta High School shop class in 2003. Lumber was donated by a local sawmill in Delta Junction. Hardware was purchased by USAG-AK. Boxes are checked each spring for maintenance needs and to document use from the previous summer. Occupancy rate has been as high as 90% at Donnelly Training Area. This is much higher than occupancy rates noted in boxes on the Chena River near Fairbanks were a University of Alaska Fairbanks graduate student was studying goldeneyes (Josh Schmidt, personal communication) We speculate the high use of Donnelly Training Area boxes is due the lack of suitable nest cavities in trees around the lakes which are close to treeline, small and generally lack large cavities. We have found evidence of nesting by one pair of boreal owls and also bufflehead (*Bucephala albeola*) on one occasion. Otherwise all use has been by common goldeneyes (*Bucephala clangula*). Barrows goldeneyes (*Bucephala islandica*) are an uncommon migrant on Donnelly Training Area. It's possible that Barrows goldeneyes could be nesting on Donnelly Training Area but all observations of females and broods in the summer have been common goldeneyes.

Construct and maintain nesting boxes for buffleheads (*Bucephala albeola*) and goldeneyes (*B. clangula*). Artificial nests are a habitat enhancement option for many wildlife species where nesting habitat is limited. This is the case with buffleheads and goldeneyes. Nest boxes were constructed and placed by volunteers in 1996. Nesting box locations will be numbered and entered into a Geographic Information System with a use log established for all notes pertaining to the boxes. The U.S. Fish and Wildlife Service may also be interested in monitoring box use during the nesting season. The maintenance and erection of boxes will be done in the winter, when snowmachines and easier access are available. This project will be done by Natural Resources staff. Equipment and supplies are currently on hand. Volunteers constructed 10 nest boxes for ducks in 1996.

Loon Nesting Habitat. Fort Richardson has habitats for nesting loons, such as Otter, Clunie, and Dee lakes. Protection for these sensitive waterfowl is of prime importance as human disturbance slowly pushes these nesters out of urban areas that sustain heavy use. Common loons (*Gavia immer*) only nest on Fort Richardson and Elmendorf Air Force Base in the Anchorage Bowl (Fair 1998). USAG-AK has loon nesting platforms on some lakes. One Eagle Scout project involved building platforms for signs to inform boaters about the need to stay away from loon-nesting areas.

Additional loon platforms are not recommended (Nancy Fair, personal communication) for the following reasons:

- Artificial platforms seldom result in additional nesting. Platforms work best on impoundments where water fluctuations are great (such as hydro-electric dams in New England), but even there, only about 25% of platforms are used with about 50% nesting success.
- Platforms can attract loons from natural nesting sites. Platforms may present hazards to young loons, such as high wind exposure, that are not present in natural sites.
- Platforms require considerable maintenance, including removal during the non-nesting season to ensure longevity.

Signs at public access points to protect loon nesting sites (if they are developed for public access) are recommended, particularly in areas with high recreational boating use, such as Clunie Lake. Signs are not recommended at Dee Lake unless access is developed. Signs are not recommended to be placed at or near nests to minimize public curiosity regarding nest sites. Plastic "Loon Alert" signs are available from the Alaska Department of Fish and Game or may be purchased from Voss Signs, (315) 682-6418 (Nancy Fair, personal communication).

- Annually post Loon Alert signs at public access points on Clunie and Otter lakes. Post signs by mid-May and remove them in early September.
- Continue to use the Alaska Loon Watch to monitor loon nesting on Fort Richardson. Post signs at any lake where loons are found to nest and public access is available.

Eagle Nesting Habitat. Although the bald eagle's (*Haliaeetus leucocephalus*) threatened status does not apply in Alaska, it has been singled out for special protection by USAG-AK in accordance with the Bald Eagle Protection Act (Quirk et al. 1978). In the raptor inventory (Schempf 1995) bald eagles were the most frequently seen species. There are five known bald eagle nesting sites on Fort Richardson. The U.S. Fish and Wildlife Service has published a *Bald Eagle Basics, Alaska* booklet. This booklet includes management recommendations, which include management of nesting sites. A primary zone should be established in a 330-foot radius around the nest to protect the nest tree and screen the nest tree from human activities. If topography or vegetation do not provide adequate screening between the nest and human activity, this zone may need to be extended out to as much as 1/4 mile. The following activities should not be permitted within the primary zone:

- Significant vegetation clearing, including timber harvest.
- Development of commercial and industrial sites.
- Home, power line, road, and other substantial construction activity.
- Surface mining.

The following activities should be avoided within the primary zone during nesting season (March through August), except in areas where in previous years they have successfully coexisted with nesting:

- Operation of off-road-vehicles, which would include some military equipment.
- Operation of heavy construction equipment, which would include some military equipment.
- Obtrusive human activities, which would include many military maneuvers.

A secondary zone should be established for 330 feet beyond the primary zone to screen the nest from particularly loud and obtrusive activities and to protect nesting habitat within the primary zone. The size of this zone may need to be adjusted for site-specific conditions and may need to be expanded to up to ½ mile in some cases to provide proper screening. The following activities should be avoided in the secondary zone:

- Construction of long-term or permanent facilities that are obtrusive or associated with noisy or otherwise intrusive activities (e.g., rock-crushing activities, open-pit or surface mines, log transfer facilities).
- Construction of roads or trails within line-of-sight of the nest.

The following activities should be scheduled within the secondary zone to avoid the nesting season (March through August):

- Timber harvest and associated activities (Note: Timber harvest should protect the nest site from blow-down threats).
- Land use activities that produce intermittent loud noise during construction (e.g., home, road, power line, and other construction located out of sight of the nest).

Land use activities that are short-term, not obtrusive, and/or demonstrated not to interfere with the subject nesting pair of eagles (e.g., use of existing roads, trails, homes, and other facilities) can occur year-round in the secondary zone.

The U.S. Fish and Wildlife Service (undated) also recommends the following general measures for the management and protection of eagle habitat:

- Important eagle roosts and food sources should not be destroyed or degraded.
- Aircraft corridors should be no closer than 1,000 feet from an active eagle nest during the nesting season.
- Toxic chemicals (e.g., fertilizers, pesticides) should not be broadcast or widely applied in areas used by bald eagles. Pesticide use should be in accordance with instructions of a local pesticide expert.
- During 1999 develop primary and secondary zones for each eagle nesting site, implement protective measures using the U.S. Fish and Wildlife Service (undated) guidelines.
- Implement protective measures using the U.S. Fish and Wildlife Service (undated) guidelines.

D2.3.2.1.6 Rights-of-Way Habitat Improvement

Adjust construction and maintenance practices involving rights-of-way on USAG-AK lands to improve wildlife habitat. Many wildlife species use open areas, such as found on rights-of-way, for foraging and as travel corridors. Construction and maintenance of rights-of-way offer opportunities to enhance wildlife habitat at little additional costs. Rights-of-way are generally bladed to bare ground which causes erosion in many areas and destroys existing vegetative cover. If these areas were cleared and maintained with a hydro-axe, erosion would be minimized, and habitat would be enhanced for many species. Use hydro-axe to clear and maintain rights-of-way to reduce destruction of vegetative mat, to reduce erosion, to maintain early successional vegetation for wildlife forage. The Natural Resources Branch will coordinate with Directorate of Public Work planners and maintenance personnel to make these positive changes. This projects cost will be born by Directorate of Public Work as part of their maintenance budget.

D2.3.2.1.7 Soldier Habitat Enhancement

The primary mission of USAG-AK is to train Soldiers. Soldier habitat enhancement includes creating habitats that support realistic training. Specific actions include creating and maintaining military ranges, such as drop zones, firing points, landing zones, landing strips, and firing ranges. Many of the military ranges require little or no woody vegetation to conduct safe and realistic training. Many wildlife species use open areas or the edge effect they create with the surrounding area if grasses and forbs are allowed to grow. Clearing and maintaining open areas with a hydro-axe instead of clearing with a dozer blade would minimize erosion and would enhance wildlife habitat for many species. Prescribed burning should be conducted after clearing of drop zones to select for native grasses and forbs. Use of hydro-axe or other methods will be the preferred method so that it will not disturb the vegetation mat when clearing above ground stems.

D2.3.2.2 Habitat Protection

D2.3.2.2.1 Migratory Bird Treaty Act Protection

Migratory bird habitat is protected during nesting season by the Migratory Bird Treaty Act. Under the Migratory Bird Treaty Act it is unlawful “by any means or manner, to purse, hunt, take, capture or kill”

any migratory bird except as permitted by regulation (16 U.S.C. 703-704). Regulation (50 CFR 21.11) prohibits the take, possession, import, export, transport, sale, purchase, barter, or offering of these activities, except under a valid permit or as permitted in the implementing regulations. Since it is so difficult to be able to identify birds and bird nests in forests, the U.S. Fish and Wildlife Service has promulgated guidance that restricts vegetation clearing in south-central and interior Alaska from 1 May to 15 July annually.

D2.3.2.2.2 Special Interest Areas

USAG-AK has created a number of special interest areas that protect habitat. Many of the special interest areas contain high function palustrine or wetland areas that provide habitat for multiple species. Special management controls exist for these areas which exceed the protective measures that apply everywhere else on USAG-AK lands.

D2.3.2.2.3 Wetlands Protection

In 2000, USAG-AK received a five-year Clean Water Act, Section 404 permit that allowed certain types of military maneuver training in low function wetlands while protecting high function wetlands. Part of the reason for this was to allow up to 40 acres of disturbance, including fill, in low function wetlands in exchange for restrictions to maneuver training in high function wetlands. The permit expired in March 2005 and was not renewed due to changes in the mission (transformation to a Stryker Brigade Combat Team). An entirely new application for Fort Wainwright and Donnelly Training Area will be submitted some time in 2006/2007.

D2.4 Outreach

Public involvement is key to USAG-AK's commitment to community outreach. Implementation of this public outreach requires keeping the public informed of recreation regulations, providing harvest forms, military maps and other items of interest. Documents pertaining to wildlife and habitat work will be made available on USAG-AK's conservation web site (www.usarak.army.mil/conservation). These include:

- Outdoor Recreation Regulation Supplement
- Harvest documents and forms
- USARTRAK and Recreation Access Permit information
- Environmental documents pertaining to wildlife management, monitoring and habitat creation.
- Recreation opportunities available on post
- Maps (including off-limits and restricted areas)
- Contact phone numbers

D3. Proposed Management

The following section details policies or procedures that have changed since the previous Integrated Natural Resources Management Plan or are new projects for 2007-2011.

D3.1 Policy

D3.1.1 Beluga Whale

USAG-AK proposes to enhance beluga whale protection through increased beluga monitoring, beluga habitat protection in Eagle River, and limiting indirect fire weapons in Eagle River Impact Area when beluga whales are present. Beluga whales are discussed in greater detail in Section D2.2.1.12, Section D2.2.2.12, and Volume II, Annex F, Rare, Threatened and Endangered Species Management Plan.

D3.1.2 Bison

USAG-AK proposes to clarify bison protection procedures on Donnelly Training Area during training exercises. Increases in training pressure on the bison from stationing of additional units in Alaska analyzed in the U.S. Army Alaska Transformation Environmental Impact Statement (U.S. Army Alaska 2003) has led to a need to define the specific procedures necessary to protect the bison (especially during calving) while sustaining the military mission. Bison are discussed in greater detail in Section D2.2,1.3 Section D2.2.2.3 and Volume II, Annex F, Rare, Threatened and Endangered Species Management Plan.

D3.2 Standard Procedures

New Fish and Wildlife Standard Procedures

Category	Standard Practice	Standard Practice Description
Planning	Fish and Wildlife Management Plan Preparation, Review, and Update.	Prepare, review, and update fish and wildlife management plans, to include the fish and wildlife management activity plan and habitat management plan.
Planning	Fish and Wildlife Geographic Information System Planning	Utilize Geographic Information System to assist landscape scale management of fish and wildlife resources.
Planning	Fish and Wildlife National Environmental Policy Act Requirements	Prepare, coordinate, review, and update National Environmental Policy Act documents for fish and wildlife projects, programs, policies, and management plans.
Project Management	Plan Fish and Wildlife Projects	Conduct project planning by inventory and identification of potential sites, project development which is accomplished using the project development worksheet, and project prioritization.
Project Management	Design Fish and Wildlife Projects	Conduct project design by providing specific project designs for fuel hazard reduction, habitat improvement, cover and concealment, timber stand improvement, invasive species control, wildlife suppression, timber harvest, and firewood projects. Project designs include site plans, cost estimates, scopes of work, and bill of materials required for each project.
Project Management	Coordinate Fish and Wildlife Activities	Conduct project coordination by coordinating forestry activities by providing project planning and oversight, technical assistance and design; and coordinating National Environmental Policy Act, wetland and cultural activities related to project oversight and management.

Project Management	Fish and Wildlife Project Site Preparation	Prepare a project site for project implementation by flagging boundaries, marking trees, evaluating site conditions, etc.
Project Management	Fish and Wildlife Project Oversight	Provide project oversight by monitoring project progress and execution. Report results back to federal project manager and Contracting Officer's representative.
Inventory / Monitoring	Conduct Bison, Caribou, and Moose Monitoring	Conduct annual bison, caribou, and moose surveys to determine population levels and locations of herds.
Inventory / Monitoring	Conduct Avian Monitoring	Conduct breeding bird surveys, migratory bird monitoring, and other avian surveys.
Inventory / Monitoring	Conduct Waterfowl Monitoring	Conduct monitoring of waterfowl on military lands.
Inventory / Monitoring	Conduct Furbearer Monitoring	Conduct furbearer monitoring to determine species composition, species frequency, and species population levels on military lands. Conduct data analysis and data summaries of furbearer surveys.
Inventory / Monitoring	Conduct Small Mammal Surveys	Conduct small mammal monitoring to determine species composition, species frequency, and species population levels on military lands. Conduct data analysis and data summaries of small mammal surveys.
Inventory / Monitoring	Conduct Fisheries Monitoring	Conduct fish habitat and fish population surveys on streams on military lands using electrofishing and other census methods. Conduct data analysis and data summaries of fish habitat and fish population surveys.
Inventory / Monitoring	Conduct Fauna Planning Level Surveys	Conduct fence-line-to-fence-line planning level surveys for faunal species to determine what species occur on military lands and in which habitats they occur.
Inventory / Monitoring	Conduct Rare, Threatened, and Endangered F&W Species Surveys	Conduct rare, threatened, and endangered fish and wildlife species surveys on military lands.
Inventory / Monitoring	Conduct Bear Monitoring	Collar and track bears on military lands to determine locations, habitat, and behavior. Conduct data analysis and data summaries of bear surveys.
Outreach	Conduct Watchable Wildlife Program	Conduct watchable wildlife program on military lands. Watchable wildlife includes designing viewing platforms, creating driving tours, and

		developing species checklists.
Outreach	Conduct Presentations/Briefings/Training	Prepare, coordinate, and conduct fish and wildlife presentations, briefings, and training.
Outreach	Develop Training/Education Materials	Prepare, update, coordinate, publish, and distribute fish and wildlife training and education materials.
Habitat Management	Habitat Enhancement	Create, upgrade, repair, or maintain habitat improvement for Soldiers or wildlife habitat. Utilize LRAM standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, vegetation protection, and revegetation.
Habitat Management	Invasive Species Control	Conduct invasive species control to control exotic and invasive species from spreading. Control invasive species to protect natural species and improve training realism. Utilize LRAM standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, and biological and chemical controls.
Habitat Management	Habitat Protection	Prepare, coordinate, and review regulations and overlays that protect sensitive and important wildlife habitat.
Population Management	Wildlife Harvest	Provide support to conduct wildlife harvest by setting population goals, supporting check stations, and enforcing state and federal laws, regulations, and policies during hunting seasons.
Population Management	Fisheries Harvest	Participate in fisheries harvest activities on military land.
Population Management	Fish Stocking	Participate in fish stocking activities on military land.
Population Management	Transplanting	Conduct transplanting of wildfire onto or off of military lands.
Population Management	Nuisance Wildlife Control	Conduct nuisance wildlife control, to include moose, bear, beaver, and other furbearers.
Population Management	Invasive Species Management	Conduct removal of invasive wildlife species from military lands, such as pike.
Population Management	Wildlife Protection and Conflict Avoidance	Put in place measures to protect wildlife species and to promote conflict avoidance through policies and regulations.

D3.3 Projects

Project Information				Year				
Priority	Location	Standard Project Category	Project Title	FY07	FY08	FY09	FY10	FY11
High	FRA	Inventory/Monitoring	Aerial Moose Survey	x	x	x	x	x
High	FRA	Fish and Wildlife Habitat Improvement	Moose Browse Survey	x	x	x	x	x
Med	FRA	Population Management	Moose Harvest Data Collection	x	x	x	x	x
Med	FRA	Inventory/Monitoring	Moose Telemetry Survey	x	x	x		
Med	FRA	Fish and Wildlife Habitat Improvement	Moose Habitat Enhancement	x	x	x	x	x
Med	USAG-AK	Planning	Ecosystem Management Literature Review	x	x	x	x	x
Med	FRA	Inventory/Monitoring	Winter Track Surveys	x	x	x	x	x
High	FRA	Planning	FRA Nuisance Wildlife SOP	x				
High	FRA	Inventory/Monitoring	Beluga Whale Surveys (Eagle River Flats)	x	x	x	x	x
Low	FRA	Inventory/Monitoring	Aerial Dall Sheep Survey	x	x	x	x	x
Low	FRA	Inventory/Monitoring	Ruffed Grouse Drumming Counts	x	x	x	x	x
Low	FRA	Inventory/Monitoring	Sandhill Crane Breeding Surveys	x	x	x	x	x
Med	FRA	Invasive Species Control	Pike Removal and Monitoring on FRA	x	x	x	x	x
Med	FRA	Invasive Species Control	Pike Removal and Monitoring on FRA					x
Med	FRA	Invasive Species Control	Pike Telemetry in Otter Lake				x	

Med	FRA	Population Management	Small Game Harvest Data Collection	x	x	x	x	x
Med	FRA	Inventory/Monitoring	Bat Inventory and Roosting Survey	x				
Med	FRA	Inventory/Monitoring	Bat Monitor	x	x	x	x	x
Med	FRA	Inventory/Monitoring	Rusty Blackbird Nesting Survey	x	x	x	x	x
High	FRA	Inventory/Monitoring	Brown Bear Telemetry Survey	x				
Med	FRA	Inventory/Monitoring	Wolf Population Estimation using Non-invasive Genetic Methods	x	x	x	x	x
Med	FRA	Inventory/Monitoring	Wolverine Population Estimation using Non-invasive Genetic Methods	x	x	x	x	x
High	FRA	Inventory/Monitoring	Brown Bear Population Estimation using Non-invasive Genetic Methods	x	x	x	x	x
Med	FRA	Inventory/Monitoring	Small Mammal Survey		x	x		
Med	FRA	Inventory/Monitoring	Wood Frog Survey	x	x	x	x	x
Med	FRA	Inventory/Monitoring	Spawning Salmon Surveys on Campbell Creek	x	x	x	x	x
Med	FRA	Inventory/Monitoring	Spawning Salmon Surveys on Chester Creek	x	x	x	x	x
High	FRA	Population Management	Nuisance/Injured Wildlife Response	x	x	x	x	x
Med	FRA	Population Management	Tracking of Nuisance Wildlife Calls	x	x	x	x	x
High	DTA FWA	Inventory/Monitoring	Fisheries Planning Level Surveys	x	x	x	x	x

Med	FWA	Inventory/Monitoring	Fish Monitoring TFTA	x	x	x	x	x
Med	FWA	Inventory/Monitoring	Fish Monitoring YTA	x	x	x	x	x
Med	DTA	Inventory/Monitoring	Fish Monitoring DTA W	x	x	x	x	x
Med	DTA	Inventory/Monitoring	Fish Monitoring DTA E	x	x	x	x	x
High	DTA FWA	Inventory/Monitoring	Stream/Water Quality	x	x	x	x	x
Med	DTA FWA	Inventory/Monitoring	Stream Evaluation	x	x	x	x	x
Med	DTA FWA	Inventory/Monitoring	Wild Ponds/Lakes Survey	x	x	x	x	x
Med	DTA FWA	Population Management	Harvest Trends: Furbearers	x	x	x	x	x
Med	DTA FWA	Population Management	Harvest Trends: Black Bear Baiting	x	x	x	x	x
Med	DTA FWA	Inventory/Monitoring	YTA/DTA E Grizzly Sightings	x	x	x	x	x
Low	FWA	Inventory/Monitoring	Black Bear Population Estimates, Yukon Training Area	x	x	x	x	x
High	FWA	Inventory/Monitoring	Moose Population Surveys, 20A/B	x	x	x	x	x
High	DTA	Inventory/Monitoring	Moose Population Surveys, 20D	x	x	x	x	x
Med	DTA FWA	Habitat Management	Moose Habitat Enhancement					
Med	DTA FWA	Inventory/Monitoring	Moose Habitat Mapping					
Med	DTA	Inventory/Monitoring	Bison Habitat Mapping	x	x	x	x	x
Med	DTA	Habitat Management	Bison Habitat Enhancement					
Med	DTA	Habitat Management	Alaska Department of Fish and Game Bison					

			Range					
High	DTA	Inventory/Monitoring	Monitor Bison Populations	x	x	x	x	x
Med	DTA FWA	Habitat Management	Moose Habitat Evaluation					
High	DTA FWA	Inventory/Monitoring	Caribou Population Monitor, 20A/D	x	x	x	x	x
Med	FWA	Inventory/Monitoring	Small Mammal Surveys	x	x	x	x	x
Med	DTA	Inventory/Monitoring	Small Mammal Surveys	x	x	x	x	x
Med	DTA FWA	Population Management	Nuisance/Injured Wildlife Issues	x	x	x	x	x
Low	DTA FWA	Inventory/Monitoring	Bat Surveys					
Med	DTA FWA	Inventory/Monitoring	Wood Frog Breeding Surveys	x	x	x	x	x
Med	FWA	Habitat Management	Ruffed Grouse Habitat Enhancement, Yukon Training Area					
Med	FWA	Inventory/Monitoring	Ruffed Grouse Drumming Counts	x	x	x	x	x
Low	FWA	Habitat Management	Osprey Nesting Poles					
High	DTA FWA	Inventory/Monitoring	Breeding Bird Surveys	x	x	x	x	x
Med	DTA FWA	Habitat Management	Duck Boxes	x	x	x	x	x
Low	DTA FWA	Habitat Management	Owl Boxes	x	x	x	x	x
Low	DTA FWA	Public Outreach	Wildlife Information /Brochures/Presentations					
Low	DTA FWA	Inventory/Monitoring	Waterbird Surveys	x	x	x	x	x
High	DTA	Inventory/Monitoring	Trumpeter Swan	x	x	x	x	x

	FWA		Brood Surveys					
Med	DTA FWA	Inventory/Monitoring	Trumpeter Swan Habitat Mapping					
High	DTA FWA	Inventory/Monitoring	Rusty Blackbird Surveys					
High	FWA	Inventory/Monitoring	Rusty Blackbird Surveys					
High	FWA	Population Management	Mew Gull Monitor/Dep. Permits	x	x	x	x	x
Med	DTA FWA	Inventory/Monitoring	Cliff Swallow Monitor	x	x	x	x	x
Med	DTA FWA	Inventory/Monitoring	Raptor Surveys					
Med	DTA FWA	Inventory/Monitoring	Threatened & Endangered Species					
Med	DTA FWA	Inventory/Monitoring	Owl Surveys	x	x	x	x	x
Med	DTA	Inventory/Monitoring	Sharptail Grouse Leks	x	x	x	x	x
Low	FWA	Inventory/Monitoring	Animal Displays					
Low	FWA	Inventory/Monitoring	Beaver Dams/Hydrology TFTA					
Med	DTA	Inventory/Monitoring	Sandhill Crane Roosting	x	x	x	x	x
Med	DTA FWA	Inventory/Monitoring	Monitor Habitat Work					
Low	DTA FWA	Habitat Management	Swallow Boxes					
Med	DTA FWA	Inventory/Monitoring	Solitary Sandpiper Surveys	x	x	x	x	x
Med	DTA	Inventory/Monitoring	Whimbrel Colony Monitor	x	x	x	x	x
Med	DTA FWA	Inventory/Monitoring	BBS Route Vegetation Survey					

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U.S. Army
Garrison
Alaska

2007-2011
Integrated
Natural
Resource
Management
Plan

Volume II, Annex E
Outdoor Recreation Management

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E1. Introduction

Outdoor recreation is an important part of life for the vast majority of Alaskans. In fact, 88% of Alaskans surveyed by the Alaska Department of Natural Resources reported that the availability of high quality outdoor recreation is important to them (*Statewide Comprehensive Outdoor Recreation Plan 2004-2009).* The top ten favorite Alaskan outdoor recreational activities as reported in the plan are the following (in decreasing order): Sport fishing, day hiking, bicycling or mountain biking, fitness walking, sport hunting, cross-country skiing, backpacking, recreational vehicle camping, snowmachining and off-road vehicle or all-terrain vehicles riding.

All of these activities are available on Army lands when accomplished in accordance with the appropriate state and federal policies and regulations. In 2005, the most popular forms of outdoor recreation on USAG-AK lands (as recorded in the U.S. Army Recreational Tracking System[1]) were big game hunting at 54% of the total recorded user days, small game hunting (15% of total), other activities[2] (hiking, biking, walking, wildlife viewing, berry picking, etc) (13% of total), fishing (9% of total), off-road recreational vehicle use (6%) and trapping (3%).

Despite the vastness of the Alaskan landscape, access for outdoor recreation is often difficult due to the complexity of land ownership. Demand for recreational access near Alaska's metropolitan areas (e.g., Anchorage and Fairbanks) is particularly high. The relatively undeveloped tracks of Army land (representing approximately 1.8 million acres), especially those just outside of Fairbanks (Fort Wainwright) and Anchorage (Fort Richardson) are popular destinations for many members of the outdoor recreational public.

USAG-AK strives to maintain an interactive relationship with local communities by providing as many opportunities for public access as allowed by current military training, military security, safety and environmental conditions. In 2005, for instance, users of USAG-AK lands logged over 6,300 user days of outdoor recreation on Army lands with an additional estimated 3,500 days of use that is thought to have gone unrecorded.

Listed in this document are specific programs to provide recreation opportunities on USAG-AK lands, consistent with the military mission. These programs are directly related to natural resources management. The policies listed in this document pertain to access, off-road recreational vehicles, hunting, trapping and fishing.

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[1] Despite USAG-AK requirements to use USARTRAK, public compliance with this system has not yet reached a satisfactory level (with the exception of the highly regulated Fort Richardson moose hunters). Alaska Department of Fish and Game, for example, estimated that Fort Richardson waters provide an average annual effort of 7,600 user days to anglers (based on five years of data collected during Alaska Department of Fish & Game's Statewide Harvest Survey for Recreational Fisheries) as compared to the 200 days reported in USARTRAK for the year 2005. While the results from the Alaska Department of Fish & Game's surveys are estimates of total usage (based on sampling a small percentage of fishing license holders) rather than actually logged user days (USARTRAK), this disparity clearly suggests a greater than reported usage.

[2] "Other activities" is not subdivided further for convenience sake within the USARTRAK system. Thus someone desiring to hike in a specific training area and someone desiring to berry-pick in that same training area would both be recorded in this catch-all category. It is possible that a single outdoor recreational pursuit that is currently allocated to this "Other activities" by default (e.g., hiking or dog mushing) could surpass, in terms of actual participation, some of the other activities that are given their own category in USARTRAK. To mitigate for potential under-representation of these activities in terms of land use consideration, USAG-AK plans to conduct periodic surveys of recreational use on USAG-AK lands.

E1.1 Goals and Objectives

Outdoor recreation goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. Outdoor recreation goals and objectives are listed below:

Military Readiness

- Manage outdoor recreation consistent with needs of the U.S. Army Alaska military mission.

Stewardship / range sustainment

- Monitor and manage soils, water, vegetation, and wildlife with a consideration for all biological communities and human values associated with these resources.
- Provide human-valued products of renewable natural resources when such products can be produced in a sustainable fashion without significant negative impacts on the military training mission.
- Involve the surrounding community in USAG-AK's natural resources program.
- Manage outdoor recreation while maintaining ecosystem integrity and function.
- Control the use of off-road recreational vehicles in terms of damage to ecosystem functionality.

Quality of Life

- Provide high quality opportunities to the USAG-AK community and the general public for hunting, trapping, and fishing within biological and recreational carrying capacities of the resources.
- Provide high quality natural resources-based opportunities for other outdoor recreation, such as hiking, skiing, snowmachining, rafting, birding, etc.

Compliance

- Manage natural resources within the spirit and letter of environmental laws, particularly the Sikes Act.
- Implement this plan within the framework of Army policies and regulations.

Measures of Effectiveness:

- Increase access opportunities for recreational activities to the extent possible within the framework of the maneuver mission and the capability of the environment to sustain that use.
- Provide recreational opportunities for the military community and the general public.
- Increase watchable wildlife opportunities.
- Update requirements and restrictions to hunting, trapping and fishing and publish in the Outdoor Recreation Supplement at least every two years.
- Remove non-registered black bear bait stands.
- Work with the conservation enforcement officers to locate black bear bait sites during and after the season to ensure proper signage and cleanup is carried out.
- Work with the Alaska Department of Fish and Game to ensure a sustainable population of game species for harvest.
- Work with the Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service to ensure a sustainable population of game and non-game species for wildlife viewing.
- Work with the Alaska Department of Fish and Game to ensure that all currently stocked lakes continue to be stocked annually and to stock additional lakes on post if warranted.
- Update requirements and restrictions to fishing and publish in the Outdoor Recreation Supplement annually.

- Maintain access to existing stocked lakes and popular fishing spots along the streams and rivers.
- Monitor erosion and damage to streambanks and lake shores.
- Mitigate erosion and damage to streambanks and lake shores by providing improved access.
- Enhance existing fishing areas with parking areas, docks, boardwalks, interpretive signs or other improvements.
- Gather fishing use and harvest data opportunistically to determine high use areas and fishing pressure.

E1.2 Responsibilities

E1.2.1 Management Responsibility

Whenever practicable, Army lands with suitable natural resources will be managed to allow for outdoor recreational opportunities. Conservation of outdoor recreation resources will be considered in all plans, programs, site feasibility studies, and project planning and design. Installations having natural resources suitable for outdoor recreation in addition to hunting, fishing, and trapping are encouraged to develop cooperative agreements with the National Park Service and appropriate state agencies to facilitate the development and management of those programs. Development of this installation Outdoor Recreation Plan (see Technical Manual5-803-12) is a joint responsibility of the Directorate of Public Works, and the Directorate of Personnel and Community Activities. The Directorate of Public Works will address that portion of the plan that deals with the biological management of game species and natural resources while the Directorate of Community Activity addresses the movement of persons, special events, and organizational elements of outdoor recreation. The Director of Community Activities will take the lead and coordinate with the Directorate of Public Works for development of the installation's Outdoor Recreation Plan. Public access to Army properties for the purpose of outdoor recreation will be allowed whenever compatible with public safety and mission activities. User fees may be collected to recover expenses of managing natural resources for outdoor recreation and access quotas may be established to reflect the carrying capacity of the area involved. Natural resources used for outdoor recreation on Army land are considered part of the land and belong to the public. Therefore, outdoor recreation opportunities will be equitably distributed by impartial procedures, such as first-come first-serve or drawing lots.

The Environmental Resources Department has responsibility for:

- Management of outdoor recreational activities and natural resources.
- Coordinated selection and designation of installation outdoor recreation areas.
- Coordination of the use of outdoor recreation areas and their maintenance.
- Prevention of environmental degradation using limitations or closures on the use of recreational areas, in coordination with the Directorate of Community Activities.
- Coordinate management of recreation activities with Conservation Enforcement Chief for enforcement/compliance of recreational activities.

The Community Recreation Division is responsible for:

- The movement of persons, special events, and organizational elements of outdoor recreation.
- Determining the need for various outdoor recreation activities (exclusive of those involving consumptive use of wildlife).
- Requesting the designation of recommended areas for outdoor recreation use.
- Administering the recreation aspects of approved programs.

The Directorate of Planning, Training, Safety and Mobilization (DPTSM) is responsible for removing trespass structures.

The Provost Marshal's Office is responsible for enforcement of all applicable state and federal conservation regulations.

E1.2.2 Maintenance of Recreational Facilities

E1.2.2.1 General

Maintenance responsibilities of the facilities engineer on recreational facilities (for example, badminton, tennis, and volleyball courts; baseball diamonds; football fields; playgrounds; and similar outdoor facilities) will include protection and replacement of playing surfaces, backstops, posts, fences, fixed playground equipment, and other fixed items, and the measuring and original permanent marking of diamonds, fields, courts, and similar playing areas. Maintenance of remote facilities may be performed by recreation services when more economical and agreed to by the facilities engineer and recreation services. Provision and maintenance of nets and other removable items, rolling, temporary marking and detailed treatment of playing areas, and similar services will not be accomplished as a facilities engineering responsibility.

E1.2.2.2 Golf Courses

The maintenance of golf courses is not a facilities engineering responsibility. Golf courses will be maintained with funds derived from user fees and will be self supporting. Funds appropriated to the Department of Defense may not be used to equip, operate, or maintain a golf course. This does not apply to facilities or installations outside the United States or at locations inside the United States designated by the Secretary of Defense as a remote and isolated location. The Installation Management Agency may authorize the use of water for irrigation if that authorization does not interfere with the normal domestic requirements of the installation and is in compliance with local water use and initiatives. Cost of water and maintenance of irrigation systems will be funded from golf course maintenance accounts and will not utilize appropriated funds.

E2. Current Management

E2.1 Public Access

While the Army has been training Soldiers around the world for more than a century, it also has provided access to quality recreational opportunities for Soldiers, their families, employees, and the general public. If recreational or management activities conflict with military activities, the military mission comes first. USAG-AK, however, has shown that these two goals can be met even in the most rigorous and demanding of training environments.

Traditionally, there have been ample opportunities for the public to participate in recreational activities on USAG-AK lands. In maintaining a liberal policy of public access, USAG-AK relies on a responsible public to adhere to installation policies designed to promote physical security, minimize safety hazards, and protect natural and cultural resources. Access to USAG-AK lands for recreation is authorized at specific entrances only, and all recreation activities must be conducted in accordance with applicable rules and regulations.

The Sikes Act states: "*Consistent with the use of military installations to ensure the preparedness of the Armed Forces, each integrated natural resources management plan prepared... shall, to the extent appropriate and applicable, provide for... (F) sustainable use by the public of natural resources to the*

extent that the use is not inconsistent with the needs of fish and wildlife resources; (G) public access to the military installation that is necessary or appropriate for the use described in subparagraph (F), subject to requirements necessary to ensure safety and military security; ..."

Department of Defense Directive 4715.3, *Environmental Conservation Program*, May 3, 1996, states: "*…Those [Department of Defense] lands shall be made available to the public for educational or recreational use of natural and cultural resources when such access is compatible with military mission activities, ecosystem sustainability, and with other considerations such as security, safety, and fiscal soundness. Opportunities for such access shall be equitably and impartially allocated.*"

Paragraph 2-10 of Army Regulation 200-3, *Natural Resources – Land, Forest, and Wildlife Management*, states that access by recreational users "*... will be within manageable quotas, subject to safety, military security, threatened or endangered species restrictions, and the capability of the natural resources to support such use; and at such times as such access can be granted without bona fide impairment of the military mission, as determined by the installation commander.*"

USAG-AK's policies regarding public access are within both the spirit and letter of federal law and Army and Department of Defense's policies, and they will be continued in 2007-2011.

E2.1.1 Public Access Policy

E2.1.1.1 General

Civilians and military personnel requesting recreational access to USAG-AK's lands and waters must obtain a Recreation Access Permit. This permit provides conditional authorization to enter Army training lands and is good for two calendar years. Permits can be obtained at each installation's Visitor Center; the Morale, Welfare and Recreation Office at Fort Wainwright; or the Environmental Office. On Donnelly Training Area, permits can also be obtained by calling the Natural Resources Office, 873-1614. The requestor must provide the following information:

(1) Full name
(2) Physical Address (place of residence)
(3) Phone Number
(4) Photo Identification

After the Recreation Access Permit is obtained and prior to entering USAG-AK lands, all recreational users must log in, using the permit number located on the Recreation Access Permit, to the U.S. Army Recreational Tracking System (USARTRAK) to ascertain which training areas are available for recreational use. Individuals are prohibited from entering areas other than those indicated as open on the USARTRAK system. Individuals are also prohibited from entering any of the areas indicated as closed by placard, blockade, verbal warning, red flag or other means of communication. Authorization for access is subject to change based on the current Force Protection Condition levels and mission training requirements.

E2.1.1.2 Fort Richardson

All recreational users south of the Glenn Highway must use USARTRAK to log in and to ascertain which training areas are available for recreational use. In addition to logging in to USARTRAK, all recreational users requesting access to Fort Richardson north of the Glenn Highway and who do not possess an authorized Department of Defense Identification Card/Fort Richardson installation pass or are not on the Fort Richardson Installation Access Roster (See Fort Richardson Garrison Commander Policy #25-15 and #24-16) must go to the Fort Richardson Visitor's Center at the main gate to obtain a visitor's pass. Recreational visitors to Fort Richardson may check in to a maximum of two training areas listed as

opened to recreation on the USARTRAK system. All recreational visitors on Fort Richardson must log out of the training areas via the USARTRAK system and physically vacate said training areas by 2400 hours on the day of use.

E2.1.1.3 Fort Wainwright

All recreational users on Yukon Training Area, Tanana Flats Training Area, Donnelly Training Area and Gerstle River Training Area must use USARTRAK to log in and to ascertain which training areas are available for recreational use. In addition to logging in to USARTRAK, all recreational users requesting access to Fort Wainwright Main Post and who do not possess an authorized Department of Defense ID card/Fort Wainwright installation pass holder or who are not on the Fort Wainwright Installation Access Roster must visit the Fort Wainwright Visitor's Center at the main gate to obtain a visitor's pass. Recreational users requesting access to training areas (Tanana Flats Training Area, Yukon Training Area, Donnelly Training Area, Gerstle River Training Area) whose relative position does not require travel through main post for access, need not obtain a visitor's pass prior to entry of the training areas. Recreational users, after properly logging in to USARTRAK, may enter any open training areas using approved motorized and non-motorized modes of conveyance in strict compliance with all pertinent state, federal and USAG-AK rules and regulations.

Hunting, trapping, and fishing programs on Donnelly Training Area will remain open to the military's personnel, dependents, civilian employees, as well as members of the public who have a current Alaska hunting, trapping, or fishing license. These individuals need only obtain a USAG-AK Recreation Access permit. There are no current restrictions on the number of permits issued to the public.

Hunter access is a significant issue with regard to the impact areas on Donnelly Training Area, Tanana Flats Training Area and Yukon Training Area. These areas are closed to access due to unexploded ordnance and the related safety and liability concerns (Army Regulation 385-63, *Range Safety*). This includes the Oklahoma and Mississippi impact areas. However, there is often illegal access during hunting, fishing, all-terrain vehicles and boating activities.

- The public is expected to comply with all rules concerning restricted access along with permanently and temporarily closed portions of the post.
- The public may use unimproved remote landing areas after complying with notification requirements, provided this use does not interfere with military activities or incur federal liabilities. Landing areas may or may not be maintained by the Army and their use by the public is at one's own risk. Users must use the USATRAK login and have a Recreational Access Permit.
- Signs will be posted to warn the public of impact areas and other closed areas. The Outdoor Recreation Regulation Supplement lists all of the off-limits areas. Temporarily closed areas are announced in the USARTRAK system.

Warning/Information signs are posted on flagpoles at all significant access points along the Richardson Highway. When an area is in use, a red flag is raised at the access point, warning the public of current off-limits areas.

E2.1.1.4 Fort Greely

There is no public access to the National Missile Defense site at Fort Greely.

E2.1.2 USARTRAK

USAG-AK has established the U.S. Army Recreation Tracking (USARTRAK) system to facilitate recreational access onto military lands. All persons (civilian and military) desiring to recreate on Army lands in Alaska must obtain a Recreational Access Permit and must use the USARTRAK system (per

USAG-AK access policy effective 15 November 2004). USARTRAK is an automated access system that allows registered users (Recreational Access Permit holders) to telephonically access range opening data and to check in to areas open to recreation.

E2.1.2.1 USARTRAK Objectives

The main objectives of USARTRAK are to:

- Increase public safety
- Reduce disturbance to military training
- Gather land-use data for land management decisions

E2.1.2.2 Background

The Sikes Act, as amended in November 1997, requires that every installation have an Integrated Natural Resources Management Plan and that each Integrated Natural Resources Management Plan must provide for public access to the military installation that is necessary or appropriate for sustainable use of natural resources by the public to the extent that such use is consistent with the military mission and the needs of fish and wildlife resources, subject to requirements necessary to ensure safety and military security.

In order to provide for and report on these requirements, a simple but reliable system of tracking recreational use by days and type of activity has been designed. The old access system involved getting a hunting, fishing, trapping permit from the post, usually the Military Police; Morale, Welfare and Recreation; or Natural Resource Office. This type of permit only reports the numbers of permits issued to users, but not total numbers of user days and type of activities. A call in system was developed, but it did not meet the full intent of the program. The new system for access to military lands for recreational activities is designed to streamline both the reporting process for USAG-AK and the check-in process for the user.

USAG-AK no longer issues hunting, fishing, trapping permits. Instead, recreational users, including firewood cutters, will be issued a Recreational Access Permit. The new Recreational Access Permits will be valid for all types of recreational access.

As always, recreational activities are permitted in the training areas as long as there are no conflicts with the military mission or training activities. This is for your safety, the safety of the troops, and to maintain the integrity of the military training experience.

E2.1.2.3 Recreation Access Permit

- Obtain a Recreational Access Permit at the main gate 24 hours a day.
- Good for two years from the date of issue.
- Authorizes conditional recreational access USAG-AK-wide when used in conjunction with the USARTRAK system (brochures explaining use of USARTRAK for Fort Wainwright/Donnelly Training Area and Fort Richardson are provided at time of Recreational Access Permit registration. Note, if you register on Fort Richardson, you will only be given information for Fort Richardson unless you specifically request brochures for Fort Wainwright/Donnelly Training Area as well).
- Must be carried on person.
- Free.

E2.1.2.4 Steps involved in using USARTRAK:

When you call the USARTRAK phone line you will be given a series of prompts that will allow you to select the area you want, activity you will be engaged in, and provide you with information about training area availability.

Your Recreation Access Permit number and one of the local phone numbers is all you need to access this phone system:

The Fairbanks area number is 353-3181.
The Delta Junction number is 873-3181.
The Anchorage area number is 384-3181.

When you call the USARTRAK phone line you will be prompted through the system as follows:

- First you will hear the welcome message.
- You will be asked to enter your Recreation Access Permit number.
- You will be able to enter additional permit numbers, if traveling in a group (and then confirm additional numbers).
- Select the post you wish to enter (press 1, 2, or 3 for Fort Wainwright, Donnelly Training Area, or Fort Richardson).
- If requesting access to Fort Richardson, you will be asked to enter the first 3 characters of your last name (e.g., for "SMITH" one would enter "7-6-4").
- Select the activity from the list that most closely identifies the activity you will be engaged in that day. If none of the menu options match your intended activity, press "7" or "Other".
- You will then hear the training area openings for a specified time period.
- You will be asked to enter the training areas of interest (limited to two on Fort Richardson).
- You will be asked to enter the number of consecutive days you will be in that location (Fort Wainwright and Donnelly Training Area only).
- You are now at the end of the menu and you are checked in to the system.
- At the end of your recreational visit to USAG-AK lands, call USARTRAK and check out (currently required on Fort Richardson only).

E2.1.3 Public Access and Military Land Use

The amount of limitations and restrictions on public use of military lands depends on the type of military use. Military use can be broken down into four general categories that affect access.

***Training areas and non-firing facilities*:** Public access into training areas is allowed subject to safety restrictions and military security, when access does not impair the military mission, as determined by the Installation Commander. Compatible uses generally include natural resources management, habitat improvement, mineral or vegetative resources extraction, hunting, fishing, trapping, bird watching, hiking, skiing, dog sledding, and off-road recreational vehicle use. In general, activities that are not compatible with training areas include any permanent nonmilitary structures, easements, or leases.

***Firing ranges, surface danger zones, and non-dudded impact areas*:** Public access into firing ranges, surface danger zones, and non-dudded impact areas is normally not allowed due to conflicts with the military mission. However, there are times during the year when public use does not conflict with military training and public access is allowed into these areas. Compatible uses generally include natural resources monitoring, range maintenance, fire prevention and suppression, hunting, fishing, and trapping. In general, activities that are not compatible with firing ranges, surface danger zones and non-dudded impact areas include any permanent nonmilitary structures, easements, or leases.

***Dudded impact areas*:** Public access into dudded impact areas is prohibited because of the hazard of unexploded ordnance. Compatible uses include remote monitoring of natural resources and military impacts, and prescribed burning to reduce fire hazards and improve habitat. Activities that are not

compatible with dudded impact areas include any on-the-ground natural resources management, digging, mineral extraction, commercial timber sales, hunting, fishing, trapping, bird watching, off-road recreational vehicles of any kind, dog sledding, airboats, camping, new construction, easements, and leases.

***Urban Areas*:** Public access into urban areas is allowed subject to safety restrictions and military security, when access does not impair the military mission, as determined by the Installation Commander. Compatible uses generally include natural resources management, habitat improvement, mineral or vegetative resources extraction, bird watching, hiking, and skiing, In general, activities that are not compatible with urban areas are hunting and trapping.

E2.1.4 Encroachment Policy

Encroachment may be defined as legal activities and land use on or next to a military installation that are incompatible with long-term military mission sustainability and success. Building residences and subdivisions up to the installation boundary often results in conflicts with the public due to noise and dust. USAG-AK is committed to working with surrounding landowners to minimize these types of potential conflicts.

Over the last ten years, USAG-AK has been inundated with numerous requests and proposals from state, federal, and municipal government agencies, businesses, utilities, clubs, organizations, and individuals for authorization or permission to use Army lands on a long-term basis for nonmilitary purposes. Requests often have included commercial or long-term real estate interests involving rights-of-way, easements, land use permits, leases, outgrants, land transfers, exclusive use areas, and special concessions.

The term “military purpose,” with regard to land use, means programs, activities, and facilities necessary to accomplish the military mission and those support elements crucial to its implementation. Any additional long-term nonmilitary uses will create the potential for adverse impact on training and thereby threaten USAG-AK’s viability as a military installation. Besides the mission, USAG-AK is mandated by both law and common sense, through sound stewardship, to preserve the integrity and health of the environment. Only by doing this can the military be assured of maintaining the realistic “backdrops” and scenarios crucial to its training.

It is, therefore, the position of USAG-AK to generally deny requests for nonmilitary uses of USAG-AK properties if those requests include or involve a requirement for long-term real estate commitments, such as leases, easements, or land transfers, or if they create a potential adverse impact on the military mission or the environment. The only exceptions to this will be when such actions clearly result in tangible benefits to the military training mission or on the environment. These situations will be carefully scrutinized and evaluated by appropriate staff elements. No longer is “good public relations” alone a justifiable reason to sacrifice limited and crucial training lands. It is also the position of USAG-AK to adopt a policy which favors temporary, low impact uses of Army lands such as, but not limited to, hunting, fishing, trapping, skiing, dog mushing, off-road recreational vehicles use in specified areas, firewood cutting, boating, picnicking, berry picking, and bird watching.

E2.1.5 Trespass

Illegal entry onto USAG-AK lands is the most common form of trespass. Most illegal activities either directly or indirectly affect natural resources. Since trespass is often the precursor to most illegal range activity, reducing trespass could also reduce illegal range activity.

Crossing the installation boundary or the internal boundary of an off-limits area without approval constitutes trespass. Little of the installation’s boundary is fenced or posted with installation boundary

signs, which adds to the problem. However, trespass is often premeditated. Posting the boundary would reduce accidental trespass, but the effect on premeditated trespass would be minimal. Boundary marking can only be effective in concert with enforcement efforts associated with premeditated trespass.

Trespass is a problem on Fort Wainwright, with most incidents occurring in the Tanana Flats Training Area related to commercial and private fly-ins, and airboat traffic for hunting. Trespass in the Yukon Training Area is most frequently related to moose hunting incidents in the Stuart Creek Impact Area (dudded). Trespassing on Donnelly Training Area is primarily a problem west of the Delta River. Failure to effectively enforce hunting, fishing, and trapping check-in requirements makes trespassing difficult to control on Fort Wainwright.

Structures built on USAG-AK lands without approval from the federal government are considered illegal trespass. Generally, illegal structures are built for use as base camps for hunting and trapping. Problems with trespass structures on Fort Wainwright and Donnelly Training Area were identified as early as 1982. These trespass structures were found to interfere with military training missions as well as to preclude otherwise authorized public use of those parcels of land.

The Post Judge Advocate concluded that "*... the present individuals have no right to construct the cabins. Moreover, paragraph 2-11, Army Regulation 405-80 clearly sets out the procedures to be followed in the event of an unauthorized use. The command should take immediate action to discontinue use of the land and obtain compensation for its use to date. If the individuals can be located the command should request them to vacate the land. If efforts are not successful the matter should be referred to the division district engineer for further action*." In 1987, after several years of command consideration the Army began posting encroachment notices on trespass structures. Specific concerns regarding unauthorized cabins are listed below.

- Trespass structures cause interference with military training missions.
- Trespass structures are "incompatible" land uses.
- In the past, Installation Commanders have allowed trespass structures to remain on Army lands.
- Persons building trespass structures deny the public authorized uses of those parcels of land.
- The Army has uncertain responsibilities to protect trespass structures from wildfires, even if it is a "let-burn" fire.
- The Army's liability in the event a person is hurt in a trespass structure is uncertain.
- Once a precedent is set allowing structures to be built on Army lands, it is difficult to change.

In 1987 it was stated that trespass structures could be important to trapper "survival," and it was noted that it was not in the Army's best interest to "anger" these trappers. This action resulted in an encroachment notice being posted on trespass structures with the following statements:

- These structures are negative to the military mission and protection of natural resources, and future action may be taken to reduce or eliminate this conflict by destroying or moving encroachment structures.
- Unauthorized improvements on Army-controlled lands become the property of the Army, but such improvements may be removed by the builder within six months, with prior approval of the Garrison Commander.
- Until the Army decides to take action against these improvements, they may remain at the builder's and user's risk if permission is obtained to enter Fort Wainwright. Cabins remain open to the public for temporary recreational purposes on a first-come, first-serve basis; the Army assumes no responsibility for loss or damage of these structures or their contents, and no adverse possession rights accrue against the government because of the continued existence of the improvements.

In 1994, the Army and the Bureau of Land Management drafted *The Fort Wainwright Resource Management Plan* which states that only the federal government and private developers authorized by the government may erect or maintain structures on Fort Wainwright. Further, this plan states that all unauthorized use of the land or resources will be investigated and either permitted or stopped and that all unauthorized structures are subject to possession by the government following proper notice.

In 1998 U.S. Army Alaska took action to begin the process of removing trespass structures. Public announcements were made whereby owners had until October 1, 1998, to register structures. Registered structure owners had an additional two years from that time to remove them. Since April 1, 1999, U.S. Army Alaska removed unregistered structures and their possessions. Illegal trespass structures will not be protected during wildfires except when lives are threatened. This course of action will be continued until all trespass structures are removed from Fort Wainwright.

E2.2 Hunting and Trapping Programs

E2.2.1 Introduction

Both hunting and trapping are important natural resources-based forms of outdoor recreation on USAG-AK lands. In 2005, for instance, hunting and trapping accounted for 72% of the recorded (in USARTRAK) total outdoor recreational usage on USAG-AK lands (big game hunting = 54%, small game hunting = 15% and trapping = 3%).

E2.2.2 Hunting and Trapping Management

Hunting and trapping on USAG-AK are conducted under regulations promulgated by the Alaska Department of Fish and Game (ADF&G) to ensure a sustainable harvest of game and furbearer species. USAG-AK manages hunting and trapping in terms of areas available, dates within ADF&G seasons, safety requirements, permit and reporting requirements, and other parameters to avoid conflicts with the military mission and provide safe, high quality recreational experiences. USAG-AK also may institute hunting and trapping regulations (including season closures or bag limit decreases) that are more restrictive than those promulgated by the ADF&G. For this reason, hunters and trappers must consult Army rules and regulations prior to attempting to harvest game on USAG-AK lands.

E2.2.2.1 Fort Wainwright

Hunting is an important natural resource-based outdoor recreational pursuit for many in Alaska. In conjunction with the ADF&G, USAG-AK operates hunting and trapping on Army lands in Alaska. The state sets hunting seasons and harvest limits and restrictions. Hunting and trapping occurs on Fort Wainwright in areas that are open to public access and other recreational uses in Game Management Unit 20A. Fort Wainwright Main Post and Yukon Training Area are in Game Management Unit 20B. Hunting and trapping occur on Donnelly Training Area in areas that are open to public access and other recreational uses in the Donnelly West Training Area, Gerstle River Training Area and the Donnelly East Training Area. Donnelly West is in Game Management Unit 20A. Donnelly East and Gerstle River are in Game Management Unit 20D. Fort Greely Main Post is in Game Management Unit 20D, although hunting is not allowed on the Main Post.

Areas within Game Management Unit 20D are open to moose hunting from September 1st through the 15th (this date may change annually). The Delta Junction Management Area is open to moose hunting to by permit drawing. Within the rest of Unit 20D, antler restrictions apply and these are described in detail in the Alaska hunting regulations booklet. Hunting is off-limits at Fort Greely and between the Delta River and Meadows Road.

Game Management Unit 20A encompasses all of the Fort Greely lands west of the Delta River and is open from September 1st through the 20th (this date may change annually). Antler restrictions may apply in this game management unit and are described in detail in the Alaska hunting regulations. This area has limited accessibility. Many hunters fly in or use a boat to cross the Delta River. Some hunters drive or transport all-terrain vehicles across to access the winter trails or the Delta Creek gravel bed.

The hunting pressure and harvest on Donnelly Training Area lands west of the Delta River continue to be unknown. A number of cabins and airstrips exist across the river. Flights by Natural Resource personnel, starting in the summer of 2000, located most of these cabin sites along with airstrips used by hunters. These areas can be spot checked on weekends during hunting season each year to help determine the number of hunters. Although it may not be as important to know the exact moose harvest in this area, civilian use of the area needs to be better monitored. The moose hunting season is a good chance to meet and talk to the people who use this remote area of Donnelly Training Area.

The Gerstle River site is 60+ miles round trip from Delta Junction. Roughly 20 people may be hunting this area at one time. The Natural Resources vehicle patrols rarely encountered hunters here because they were out hunting along the all-terrain vehicles trails. Aerial photos of the Gerstle River area and Global Positioning System mapping of all-terrain vehicles trails and other special areas has helped to delineate boundaries. A new sign has been installed at the main entry point that shows a large topographical map of the area with boundaries, trails and off-limits areas noted.

Two major habitat projects were initiated in 1999. A bison habitat project began in the early 1980s to assist the community in delaying the movement of bison into the local agricultural fields. During the summer of 1999, sixty acres of the older habitat plots were rehabilitated. As funding becomes available, this project will expand. The second project was hydro-axing forty acres of aspen that had grown too large for most species to use as forage. This was cut in May, and root sprouting should increase forage available for moose, black bears, hares and grouse. This work was carried out in the Delta Junction Management Area and will be done throughout the post as habitat areas and funding are identified.

The Donnelly Flats fire burned large tracts of black spruce and hardwoods in the Delta Junction Management Area. The fire has killed off much of the overstory, which is stimulating sprouting of willows and aspen. This is increasing moose forage in the Delta Junction Management Area. Hydro-axing and shear-blading may be used to create openings in some of the burned areas in the future.

E2.2.2.2 Fort Richardson

Hunting, according to 2005 USARTRAK usage data, is the most popular form of outdoor recreation on Fort Richardson. In 2005, for instance, Fort Richardson hunters logged 1510 user days, or 58% of the total post use, into the USARTRAK system as compared to those engaged in fishing (8% of 2005 total), off-road recreational vehicle use (8% of 2005 total) and other activities such as walking, hiking, biking, etc (25% of 2005 total). Moose hunting, the only authorized big game hunt on Fort Richardson, is traditionally the most popular form of hunting on Fort Richardson while small game and waterfowl hunting are pursued to a lesser degree (2005 moose hunts on Fort Richardson accounted for 47% of total post use while small game/waterfowl hunts accounted for 11%).Hunting occurs on Fort Richardson in areas that are open to public access and recreational use in State Game Management Unit 14C, Fort Richardson Management Area, per Alaska Department of Fish and Game regulations and U.S. Army Alaska Regulation 190-13. Recreational trapping is prohibited on Fort Richardson.

Although moose hunting occurred on Fort Richardson prior to 1965, no information is available as records were not maintained. From 1965 to 1974, several moose hunts were organized and carried out by ADF&G and Fort Richardson biologists. From 1975 through 1981, no moose hunting occurred on Fort Richardson. From 1982 to 1986, moose hunts on Fort Richardson were guided due to the safety hazards

of using big game rifles close to the Glenn Highway and near residential areas in east Anchorage. The ADF&G and the Army provided the guides necessary to conduct the hunt. Even with guided hunting, safety was becoming a serious issue of concern. In addition, the guided hunts required significant amounts of manpower and logistical support, which were not only an unnecessary burden to the Army and ADF&G, but also interfered with the training mission. As a result, in 1987, the Fort Richardson moose hunt was converted to archery only. Two years later, in 1989, a black powder (rifle) hunt was added in a designated area of Fort Richardson north of Eagle River.

The Fort Richardson moose hunt is currently administered by ADF&G as a drawing permit hunt. Between 100 and 150 permits are awarded for the hunts collectively, with typical success rates between 30 and 40 percent for the year. The bag limit for these hunts is one moose, with legal animals (i.e., bull only, either sex, antlerless) varying depending on a variety of factors, the foremost being the results from the annual aerial census.

There are two moose hunting seasons on Fort Richardson, a fall hunt which typically begins the day after Labor Day and ends around November 15, and a winter hunt, which typically runs from the 15th of December to the 15th of January. Both archery and muzzleloader hunting are allowed during the fall hunt which takes place before, during, and after the breeding season (rut). The winter hunt is typically archery-only but may also include muzzleloader hunting as deemed appropriate by USAG-AK and ADF&G personnel. Annual moose harvest levels and sex ratios will be cooperatively determined by USAG-AK and ADF&G.

The current Fort Richardson moose hunts are intensively managed by USAG-AK requiring hunter completion of several administrative and procedural steps prior to issuance of a Fort Richardson Moose Hunt Permit (see Section E2.2.4.2). Hunts are unguided and not regulated in terms of area selection[3] or hunter density. All harvested moose are checked at the kill site by either USAG-AK natural resources personnel or by the Military Police. These mandatory checks allow for collection of data (sex, age class, antler size, general health, exact location) and samples (as appropriate) as well as providing an opportunity for a check of hunter compliance with pertinent policies and regulations. Hunters are required to report animals that are wounded. Every effort is made to locate these animals, including tracking with dogs provided by volunteers from the North American Versatile Hunting Dog Association.

Small game hunting on Fort Richardson is permitted in specified areas on both North and South posts (see map). Game pursued includes snowshoe hare, spruce grouse and ptarmigan with furbearer hunting restricted to coyote (bag limit–one per season). Waterfowl hunting is restricted to areas north of Eagle River. Current harvest data is not available for any of these species, but historical records indicate an average annual harvest of 250 spruce grouse, 100-500 snowshoe hare and 10 ptarmigan. USAG-AK plans to collect small game harvest data beginning in 2007.

E2.2.3 Authority to Hunt, Fish, and Trap

Hunting, fishing, and trapping may be permitted within the current sustainable population levels and carrying capacity of specific wildlife habitats. The number of users of fish and wildlife resources may be limited on a daily or seasonal basis.

Membership in an organization, including rod and gun clubs, will not be a prerequisite for or give priority in receiving permits or authorization to hunt, fish, or trap on USAG-AK lands.

[3] A map of authorized areas for the season is provided at the orientation. These are areas that are potentially open depending on military security and training requirements. Hunters call the USARTRAK system to check on area availability and to check in to an open hunting area.

All hunting, fishing, or trapping on a military installation under the control of the Department of the Army will be in accordance with applicable federal, state, host nation, or territory laws and regulations. (10 USC 2671).

There will be no hunting, fishing, or other recreational activities in officially designated and marked impact areas and associated buffer zones. Impact areas that have been permanently or temporarily closed may be opened to hunting and fishing only after approval from the Installation Range and Safety Officers. The Range, Safety, and Natural Resource Offices will determine recreational use boundaries (pursuant to the Integrated Natural Resources Management Plan) that are adjacent to impact areas.

Any individual eligible to hunt, fish, or trap on a military installation must obtain:

- A license from the state of Alaska (see current Alaska Department of Fish and Game regulations for details).
- A special state permit (16 USC 670a) from the commander of said installation, or his designee, when such permits are required (e.g., Fort Richardson Moose Hunt Permit).

Whoever violates a requirement prescribed in this section is liable of an offense under 10 USC 2671(c).

E2.2.4 Permits

E2.2.4.1 USAG-AK Recreation Access Permits

Military installations usually have complex hunter and angler control systems. These are needed to accommodate recreational activities without interference to the military mission and to ensure safe recreational experiences.

Civilians and military personnel who desire to hunt, fish, trap or otherwise recreate on USAG-AK lands are required to obtain a Recreation Access Permit. All hunters and trappers on USAG-AK lands must also have the following in possession while hunting or trapping on USAG-AK lands:

- All required state and federal hunting licenses and stamps
- State issued hunter safety cards regardless of age

E2.2.4.2 Fort Richardson Moose Hunt Permit

The following steps must be completed prior to issuance of a Fort Richardson Moose Hunt Permit:

- Complete a state of Alaska approved bowhunter education course (i.e., International Bowhunters Education Program) or muzzleloader education course as appropriate.
- Purchase all appropriate state licenses and tags (i.e., non-resident moose tags).
- Successfully draw a state of Alaska moose hunting permit (permits are mailed to the Army). Permittees are contacted by mail and given specific information regarding mandatory orientation and proficiency testing.
- Complete a state of Alaska approved basic hunter education course (may be from any state but must meet Alaskan standards).
- Pass a proficiency test administered by USAG-AK.
- Attend a hunter orientation presented by USAG-AK.
- Obtain a Recreational Access Permit from USAG-AK.
- Remit $125 conservation fee to USAG-AK.

E2.2.4.3 Hunting and Fishing Permit Fees

Almost all military installations issue permits for hunting, fishing, and trapping, but most are charging a fee for those permits. Army funding policies are making it almost impossible to fund hunting and fishing programs unless a fee system is installed.

Pursuant to16 USC 670a-f and Army Regulation 200-3, USAG-AK Garrison Commanders are authorized to collect, spend and administer fees for hunting, fishing, or trapping on USAG-AK lands. The only fees currently collected on USAG-AK are those collected on Fort Richardson pursuant to its annual moose hunt. This fee system was established in 2002 and will continue through 2011. Such fees are administered in accordance with Army Regulation 200-3 and are used on the installation from which they are collected for the protection, conservation, and management of fish and wildlife, including habitat restoration and improvement, biologist staff and support costs, and related activities, as stipulated in the Fish and Wildlife Cooperative Plan, but for no other purpose.

All fees collected will be accounted for in accordance with guidance provided for the appropriation titled "Wildlife Conservation, Military Reservations," Army Account 21X5095 (Army Regulation 37-100 and Army Regulation 37-108). Un-obligated balances will be accumulated with current fee collections, and the total amount accumulated at an installation will be available for obligation as apportioned by the Office of Management and Budget. Budget and support information, required to obtain obligation authorities, will be provided annually to the ACSIM ATTN: DAIM-ED, 2511Jefferson Davis Hwy, NC1 (Presidential Tower), Suite 9300, Arlington, Virginia 22202. The policies and procedures in paragraph 6.4.1 apply to those outdoor recreation programs and opportunities as defined in the glossary and take precedence over Army Regulation 215-1.

Funds collected pursuant to the Sikes Act (account 21X5095) may be used only to defray the costs of fish and wildlife management programs. The quality of hunting and fishing opportunities are usually in direct relationship with the effort expended for habitat protection and improvement and will receive primary emphasis when developing annual work plans to implement the fish and wildlife management program. Funds collected for hunting and fishing permits will not be used for construction of recreational structures (for example, blinds, deer stands, fishing piers, and so on) or for transportation of hunters to designated stations, unless the only means of participation is by transportation required to reach the hunting and/or fishing areas. Such facilities are primarily for recreational use and therefore should be funded from the installation Morale, Welfare, and Recreation account.

The revenues generated from this program in the current fiscal year and deposited in the 21X5095 account are considered to be "no year" funds and remain available for obligation indefinitely. Installations are encouraged to use the un-obligated balances for the collection of hunting, fishing, and trapping fees for the protection, conservation, and management of fish and wildlife.

Funds available for obligation in the current year consist of the following:

- Un-obligated funds carried forwarded that are not reflected on the current year fund allowance system document/Funding Authorization Document.
- Prior year recoveries that are not reflected on the current year Fund Allowance System Document/Funding Authorization Document.
- Current year collections/receipts that are received and authorized on the current year Fund Allowance System Document/Funding Authorization Document. Obligations from current year collections/receipts are limited to the lesser of current year obligation authority issued on Document/Funding Authorization Document.

- Installations have access to all un-obligated balances from previous years since once past year funds have been apportioned, they do not need to be apportioned again. Permission to spend un-obligated prior year balances (21X5095) is not required; however, the Installation Management Agency may require associated work plans as part of its oversight function. Also, Installation Commanders must ensure that obligations do not exceed available funds as indicated by monthly Defense Finance Accounting Service reports or the amount authorized in their Funding Authorization Document, whichever is the lesser amount.

Commanders are responsible for authorizing expenditures of 21X5095 funds only as permitted under the Sikes Act Improvement Act and this guide. A separate community recreation hunting and fishing activity fee, not accounted for as Sikes Act hunting and fishing permit fees (16 USC 670a), may be charged to users of optional hunting and fishing services. These fees should be used for items not authorized, as discussed in a previous paragraph (for example, prizes for fishing rodeos, use of blinds or fishing piers only when they are not a requirement to hunt or fish on the installation, rental of hunting and/or fishing equipment, and so on). All recreation hunting and fishing activity generated from these recreational activity fees will be deposited to the installation Morale, Welfare, and Recreation fund.

Funds that are required to support hunting and fishing fee collection administration (that is, printing and issuing of permits) will not exceed 10% of the annual revenues from hunting, fishing, and trapping fees (Army Regulation 215-1, Chapter 8, Section 18). Exception to this 10% may be approved only through the Army Chief of Staff for Installation Management. Furthermore, funds collected pursuant to an Integrated Natural Resources Management Plan, prepared in accordance with the Sikes Act Improvement Act (ACCOUNT 21X5095), may be used only to defray the costs of fish and wildlife management programs. The quality of hunting and fishing opportunities through habitat improvement and expansion will receive primary emphasis when planning activities. Hunting and fishing permit funds will not be used for the construction of recreational structures. Management of this source of funds will be the responsibility of the installation's natural resources management professional.

E2.2.5 Regulations

Hunting, fishing and trapping on USAG-AK lands are regulated by both the state of Alaska, through its hunting and trapping regulations and the federal government through Army-wide and installation specific regulations. The Alaska Department of Fish and Game issues various regulations (trapping, migratory bird hunting, and hunting) for hunters and trappers in Alaska. Army Regulation 200-3, *Natural Resources - Land, Forest and Wildlife Management*, and U.S. Army Alaska 190-13, *Enforcement of Hunting, Trapping and Fishing on Army Lands in Alaska*[4], are the primary means of establishing controls on hunting and trapping as well as other natural resources-related activities on USAG-AK. U.S. Army Alaska 190-13 pertains to hunting, trapping, fishing and off-road recreational vehicle use on USAG-AK lands. The Fort Wainwright, Donnelly Training Area, and Fort Richardson recreation supplements (updated at least every two years) condense these regulations into a user-friendly format and are distributed to the public

E2.3 Fishing Program

Fishing remains a popular sport on USAG-AK. The popularity of the sport can be attributed to both sound management and efficient administrative procedures that allow easy access for anglers.

[4] USAG-AK is currently in the process of drafting a conservation enforcement regulation that will supercede U.S. Army Alaska Regulation 190-13, *Enforcement of Hunting, Trapping and Fishing on Army Lands in Alaska.* This new regulation, USAG-AK 200-X (number format not yet approved) is expected to take effect by October of 2006. Anyone requesting access to USAG-AK lands for recreational purposes should check at the main gate of each installation for the status of Army regulations pertaining to outdoor recreation.

E2.3.1 Fisheries Management

Fishing on USAG-AK is conducted under regulations promulgated by the Alaska Department of Fish and Game (ADF&G) to ensure a sustainable harvest of fish species. USAG-AK manages fishing in terms of areas available, dates within ADF&G seasons, safety requirements, permit and reporting requirements, and other parameters to avoid conflicts with the military mission and to provide safe, high quality recreational experiences. USAG-AK also may institute fishing regulations (including season closures or creel limit decreases) that are more restrictive than those promulgated by ADF&G. For this reason, anglers must consult Army rules and regulations prior to fishing on USAG-AK lands.

E2.3.1.1 Fort Wainwright and Donnelly Training Area

Fishing opportunities abound across the Fort Wainwright and Donnelly Training Area lands. Fort Wainwright is unique because of the fact that a major recreational river flows through its boundaries. The Chena River is a popular fishing location where wild Arctic grayling, burbot, sheefish, northern pike, and whitefish are available year-round, and both Chinook (king) and chum salmon may be caught seasonally. Historically five Fort Wainwright lakes have been stocked by ADF&G. However, due to a reduction in available fish and a loss of some public access, only two lakes/ponds are currently stocked. In the future more stocking opportunities may become available. Additional fishing opportunities on Fort Wainwright lands include the Tanana and Wood rivers and some other small streams, lakes, and ponds.

Sixteen lakes at Donnelly Training Area are stocked by ADF&G. Koole Lake, in the Donnelly West Training Area, is reached by floatplane in the summer and snowmachine in the winter. The other fifteen lakes are in the Donnelly East Training Area, along Meadows Road, Windy Ridge Road and trails to the west of the Richardson Highway. The Delta River contains sportfish such as grayling, and possibly other species common in the Tanana drainage. Jarvis Creek contains grayling. ADF&G stocks the ponds and lakes with grayling, rainbow trout, Arctic char and king salmon. Five lakes at Fort Wainwright are stocked by ADF&G. The Chena River is a popular fishing location where grayling, burbot, and northern pike are available year-round, and salmon is a migratory species. There are also fishing opportunities in the Tanana and Wood rivers and some streams, lakes, and ponds

The state of Alaska requires that all persons (16 and older) wishing to fish in Alaska purchase a state fishing license. All state laws apply on Fort Greely along with military restrictions which are listed in the Fort Wainwright and Donnelly Training Area hunting and fishing supplement. A king salmon stamp must be purchased and attached to the back of the license for those who wish to fish for Kings. Icehouses are permitted on Donnelly Training Area lakes but not on Fort Wainwright Main Post. Icehouses not removed from the ice at the end of a day's fishing must be registered and a permit obtained from ADF&G. This helps ensure the removal of icehouses from lakes at the end of the year. A separate military permit for icehouses is not needed.

E2.3.1.2 Fort Richardson

Fishing at Fort Richardson is centered primarily around the four main lakes that are stocked with fish (i.e., Clunie, Gwen, Otter and Waldon). River fishing is pursued but to a much lesser degree as it is limited to a section of the Eagle River between the Bailey Bridge and Bravo Bridge. There is some potential for growth of Fort Richardson’s fishing program, but it is dependent almost entirely on the availability of fish from the hatchery and expansion of the stocking program. Increased stockings of Otter Lake and Gwen Lake hold the most potential for increased fishing use on the post. Northern pike are believed to have been illegally introduced into Otter Lake sometime in the mid 90s. The current population size of pike in Otter Lake is unknown, but the fish are clearly reproducing and represent a definite threat to the lake’s other fauna, especially the “predator-naive” stocked rainbows. Stocking efforts in Otter Lake have been decreased due to the presence of the pike. In 2004, USAG-AK established an aggressive pike removal

program on Otter Lake involving netting with variable mesh gill nets. All other Fort Richardson lakes are monitored for the presence of pike and will be netted if necessary.

Improving access and maintenance, and upgrading facilities at some of the post's lakes is another area of potential growth for the fishing program. The Clunie Lake area could be improved by graveling the parking area, providing sanitation facilities, and installing barriers to keep vehicles out of wetlands. In addition, the area has great potential for camping facilities. Waldon Lake has a good parking area, but adjacent natural areas are being degraded by uncontrolled, unauthorized uses such as camping. A boardwalk or portable pier for anglers could be installed to enhance fishing opportunities. Thompson Lake mainly requires the installation of barriers around common parking areas to stop damage to wetlands by vehicles. Improvements to Gwen Lake should concentrate on shore rehabilitation as the area has extensive damage from both beaver activity and human foot traffic. Development of a trail and possibly boardwalks in the marsh and wetland areas could greatly improve angler access to this area. Of concern is the practice of driving vehicles onto frozen lakes, generally for ice fishing. This can lead to loss of vehicles and is a significant human safety hazard. It also poses a potential pollution risk (oil spills, etc.). It is for these reasons that driving privately-owned vehicles onto frozen lakes is prohibited.

E2.3.2 Fisheries Regulations

The Alaska Department of Fish and Game issues sport fishing regulations for anglers in Alaska. Army Regulation 200-3, *Natural Resources - Land Forest and Wildlife Management*, and U.S. Army Alaska Regulation 190-13, *Enforcement of Hunting, Trapping and Fishing on Army Lands in Alaska*, are the primary means of establishing controls on fishing as well as other natural resources-related activities in USAG-AK (see Section E 2.2.5).

E2.4 Subsistence

Subsistence has been legally defined to include the customary and traditional uses of fish and game in all of Alaska's rural areas. If a person moves into a rural area and adopts that way of living for their own, then that person, whether Alaska Native or non-Native, may legally fish and hunt for subsistence. Both Alaska Natives and non-Natives may hunt and fish for subsistence if they live in rural areas. Currently, more than half of the people who qualify for subsistence are non-Natives. In 1985, about 110,075 Alaskans lived in rural areas. Of these about 50,084 (45.5%) were Alaska Native and 59,991 (54.5%) were non-Natives (Wolfe 1989).

Food is one of the most important subsistence uses of wild resources. The current rural subsistence harvest is about 354 pounds of food per person per year. That is more than the U.S. average consumption of 255 pounds of domestic meat, fish, and poultry per year. (The average American uses a total of 1,371 pounds of all foods a year.) However, there are other important uses of subsistence products, such as:

- Clothing: Wild furs and hides are still the best materials for ruffs (wind guards), mitts, parkas, kuspuks, clothes lining, and mukluks (winter boots) in many regions.
- Fuel: Wood is a major source of energy in rural homes, and is used for smoking and preserving fish and meat.
- Transportation: Fish, seals, and other products are used to feed dog teams.
- Construction: Spruce, birch, hemlock, willow, and cottonwood are used for house logs, sleds, fish racks, and innumerable other items.
- Home goods: Hides are used as sleeping mats. Seal skins are used as pokes to store food. Wild grasses are made into baskets and mats.
- Sharing: Fish and wildlife are widely given out to support neighbors who cannot harvest for themselves because of age, disability, or other circumstances.

- Customary trade: Specialized products like seal oil are bartered and exchanged in traditional trade networks between communities. Furs sold to outside markets provide an important source of income to many rural areas.
- Ceremony: Traditional products are used in funerals, potlatches, marriages, Native dances, and other ceremonial occasions.
- Arts and Crafts: Ivory, grass, wood, skins, and furs are crafted into beautiful items for use and sale.

All of these uses of wild resources are recognized and protected in law. Subsistence is a rich pattern of living, of which food is but one important part (Wolfe 1989).

Since 1989, laws of the United States and the State of Alaska governing subsistence in Alaska have been in disagreement. Because of this unresolved discrepancy, the State of Alaska and United States governments each maintain separate programs for providing for subsistence on their separate lands and waters within the state. This Integrated Natural Resources Management Plan does not attempt to solve these discrepancies or differences. Rather, the following section attempts to explain the differences in the federal subsistence program, the state subsistence program, and traditional subsistence and then discuss how those programs apply to USAG-AK lands.

State and federal programs for managing subsistence share some similarities. Each program establishes subsistence as the highest priority consumptive use of resources. Each manages first to protect and perpetuate fish and game populations. Each makes provisions for differentiating among subsistence users when stocks aren't sufficient to provide for all.

But the two systems differ in several key ways, including who is eligible for subsistence fishing and hunting, where subsistence uses are allowed, how uses are defined and how decisions regarding subsistence fisheries are made. Knowing these important differences is the first step to understanding the complexity of dual subsistence management in Alaska.

Neither one of these programs addresses traditional subsistence patterns of Native Alaskans. The following section will attempt to discuss the various definitions of subsistence in relation to Army lands in Alaska.

E2.4.1 Federal Subsistence

The area of federal jurisdiction includes 34 wildlife refuges, parks, preserves, monuments, conservation and recreation areas, national wild and scenic rivers and the Tongass and Chugach national forests (not including marine waters). It excludes Glacier Bay National Park, Kenai Fjords National Park, Katmai National Park, the portion of Denali National Park established prior to 1980, and all military lands. This area comprises about 60% of lands in the state.

The federal subsistence program was established under Title VIII of the Alaska National Interest Lands Conservation Act (Title VIII), a federal law passed in 1980. (The Marine Mammal Protection Act and Migratory Bird Act also govern management of subsistence harvesting activities for some other species. Federal subsistence law under Alaska National Interest Lands Conservation Act is further defined in regulations found in the Code of Federal Regulations, Sections 36 CFR 242 and 50 CFR 100.

Under the Alaska National Interest Lands Conservation Act, rural Alaska residents are eligible for the subsistence priority. Rural residents make up about 20% of the state's population. Rural residents are defined as all Alaskans except those living in and around Anchorage, Fairbanks, Juneau, Ketchikan, Adak, Valdez, Wasilla, Palmer, Homer, Kenai and Soldotna.

The federal "subsistence priority" means that subsistence uses by rural residents are accorded priority over non-subsistence uses (commercial or sport). To implement this priority, the Federal Subsistence Board can, during times of resource shortage, close non-subsistence uses on federal land to protect fish and game resources or to assure subsistence harvests by rural residents. The board also reserves the right to restrict non-subsistence uses on federal land. In addition, the board retains authority to restrict or eliminate uses off federal lands to provide the subsistence priority.

The federal subsistence management program is regulated by the six-member Federal Subsistence Board, comprised of a chairperson appointed by the U.S. secretaries of Agriculture and Interior, and one representative each from the U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, Bureau of Indian Affairs and U.S. Forest Service. The board meets at least twice annually to consider proposals for changes to fish and game regulations.

The federal subsistence management program is administered by the Anchorage-based Office of Subsistence Management, including employees of the Bureau of Indian Affairs, Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service, and U.S. Forest Service.

The Federal Subsistence Board receives recommendations from 10 advisory councils representing the different regions of the state. Regional advisory councils are comprised of rural residents from the regions and meet at least twice a year. Councils consider subsistence proposals for fish and wildlife in their regions, hear from subsistence users from their regions, and make recommendations to the federal board.

Under the federal program, rural residents may take fish or game for subsistence uses on federal lands and waters unless prohibited by federal regulation. That general allowance for subsistence is narrowed by "customary and traditional" use determinations, which limit subsistence uses of fish stocks or game populations in a particular location to a specific subgroup of rural residents.

Legally, customary and traditional is defined as "a long-established, consistent pattern of use, incorporating beliefs and customs which have been transmitted from generation to generation (and) plays an important role in the economy of the community."

In making a customary and traditional use determination, the Federal Subsistence Board identifies communities that have practiced a particular use. Only those communities are eligible for subsistence use under such "customary and traditional use" determinations.

In judging a customary and traditional use determination, the federal board considers eight factors including: a long-term and consistent pattern of use, uses recurring in specific seasons, uses involving methods of harvest that are efficient and economic, harvests and uses that are related to past ones and are reasonably accessible to a community, methods of handling and preserving resources that are traditional, allowing for some alteration for technological advances, uses involving the handing down of knowledge of harvest skills, values and lore from one generation to the next, uses in which harvests are shared within a defined community, and, uses that involve reliance on a wide variety of resources in an area and provide an area with cultural, economic, social and nutritional elements.

These eight factors are viewed as guidelines, not criteria. A use does not have to meet all factors to be determined "customary and traditional" by the Federal Subsistence Board. The board also considers Advisory Council recommendations and public input when making determinations.

Federal law allows subsistence managers to differentiate among subsistence users when fish stocks or game populations aren't sufficient enough to meet subsistence demand. The following criteria are used to

determine subsistence eligibility at such times: (1) customary and direct dependence upon the populations as the mainstay of livelihood, (2) local residency, (3) availability of alternative resources.

E2.4.2 State Subsistence

The state holds exclusive authority to manage subsistence on lands and waters on state and private property in Alaska, or about 40% of Alaska lands and rivers. Its jurisdiction also includes most marine waters in the state. The state allows no subsistence fishing or hunting in non-subsistence areas centered around Anchorage (including the Kenai Peninsula and Matanuska and Susitna valleys), Fairbanks, Juneau, Ketchikan and Valdez.

Alaska's subsistence laws are based on the principles found in Article VIII of Alaska Constitution and can be found in Alaska statutes at 16.05.258 and 16.05.940. The constitution establishes that wild fish and game “are reserved to the people for common use” and that “no exclusive right or special privilege of fishery shall be created.” Subsistence fisheries regulations are found in Title V of the Alaska Administrative Code and are published in booklet form annually by the Department of Fish and Game. Under state law, all Alaskans are potentially eligible for the subsistence priority.

Like the federal government, the State of Alaska gives top priority in allocation decisions to subsistence users. Under state management, a subsistence decision begins with a determination that a portion of a fish stock or game population can be harvested for subsistence consistent with sustained yield. Following such a decision, the Board of Fisheries or Board of Game determines what amount of the harvestable portion of the population is "reasonably necessary for subsistence uses." Then regulations are adopted that provide a "reasonable opportunity for subsistence uses.”

Alaska subsistence regulations are developed by the Board of Fisheries and the Board of Game at their annual meetings. Each board is comprised of seven citizen members appointed by the governor and confirmed by the legislature. Each board meets several times a year to consider proposals and take other action. (However, the Board of Fish takes up proposals for each area on a three-year cycle; the Board of Game works on a two-year cycle).

The boards have authority to close and open seasons, set bag limits, and establish methods and means of subsistence harvest. The boards also determine what fish stocks or game populations are customarily or traditionally taken for subsistence. The Boards consider subsistence proposals concurrently with proposals to change regulations for commercial, sport and personal use uses.

State management is administered by the Alaska Department of Fish and Game, with assistance from the State Division of Subsistence, the Division of Commercial Fisheries, and the Division of Wildlife Conservation.

The Board of Fisheries and Board of Game receive recommendations from about 80 Local Advisory Committees statewide. The committees have up to 15 members each elected from their community or region of jurisdiction. They typically meet annually to review proposals to the boards for regulation changes.

In state law, "customary and traditional" means "the non-commercial, long-term and consistent taking of, use of, and reliance upon fish or game in a specific area and the use patterns of that fish or game that have been established over a reasonable period of time, taking into consideration the availability of the fish or game."

Under state law, the Boards of Fish and Game are required to identify stocks with customary and traditional uses, using eight criteria similar to those under federal regulation. Unlike federal regulation, all eight criteria must be met to establish a customary and traditional use. The state then is required to establish an amount necessary to provide a reasonable opportunity for subsistence harvests of each stock with a customary and traditional designation.

Under state law, if a harvestable portion of a fish stock or game population isn't enough to provide for all subsistence users, the state differentiates between users, employing the following criteria: (1) customary and direct dependence on the fish stock or game population by the subsistence user for human consumption as a mainstay of livelihood and, (2) ability of the subsistence user to obtain food if subsistence use is restricted or eliminated.

E2.4.3 Traditional Subsistence

Alaska continues to manage non-subsistence uses of fish, game, and other renewable resources on federal public lands. Since 1990, Alaskans have been looking at options for subsistence management in Alaska. Although Alaska National Interest Lands Conservation Act specifies a subsistence preference based on place of residence (rural vs. urban), not race or ethnicity, Alaska Natives, many of whom depend heavily on subsistence for their livelihoods, have much to gain or lose depending on what solution is ultimately found to the subsistence dilemma.

In Alaska today, the rural economies are "mixed economies," where families and communities live by combining wild resource harvests with commercial-wage employment. Monetary jobs tend to be few and unstable. Monetary incomes tend to be small and insecure. Economic activity seems to occur in family groups, rather than business firms. Economic ventures are inclined to be small scale. Economic goals tend to be for the benefit of family groups, rather than monetary profits for business firms. These are major differences. Because of this, Alaska is a pluralistic society, with "mixed subsistence-cash economies" existing side-by-side with the "industrial capital economy" of the large population centers of Anchorage and Fairbanks (Wolfe 1989).

Rural communities depend on the land for subsistence. It is to their advantage to maintain undamaged land and ecosystems, so wildlife remains abundant. Most subsistence communities have customary rules for treating the land and the ecosystem. These rules have been passed on through the generations: "Do not waste," "Take only what is needed," "Treat the animals with respect," "Do not damage the land without cause," among others. It is believed that if the rules are followed, then the land will continue to provide. Subsistence peoples are the original conservationists, although they may not use that word, because their very lives depend on it (Wolfe 1989).

E2.4.4 Subsistence on Army Lands in Alaska

All Army lands in Alaska are federal lands. USAG-AK consists of mostly public domain land withdrawn for military purposes. There are no lands withdrawn for military use in Alaska that are managed as part of the Federal Subsistence Program. Federal subsistence regulations specifically state that Fort Richardson is closed to subsistence hunting of wildlife. 50 CFR 100.3(d), published 27 December 2005, in the Federal Register states: (d) The regulations contained in this part apply on all other public lands, other than to the military, U.S. Coast Guard, and Federal Aviation Administration lands that are closed to access by the general public, including all non-navigable waters located on these lands.

While there are no subsistence priorities on military lands for those who qualify under federal or state rules, subsistence users do utilize subsistence resources on military lands. USAG-AK is responsible for managing these subsistence resources for all users. USAG-AK must assess impacts to all subsistence resources for any proposed actions.

USAG-AK lands were traditionally used for subsistence activities by Alaska Natives. USAG-AK has a trust responsibility to conserve these subsistence resources.

E2.5 Off-Road Recreational Vehicles and Watercraft

E2.5.1 Introduction

Army is a trustee of public lands and has a responsibility to protect and enhance environmental quality, conserve natural resources, and provide opportunities for outdoor recreation. However, it must be recognized that land under Army control was acquired solely for national defense purposes. Other uses are therefore secondary to mission needs.

Off-road recreational vehicles are used in association with many activities throughout Alaska. These vehicles are used to access hunting, fishing, and trapping areas, for recreational riding and other activities.

All land and water areas will be closed to off-road recreational use by motorized off-road recreational vehicles and watercraft except those areas and trails, which are determined suitable and specifically designated for such under the procedures established in this Integrated Natural Resources Management Plan.

E2.5.2 Background

In determining suitability of areas and trails for off-road recreational vehicles use, each type of motorized off-road recreational vehicles will be considered separately, taking into account its potential environmental impact, the seasonal nature of its use and opportunities for counter-seasonal use with other recreational uses.

The characteristics of use of one type of motorized recreational off-road recreational vehicles will not affect or govern regulations on the use of an area or trail by another type of off-road recreational vehicle use. When off-road recreational vehicle use is permitted, the intensity, timing, and distribution will be carefully regulated to protect the environment. In designating suitable sites, equitable treatment should be given to all forms of outdoor recreational activity and, where possible, non-conflicting use will be encouraged on existing trails.

Prior to designating such areas or trails for off-road recreational vehicle use, the environmental consequences must be assessed and environmental statements prepared and processed when such assessments indicate that the proposed use will create a significant environmental impact or be environmentally controversial (32 CFR 651). This procedure applies to all areas, including areas under consideration as well as those areas that are currently designated or being used by off-road recreational vehicles.

If the Garrison Commander, or his or her designee, determines that off-road recreational vehicle use is causing or will cause considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat, or cultural or historic resources, he or she will immediately prohibit the type of off-road recreational vehicle use causing such effects and, if necessary, close such designated sites. Restrictions on off-road recreational vehicle use or closure of designated sites will remain in effect until such adverse effects have been eliminated, including site restoration if necessary, and appropriate measures implemented to prevent any such recurrence. Persons abusing the off-road recreational vehicle use privilege will be barred, with their vehicles, from access to the Army installation for off-road recreational vehicle use. Further action, as appropriate, may be taken under 18 USC Section 1382. Violations of federal or state laws applicable to

Army installations under title 18 USC (Assimilative Crimes) may be referred to a U.S. Magistrate according to Army Regulation 27-40 and Army Regulation 190-29.

The limitations imposed by this regulation on off-road travel by off-road recreational vehicles do not apply to official use. It is Army policy to minimize environmental degradation of sensitive portions of facility sites, which play a significant ecosystem support role.

E2.5.3 Responsibilities

E2.5.3.1 USAG-AK Garrison Commander

Commanders of Army installations and activities are responsible for developing policy and procedures prescribing operating conditions for motorized off-road recreational vehicles and non-motorized mountain bikes which are designed to protect resource values; preserve public health, safety, and welfare; and minimize use conflicts. These procedures will include as a minimum the following:

- Registration – Off-road recreational vehicles used both on and off the traffic way will be registered according to Army Regulation 190-5, *Motor Vehicle Traffic Supervision*. Off-road recreational vehicles operated solely off the traffic way will be registered at the discretion of the Garrison Commander.
- Fees – Garrison Commanders are authorized to impose appropriate fees and charges for off-road recreational vehicle activities according to Army Regulation 215-2 (*The Management and Operation of Army Morale, Welfare, and Recreation Activities and Nonappropriated Fund Instrumentalities*), as an element of the Outdoor Recreation Program. Such fees and charges are accounted for as income to non-appropriated funds according to Army Regulation 215-5 (*Nonappropriated Fund Accounting Policy and Reporting Procedures*).

E2.5.3.2 Directorate of Public Works

Ensures that lands where off-road recreational vehicles use will be permitted are designated in the Integrated Natural Resources Management Plan and, where appropriate, included as part of the installation's master plan (Army Regulation 210-20). Provides opportunities for users to participate in the selection and designation of suitable sites, and distributes information that identifies authorized sites and describes the conditions of use. Establishes appropriate procedures to monitor the effects of the use of off-road recreational vehicles. This monitoring will be the basis for changes to installation policy to ensure adequate control of off-road recreational vehicle use, amendment of area and trail designations, or conditions of use which are necessary to protect the environment, ensure the public safety, and minimize conflicts among users. Ensures that potential wildlife and vegetation disturbance is evaluated and that appropriate agency coordination occurs.

E2.5.3.3 Directorate of Community Activities

Organized recreational activities involving off-road recreational vehicles are within the scope of responsibilities of the Outdoor Recreation Program of the Directorate of Personnel and Community Activities. The Directorate of Community Activities:

- Posts appropriate signs at authorized areas and trails.
- Provides for the maintenance of the off-road recreational vehicles areas or trails
- Provides for the administration, maintenance, enforcement, and policing of trails and areas to ensure that conditions of use are met on a continuing basis.
- Coordinates off-road recreational vehicle use, projects, activities, designated off-road recreational vehicle areas, and all related matters, with the installation Environmental Quality Control Committee and Environmental Office.

E2.5.3.4 Provost Marshal's Office

Enforces State of Alaska laws and U.S. Army/USAG-AK regulations relating to off-road recreational vehicle use.

E2.5.4 Environmental Considerations

The environmental and related impacts of off-road recreational vehicle use will be assessed according to Army Regulation 200-1 and 32 CFR 651. Coordination with adjacent private and public landowners and managers will be included in the assessment process. Coordination must be made to ensure all local, state, and federal requirements are met. Although many off-road recreational vehicle riders use established trails and roads, off-road recreational vehicles have the potential for damage to natural resources. Army policy on off-road recreational vehicles is very restrictive (Army Regulation 200-3).

Off-road recreational vehicles activity can create at least three significantly negative impacts:

- Trespass: Those who trespass may be unaware of impact area boundaries, critical habitat, military training and other permanent or temporary restrictions to access.
- Interference with military mission: Off-road recreational vehicle use can interfere with ongoing military activities. An off-road recreational vehicle can disrupt military training to varying degrees depending upon the location of the training and impact of the off-road recreational vehicle usage.
- Soils and vegetation: The most critical factor to natural resources management and protection is damage caused to soils and vegetation. Off-road recreational vehicles use the roads and trails developed by the military throughout post. They also tend to use these trails to access areas of post that are relatively isolated and unaffected by military training and vehicles. Off-road recreational vehicles impact on wetlands and more rugged and steep terrain can be significant. Trail detouring occurs when a problem area such as wetlands has had its vegetative cover destroyed and soils churned up. The off-road recreational vehicle user typically goes around the mud hole that has formed, creating a new and wider trail. This new trail will also eventually have the same problems if the vegetation and soils underlying it are the same as the original problem spot. This process may continue, creating large areas of exposed soils and water accumulation. The areas that are most susceptible to damage include wetlands, sub-alpine and alpine areas, that are important to the overall Alaskan ecosystem.

E2.5.5 Evaluation and Utilization of Army Lands for Off-Road Recreational Vehicle and Motorized Watercraft Use

E2.5.5.1 Designation

Army lands may be designated for one or more types of off-road recreational vehicle use in response to a demonstrated need, providing there are sufficient suitable areas available. Lands that may not be designated for one or more types of off-road recreational vehicle use are as follows:

- Areas restricted for security or safety purposes, such as explosive ordnance impact areas.
- Areas containing geological and soil conditions, flora or fauna, or other natural characteristics of fragile or unique nature, which would be subject to excessive or irreversible damage by use of off-road recreational vehicles.
- Areas where the use by a type or types of off-road recreational vehicles would cause unequivocal and irreversible damage or destruction as a result of such use, provided, however, that other types of off-road recreational vehicles not causing such damage or destruction may be permitted to use such areas.
- Areas that are key fish and wildlife habitats, as identified under environmental consideration.

- Areas that contain archeological sites, historic sites, petroglyphs, pictographs, or areas set aside for their scenic value, and areas in which noise would adversely affect other uses or wildlife resources.
- Areas in or adjacent to outdoor recreation areas where noise or vehicle emissions would be an irritant to users of the outdoor recreation area.
- Noise sensitive areas such as housing, schools, churches, or areas where noise or vehicular emissions would be an irritant to inhabitants.
- Areas or trails set aside for horses and their recreational use.
- Areas where off-road recreational vehicle use would disturb nesting or breeding of wildlife, especially those protected under the Endangered Species Act or Migratory Bird Treaty Act.

Before designating sites for off-road recreational vehicles and mountain bike use, the capabilities of the ecological factors and the impacts on the total ecosystem must first be assessed through the National Environmental Policy Act process in order to determine carrying capacities and approved uses.

Area designation offers a greater freedom of movement and is probably preferred by users over trail designation. However, area designation may result in greater environmental damage and cause conflicts with other uses. Therefore, great care must be exercised in designating suitable sites for area use.

Restrictions to designated trails probably constitute a compromise for most off-road recreational vehicle users. However, this method is more compatible with the objective of this Integrated Natural Resources Management Plan. Therefore, when it is practicable to designate existing or proposed trails for use of off-road recreational vehicles without environmental despoilment, preference should be given to designating these existing trails and sites. Trails currently used for hiking, bicycling, or horseback riding will not be designated for concurrent off-road recreational vehicle use.

E2.5.5.2 Use Classification

Areas and trails should be classified as either open to public with access controlled within manageable quotas, or closed to the public. Where use of off-road recreational vehicles by installation personnel is permitted, exclusions of the public may not be justifiable except under the most compelling conditions.

Areas and trails will be located to minimize:

- Damage to soil, watershed, vegetation, or other resources on the public lands.
- Harassment of wildlife or significant disruption of wildlife habitat.
- Conflicts between off-road recreational vehicle use and other existing or proposed recreational uses on the same or neighboring lands.
- Damage to overhead or underground utility distribution lines.

Prior to designating areas or trails for use by a type or types of off-road recreational vehicles, consideration will be given to the possible traumatic effects on the environment by each type of off-road recreational vehicle. Such considerations should not be limited to the proposed sites to be designated for off-road recreational vehicle use. Some factors to consider are the effects of:

- Dust from the use of off-road recreational vehicles and emissions from internal combustion engines on air quality.
- Siltation in streams or other bodies of water, which may result from soil erosion created by off-road recreational vehicles.
- Soil erodibility and soil compaction.
- Impacts on native and desirable species of plants, with special consideration given to those species listed as threatened or endangered.

- Impacts on wildlife, their breeding and drumming, routes, grounds, winterfeeding and yarding areas, migration routes, and nesting areas. Also, the effects of such use on the spawning, migration, and feeding habits of fish and other aquatic organisms, with particular attention given to the effects on fish and wildlife species classified as threatened or endangered or protected by federal or state laws and regulations.
- Excessive noise on humans and wildlife.
- Potential despoilment of aesthetic values or visual characteristics of the sites.

Off-road vehicles will not be operated:

- In a reckless, careless, or negligent manner.
- In excess of established speed limits.
- While the operator is under the influence of alcohol, harmful drugs, or narcotics. Operators of off-road recreational vehicles cited or lawfully apprehended for any alleged offense, while on Army lands, must consent to a test of their blood, breath, or urine for the purpose of determining the alcoholic content of their blood. Failure to submit to or complete such test will result in suspension of the use permit for a minimum of 6 months. See Army Regulation 190-5. As a condition for the privilege of operating off-road recreational vehicles on Army property, owners and operators consent to submit to a test of their blood, breath, or urine to determine if an illegal substance is present; or if cited or lawfully apprehended for any offense allegedly committed while driving or in control of an off-road recreational vehicle on the installation.
- In a manner likely to cause excessive damage or disturbance of the land, wildlife, or vegetative resources.
- From sunset to sunrise without lighted headlights and taillights.

All off-road recreational vehicles must conform to applicable state laws, including those with respect to pollutant emissions, noise, and registration requirements.

- No person may operate an off-road recreational vehicle on Army lands without a valid operator's license or learner's permit where required by state or federal law. Unless contrary to state or federal law, persons under the age required for licensing may operate an off-road recreational vehicle on Army lands providing they are at least 10 years of age and are under the direct supervision of an individual 18 years of age or older who has a valid operator's license when required by state or federal law, and who is responsible for the acts of that person.
- No off-road recreational vehicles may operate on Army land unless equipped with brakes in good working condition.
- Every off-road recreational vehicle will at all times be equipped with a muffler in good working order which cannot be removed or otherwise altered while the vehicle is being operated on Army lands. To prevent excessive or unusual noise, no person will use a muffler cutout, bypass, or similar device on a motor vehicle. A vehicle that produces unusual or excessive noise or visible pollutants is prohibited.

The carrying of firearms or other hunting instruments on any off-road recreational vehicle will be according to applicable state or federal laws and regulations.

All off-road recreational vehicle operators and passengers will be required to wear the same safety equipment as any motorcycle operator. Off-road vehicles, when operating off established road and parking areas, not covered by ice, snow or water will be equipped with a properly installed spark arrester that meets standard 5100-1a of the U.S. Forest Service, Department of Agriculture. This standard includes the requirements that such spark arrester will have an efficiency to retain or destroy at least 80% of carbon particles for all flow rates, and that such spark arrester has been warranted by its manufacturer as

meeting these efficiency requirements for at least 1,000 hours, subject to normal use, with maintenance and mounting according to the manufacturer's recommendations.

E2.5.6 Off-Road Recreational Vehicle and Motorized Watercraft Use on Alaska Military Lands

Off-road recreational vehicles are used in association with many activities in the Alaskan Interior. All-terrain vehicles, which are three or four-wheel recreation vehicles, snowmachines, dirt bikes, four-wheel-drive trucks, swamp buggies, and civilian use small unit support vehicles, are all considered off-road recreational vehicles. These vehicles are used to access hunting, fishing, and trapping areas, for recreational riding and for other activities.

E2.5.6.1 Objectives

Manage off-road recreational vehicle and motorized watercraft use on USAG-AK lands consistent with protection of natural resources, the needs of the military mission, and the provision of high quality outdoor recreation opportunities.

E2.5.6.2 Definitions

Snowmachines, dirt bikes, three and four-wheelers (all-terrain vehicles), four-wheel-drive vehicles, Argos, and civilian-use small unit support vehicles are all considered off-road recreational vehicles. Off-road recreational vehicles are primarily used to access hunting, fishing, and trapping areas, for recreational riding and for other activities.

Motorized watercraft include all boats with some type of motor attached, which includes jetboats, riverboats, and airboats.

E2.5.6.3 Off-Road Recreational Vehicle and Motorized Watercraft Management Areas

All land and water areas will be closed to off-road recreational use by motorized off-road recreational vehicles, except those areas and trails which are determined suitable and specifically designated for such under the procedures established in this Integrated Natural Resources Management Plan. In determining suitability of areas and trails for off-road recreational vehicle and motorized watercraft use, each type of motorized vehicle will be considered separately, taking into account its potential environmental impact, the seasonal nature of its use and opportunities for counter-seasonal use with other recreational uses.

USAG-AK is managed for a number of different types of public recreational use. All areas that are determined open for recreational use may be closed temporarily during periods of military use. All users must daily check in through USARTRAK to determine if areas are open to recreational use. USAG-AK uses the following classification system to describe recreation areas on the installation.

> ***Open Use Area*:** Open to all types of off-road recreational vehicles. Open to all other recreational activities year-round.
>
> > *Frozen* (6+ inches of snowcover): No restrictions for any off-road recreational vehicles when soil is frozen.
> >
> > *Unfrozen summer conditions:* During unfrozen conditions, off-road recreational vehicles over 1,500 lbs (road vehicles, dune buggies, Argos, small unit support vehicles etc.) must stay on existing roads and trails. No restrictions for off-road recreational vehicles under 1,500 lbs (all-terrain vehicles, snowmachines, dirt bikes etc.). Motorized watercraft must stay within existing open water channels.

Modified Use Area: Open to all types of off-road recreational vehicles. No restrictions for any off-road recreational vehicles when soil is frozen. All off-road recreational vehicles must stay on existing roads and trails during the summer. Motorized watercraft must stay within existing open water channels. Open to all other recreational activities year-round.

Limited Use Area: Open to all non-motorized recreation (hunting, fishing, trapping, hiking, skiing, and berry picking) year-round but not open to any type of Off-Road Recreational Vehicle at any time. Motorized watercraft must stay within existing open water channels.

Special Use Management Area: An area managed for recreational use under specific rules that apply only to that area (i.e., Tanana Flats Training Area Airboat Special Use Management Area).

Closed Area: Closed to all recreational activities year-round. Airfields, tank farm, landfill, small arms ranges, impact areas, ammunition storage point.

U.S. Army Alaska Regulation 200-3 (Appendix D), and the Fort Wainwright , Donnelly Training Area and Fort Richardson Supplements address areas open and closed to off-road recreational vehicle use on USAG-AK lands. Use of privately owned off-road recreational vehicles on post is allowed on a limited basis. The Fort Greely Resource Management Plan (Bureau of Land Management and U.S. Army 1994a) restricts off-road recreational vehicle use along the Trans-Alaska Pipeline System right-of-way without permission from Alyeska Pipeline Service Company.

E2.5.6.4 Recreational Impacts on Tanana Flats Training Area

Recreational use on Tanana Flats Training Area has been a contentious issue over the years. During 2001-2005, USAG-AK conducted a recreational vehicle impact study in Tanana Flats Training Area to identify the impacts of airboats and other recreational vehicles on the sensitive fen ecosystem.

Background

The Sikes Act requires USAG-AK to sustain its lands for military readiness while balancing natural resource stewardship and maximizing recreational use while complying with any and all applicable laws, executive orders, and regulations. Military land withdrawals (public land orders, public law, executive orders, etc) set the military mission as primary use. Section 404 of the Clean Water Act regulates fill into wetlands and waters of the US. The Migratory Bird Treaty Act requires no disturbance to nesting migratory birds. Executive Order 11989 (*Off-Road Vehicles on Public Lands*) states that " the respective agency head shall, whenever he determines that the use of off-road recreational vehicles will cause or is causing considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat or cultural or historic resources of particular areas or trails of the public lands, immediately close such areas or trails to the type of off-road vehicle causing such effects, until such time as he determines that such adverse effects have been eliminated and that measures have been implemented to prevent future recurrence." Non-compliance with these laws and executive orders jeopardizes military readiness and recreation.

Evidence based on a 1989 study on the environmental impacts of airboats on the Tanana Flats suggested that the floating mats should be fairly resistant to airboat damage (Racine et. al 1990). However, further evidence, as outlined in a more detailed 1995 study appearing in *Arctic*, showed that "the vegetation and soils of floating mat fens in the Tanana Flats have been severely damaged along main airboat trails: there are over 100 km of trails with open-water, stream-like channels on which all of the emergent vegetation and about 50% of the underlying mat have been destroyed" (Racine et. al. 1998).

The 1998-2002 Fort Wainwright Integrated Natural Resources Management Plan determined that certain recreational vehicle use was incompatible with resource stewardship goals in the Tanana Flats Training

Area and proposed that a new off-road recreational vehicle use policy be reviewed and implemented in the 2002-2006 Integrated Natural Resources Management Plan update.

Based on the 1998 Cold Regions Research Laboratory study (Racine et. al. 1998) and Executive Order 11989 (*Off-Road Vehicles on Public Lands*), USAG-AK proposed certain limitations on the use of airboats in the floating mat fens of Tanana Flats Training Area in the 2002-2006 Integrated Natural Resources Management Plan update. As a result of significant public concern and input during the public review process, USAG-AK chose to defer implementation of the new policy until a new detailed study could be conducted. This study was mandated by the 2002-2006 update of the USAG-AK Integrated Natural Resources Management Plan to develop management options for the Tanana Flats Training Area. The Integrated Natural Resources Management Plan also directed that these management options be incorporated into a revised recreational use policy in the 2007-2011 Integrated Natural Resources Management Plan update. Starting in the summer of 2002, USAG-AK partnered with Cold Regions Research Engineering Laboratory U.S. Army Corps of Engineers, ABR, Inc., Interior Alaska Airboat Association, and the Center for Environmental Management of Military Lands, Colorado State University to conduct the study.

Study Goals and Objectives

USAG-AK initiated a study in 2002 with the following goals:

- Quantify short and long-term impacts on Tanana Flats Training Area ecosystem from recreational use by conducting studies to:
    - Measure impacts from recreational use on vegetation, hydrology, and wildlife.
    - Assess potential short and long-term changes to Tanana Flats ecosystem
- Develop Tanana Flats Training Area recreational use management strategy based on scientific study results that maximizes recreational and military use while sustaining the environment.
- Incorporate management options into updated Tanana Flats Training Area recreation use policy in 2007-2011 Integrated Natural Resources Management Plan.

Study objectives included:

- Literature search
- Measure amount and frequency of use
- Hydrology
- Measure soil and vegetation impacts and recovery
    - Soil and vegetation monitoring
    - Photo points
    - Natural recovery
    - Conduct tracking study
- Assess wildlife impacts
- Recommend management alternatives

Amount, timing and distribution of use

In 1989, the total length of trails was 263 km, of which 37% (99 km) were heavily used main trails, 54% (143 km) were less-used secondary trails, and 8% (22 km) were trails on existing streams. By 1995, the total length of airboat trails had increased by 15%, to 303 km. During that period, trails were extended toward the southeast into the Tanana Flats, from 17 km from the Tanana River access points in 1989 to 26 km by 1995 (Racine et al. 1998). By 1999, total length of trails in northwest Tanana Flats Training Area had expanded to 314 km. These 314 km trails impact approximately 161 acres of sensitive wetlands, 78 acres of which are permanently damaged by main trails (U.S. Army Alaska 2001), which do not recover within a few years like abandoned secondary trails (Racine et al.1998).

Most airboat traffic into the fens occurs after July 15th annually. Over 83.2% of airboat traffic during 2003 and 2004 occurred after July 15 (ABR, Inc. 2005). Noise monitors were placed at four locations (Little Rusty, Upper Rusty, Tree Trail, Willow Creek) to measure the distribution and timing of airboat use. Over 62% of airboat passes occurred at the tree trail entrance to the fens and 32% (2003) and 24% (2004) of the traffic went into the closed area of the study (ABR, Inc. 2005).

Hydrology
Water levels in upper and lower swamps result from a combination of snowmelt, surface drainage, and groundwater. Outlet "dams" control water levels. The water levels in upper and lower swamps are not the same. Water surface slopes in Lower Fen are generally greater than those in Upper Fen. Higher velocities remove organic material and slow recovery. Beaver dams pool and slow the water and retain organic material, but the deeper water also slows revegetation. Groundwater flow does not supply significant heat. Temperatures were above freezing at all depths by 1 May. Soil/water below the fen does not freeze in winter (Cold Regions Research Laboratory 2005).

Vegetation and Soils
There was significant damage to the vegetative mat at many locations, especially in Lower Fen. The amount of damage caused by airboat use was directly correlated to water level. The tracking study results show that during high water levels, disturbance results in negligible impacts to vegetation. Early season disturbance impacts vegetation recovery (plant energy is in shoots) much more than late season disturbance (plant energy is in the roots) (Cold Regions Research Laboratory 2005).

Wildlife
Tanana Flats is an important nesting area for migratory birds. Airboat use can impact nesting success for trumpeter swans. Fewer nesting pairs of swans are found inside airboat area than in surrounding similar habitat. The upper and lower swamps in Tanana Flats are also important moose calving grounds.

Preliminary Conclusions
The amount of airboat use in Tanana Flats Training Area has increased almost 20% since 1989 (263 km of permanent trails in 1989 to 314 km in 1999). Airboat trails speed drainage of fens, but no evidence of drying was observed.

Outlet "dams" are very important in maintaining hydrology of fen ecosystem. Most damage to soils and vegetation occurs during low water levels.

Study Recommendations
The study has produced some preliminary recommendations for future management. The number one recommendation is to protect the outlet "dams," a huge factor in maintaining the hydrology in the fen wetlands. Another recommendation is to minimize disturbance to vegetation during early season (to promote recovery) and during periods of low water levels (to protect roots). Placement of just a few water level monitors in the fens can provide real time water levels that can be displayed on the USAG-AK web site and in USARTRAK. Since the water levels in the upper and lower fens are not directly linked, the upper and lower fens can be managed separately. Finally, minimizing disturbance to wildlife habitat during early season can improve nesting and calving success.

Discussion
As stated above in Section E2.5.5.1, Army policy directs commanders to evaluate impacts to certain resources before designating any area for a particular recreational vehicle use. Specifically related to Tanana Flats Training Area, the USAG-AK Commander must consider the following issues before allowing any particular type of off-road recreational vehicle use in an area.

The fen wetland ecosystem in Tanana Flats Training Area can certainly be considered to have natural characteristics of fragile and unique nature. Does airboat use cause excessive or irreversible damage to this unique wetland system? Airboats are well suited for use on the shallow Chena and Tanana rivers, as well as on a unique system of floating mat fens in Tanana Flats Training Area (Racine et al. 1998). Is airboat use a type of use that does not cause lasting or irrevocable damage? What is certain is that damage is in the eye of the beholder. For instance, the system of trails throughout the fens is considered progress to the airboat user group while evidence of significant damage to others. The number of airboats in Alaska has grown since 1989 and likely will continue to increase. The number of areas available for airboat use in the state has decreased since 1989. Spatial distribution of trails in Tanana Flats Training Area is likely to increase in the future as users increase and available areas decrease.

Airboats produce a greater amount of noise than any other type of off-road recreational vehicle. Noise is the number one complaint about airboats from non-airboat recreational users. Recreational users have reported to have heard an airboat approaching while it was still over one mile away. It is clear that commanders may not designate off-road recreational vehicle areas near noise sensitive areas such as housing, schools, churches, or areas where noise or vehicular emissions would be an irritant to inhabitants. Balancing noise concerns in non-sensitive areas between user groups is more difficult.

The wetland ecosystem on Tanana Flats Training Area provides key habitat to fish and wildlife species. Airboat use has a high potential to disturb nesting or breeding of wildlife, especially those species protected under the Endangered Species Act or Migratory Bird Treaty Act. While there are no species breeding or nesting in Tanana Flats Training Area that are on the federally endangered species list, there are numerous species in Tanana Flats Training Area protected by the Migratory Bird Treaty Act. In interior Alaska, the U.S. Fish and Wildlife Service has designated primary breeding and nesting season to be between May 1 and July 15. Airboats on Tanana Flats Training Area are primarily used from May through July for general recreation and August through October for hunting. Early season restrictions could serve to protect wildlife species during breeding and nesting while allowing access for hunting. Hunter access and success is very important for the state of Alaska to manage the moose herd in Unit 20A. An additional solution would be to stop expansion of current airboat area but continue to allow use of existing airboat trails for hunting access.

Balancing Environmental Stewardship and Recreational Use

USAG-AK proposes to create a Tanana Flats Special Use Management Area. The boundaries of this area would be defined as the extent of the area currently used by airboats, between Salchaket Slough, Willow Creek, Tanana River and Bonnifield Trail. This special use management area would be open to airboats and other motorized watercraft with no restrictions between 15 August and 1 April each year. Between 1 April and 15 July, the special use management area would be off-limits to all off-road recreational vehicles, including airboats and other motorized watercraft. Between 15 July and 15 August, access into the upper and lower fen (managed separately) would be based on water levels.

Outside the special use management area, Tanana Flats Training Area would be managed for off-road recreational vehicles as proposed in the 2002-2006 Integrated Natural Resources Management Plan update. Outside the special use management area, airboats and other motorized watercraft would be limited to open water – no fens. In addition, USAG-AK proposes to create a special interest area between Willow Creek and Crooked Creek. This area contains similar unique floating mat fen wetlands and contains important wildlife nesting habitat. This area contains no trails. Creation of this special interest area would restrict creation of any new trails in this area.

Neither of these proposed actions affects rules and regulations for hunting in Tanana Flats Training Area.

E2.6 Other Recreational Activities

E2.6.1 Introduction

USAG-AK strives to maintain an interactive relationship with local communities by providing many recreational opportunities to the public. Other recreational activities include picnicking, camping, hiking, cross-country skiing, snowshoeing, dog mushing, boating, rafting, and berry picking.

E2.6.2 Watchable Wildlife

The Watchable Wildlife program provides wildlife viewing opportunities for Soldiers, civilians, Alaska residents, and visitors, as well as benefiting public relations for U.S. Army Alaska. Watchable wildlife programs include wildlife viewing platforms, nature trails, interpretive signs, brochures, facilities, audio visual productions, public presentations, and cooperative publications with local, state, and federal agencies. This program provides recreation and enhances environmental awareness among participants. Two wildlife viewing platforms and interpretative panels have been installed in locations overlooking the Chena River. Bike paths have also been added.

E2.6.3 Boating and Rafting

All personal use boats and rafts will adhere to Alaska state law for safety and registration requirements on USAG-AK properties. In addition, USAG-AK requires that all individuals, while operating the boat or raft, wear Coast Guard approved Personal Floatation Devices, regardless of age.

E2.6.3.1 Fort Richardson

Recreational boating on post lakes, particularly Otter Lake, is popular. Eagle River is heavily used during the summer months by rafters, canoers, and kayakers. Current usage data is not available but historically, 500-600 Eagle River boating permits were issued by the Army annually. Many boaters make multiple trips down lower Eagle River, some as many as a dozen trips, during the summer.

Lower Eagle River, which passes through Fort Richardson, is rated as Class II whitewater (Embrick 1994). At high water, some reaches of the river may be low Class III. The Army prepared environmental documentation and held public meetings on the recreational boating use of Eagle River in 1995. The need for an improved permitting policy and a new boat take-out area were identified. The Army constructed a boat take-out in May 1995, which included a gravel access road and parking area, signs, picnic table, portable toilet, and a large dumpster for trash disposal. All recreational users (including boaters) of USAG-AK lands must obtain a Recreational Access Permit and use the USARTRAK system (see Section E2.1.2).

The canyon portion of Ship Creek where it exits the Chugach Mountains is located on Fort Richardson. This section of the creek is very difficult to boat and is rated as Class V during normal flow and V+ during high water (Embrick 1994). The river drops at a high rate in the canyon, which causes the current to be exceedingly swift. In addition, narrow channels strewn with boulders make these waters even more dangerous. Ship Creek is a major public water supply for both military installations (Fort Richardson and Elmendorf Air Force Base) and the city of Anchorage. For these reasons, boating on Ship Creek is not allowed.

Other boating is authorized for anglers using lakes on post, including Otter, Gwen, Thompson, Waldon, and Clunie. Only electric motors are authorized for use on Otter, Gwen, Thompson, and Waldon lakes. Outboard motors up to 6 horsepower may be used on Clunie Lake. Testing outboard motors on post lakes is prohibited. Boats of any design including canoes, kayaks, and rafts and any other flotation device are

not authorized on Ship Creek, North Fork Campbell Creek, or any other stream on the reservation with the exception of Eagle River.

Commercial rafting is not permitted on the post. USAG-AK must have the option to close Eagle River to rafting with little notice, encumbrances, or threat of tort claim, and this stipulation is not compatible with commercial rafting.

E2.6.3.2 Fort Wainwright

The Chena River is a popular canoeing or rafting trip that requires about two hours from the canoe launch near the Chena Bend Golf Course to the boat ramp at Glass Park. The launch near the golf course is lacking in aesthetic quality but is functional. The boat ramp at Glass Park was completed in 2001 and serves as a take-out point. This project is part of a larger recreational facility construction project by the Morale, Welfare, and Recreation Office. Picnic facilities have been added to create a day-use area, toilet facilities are provided, and a kiosk is available with canoe trail brochures, hunting supplements, and other recreation information.

Boats with jet engines may be rented from the Outdoor Recreation Center. The Tanana and Wood rivers and the Salchaket Slough offer good boating opportunities. Other boating rivers and streams in the area include the Chatanika, Nenana, Salcha, Tolovana, and Goodpasture rivers and Birch Creek. Popular area lakes include Birch, Harding, Little Harding, Quartz, Lost, Summit, and Paxson.

E2.6.4 Skiing

E2.6.4.1 Fort Richardson

Skiing: Downhill and cross country skiing is available on the Five Mile Trail and at the Dyea Ski Area[5]. Bulldog trail is also popular for cross country skiing.

E2.6.4.2 Fort Wainwright

Downhill and cross country skiing is available at Birch Hill Ski Area on Fort Wainwright.

E2.6.5 Additional Recreational Activities

E2.6.5.1 Fort Richardson

USAG-AK strives to maintain an interactive relationship with local communities by providing many recreational opportunities to the public. The post has been used for activities such as marathons, hiking, backpacking, dog mushing, mountain and road cycling, camping, berry picking, golfing, scouting, dog trials, and Special Olympics.

There are three areas of the post where dog training clubs can train their dogs and hold field trials. These areas are Derby Pond, Kiowa Lake, and Thompson Lake. Dog trainers are not permitted to use live birds or live ammunition for training.

Pets must be under either voice or leash control in all areas, and must be leashed in developed recreation sites and waterfowl nesting areas.

Swimming in any lake, stream, creek or reservoir on Fort Richardson is prohibited.

[5] Downhill Skiing on Dyea Slopes is only available to Department of Defense ID card holders.

Falconry can be conducted on Fort Richardson's lands in accordance with stipulations set forth by the Natural Resources Branch and Fort Richardson Range Control Office.

Post rifle ranges are used by numerous law enforcement agencies. Public tours of the fish hatchery and other areas are offered. This type of open and cooperative interaction is essential for allowing diverse recreational pursuits on a continuing basis.

Horseback riding is not permitted on Fort Richardson.

Recreational activities involving removal of minerals (including gold panning, dredging, and mining of any kind), and/or fossils from Army-controlled land is not authorized.

USAG-AK also maintains a recreation camp located in Seward. This recently renovated camp offers many outdoor recreation activities available for active duty military personnel.

E2.6.5.2 Fort Wainwright

The Fort Wainwright Outdoor Recreation Center provides equipment, information, and programs to encourage and enhance the recreational use of Alaska's natural resources by the Fort Wainwright community. The center provides:

- Rental equipment for snowmachining, boating, canoeing, boating, fishing, camping, backpacking and bicycling.
- Information on boating safety, trails and waterways, campsites, parks, outdoor activities, equipment, flora, fauna, and outdoor skills.
- Topographic maps and reference books on Alaska natural resources.
- Boating and canoeing safety classes.
- Specialized outdoor clinics.
- Organizes group trips.
- Advertise the sale and purchase of outdoor recreation equipment.
- Reservations made for group use of Glass and Engineer parks.

There are some excellent trails and facilities on post. These include:

- Pathways along the Chena River and scattered through the woods in Glass Park.
- Off-road vehicle trails in the woods in Engineer Park.

Fort Wainwright's Glass and Engineer parks are available for use by the local community. Parks have picnic tables, fire rings, trash barrels, latrines, and trails. Overnight camping is permitted in Glass Park. Reservations are made for group use through the Outdoor Recreation Center. The Fort Wainwright community also has access to Birch Lake Recreation Area, 58 miles southeast of the post along the Richardson Highway. This Air Force facility has cabins, picnic and camping facilities, a boat dock, equipment rental center, lodge, and swimming beach. Seward, Alaska, is the location of the Seward Recreation Camp offering cabins, a lodge with dining facilities, marina, equipment rental, an exchange facility, a trailer camping area, and related services.

Although no Outdoor Recreation Center rentals are available on Donnelly Training Area, the Morale, Welfare and Recreation Office at Fort Greely has a complete line of rental that are often used on Donnelly Training Area by Missile Defense personnel. Fort Greely Morale, Welfare and Recreation Office provides the same services as listed above for the Fort Wainwright Outdoor Recreation Center.

Trails on Donnelly Training Area include a hiking path to the top of Donnelly Dome. Countless other trails are utilized for mountain biking and hiking, especially 33-Mile Loop Road in the areas east of Jarvis Creek and trails linking the stocked lakes in the Meadows Road area.

E2.7 Recreational Use Monitoring

E2.7.1 Introduction

Monitor recreational use on USAG-AK to determine impacts on the ecosystem. Monitoring includes field surveys, aerial surveys, and user surveys to determine location, type, duration and frequency of use. Monitor training areas to locate trespass structures. Recreational use of military land in Alaska creates impacts on military training lands, primarily a result of legal recreational use and illegal trespass of recreational vehicles. A basic tenet of ecosystem management is the importance of human values and use. USAG-AK's outdoor recreation program affects ecosystems in terms of both renewable resources (fish and game species, firewood, etc.) and disturbance associated with recreationists. USAG-AK is well aware of the need to ensure these activities do not significantly impact ecosystem integrity. Conducting outdoor recreation monitoring is required by Public Law 106-65 (Military Land Withdrawal Act) as mitigation for the land withdrawal legislative EIS and Public Law 86-797 (Sikes Act) to implement the Integrated Natural Resources Management Plan.

Measures of Effectiveness:

- Monitor the extent and condition of off-road recreational vehicle trails.
- Monitor erosion and damage to streambanks and lake shores.
- Monitor damage to training lands from off-road recreational vehicle trails, campsites, remote airstrips, etc.
- Gather fishing use and harvest data opportunistically to determine high use areas and fishing pressure.
- Develop voluntary surveys to be posted at the recreation kiosks, and analyze data to determine various recreational use information.
- Collect and compile annual trapper harvest reports.
- Collect and compile annual black bear harvest reports.

E2.7.2 Management

There are a number of elements of the outdoor recreation inventory and monitoring program. Recreational facility inventory, recreational user monitoring, recreational impact monitoring, and trespass structure monitoring and inventory all are components of the outdoor recreation monitoring and inventory program.

E2.7.2.1 Recreational facility inventory

A baseline recreational facility inventory delineates and maps recreational trails, campgrounds, cabins, boat ramps, pull-outs, lakes and rivers. Documentation includes written paragraphs describing recreational activities associated with various trails and trail networks. Trail maps are developed from digital orthophotos, and ground-truthed by truck, all-terrain vehicles or snowmachine. Written descriptions are created from direct observation, institutional knowledge and additional field notes.

E2.7.2.2 Recreational user monitoring

Recreational user monitoring includes monitoring users during hunting, fishing, and trapping seasons; recording and maintaining a database of users through USARTRAK; and conducting recreational user surveys. Aerial surveys are conducted to observe hunting, fishing, and all-terrain vehicles use on remote areas of Fort Wainwright and Donnelly Training Area. The USARTRAK database is a useful tool to measure the amount of recreational use on USAG-AK. USARTRAK records user days and the general

location of use on the installation. This database also provides the mailing addresses for recreational user surveys. The user surveys are used to determine area use, number of recreational users, and types of recreational activities.

E2.7.2.3 Recreational impact monitoring

Aerial and on-the-ground monitoring is conducted to assess the impacts from recreational use on the environment. Recreational use impacts usually result from off-road recreational vehicle use, but can also result from campsites, airstrips, river use, and foot use along stream and lake banks. Impacts are identified, delineated, mapped and prioritized for repair. Additional recreational use monitoring concentrates on assessing use in critical areas. Special consideration is given to protection of these critical areas (nesting sites, highly erodible areas, etc.) from negative impacts due to outdoor recreation. In addition, USAG-AK uses aerial photographs or other imagery to monitor long-term changes and effects of recreational use of remote areas.

E2.7.2.4 Trespass Structure Inventory and Monitoring

An inventory of encroachment cabin sites and other trespass structures was conducted in 1998-2000. Monitoring of these sites and additions to the inventory is conducted on a continuing basis. The remote areas of post are flown monthly or as needed to monitor existing structures and to patrol for new construction, undiscovered existing cabins or other trespass activities. Surveys for trespass cabins use helicopters, all-terrain vehicles, a small plane, and snowmachines. Data collected from each trespass cabin includes GPS location, photographs, structure status, contamination, solid waste and outbuildings, information on owners, and access issue information. Site information also includes an assessment of safety hazards and impacts to wildlife, wetlands, and training.

E2.8 Public Outreach

The public outreach program develops informational materials, conducts briefings, attends public meetings and events, and conducts surveys of public desires for natural and cultural resources management on USAG-AK lands that will improve public awareness about the diverse and unique natural and cultural resources found on Army lands in Alaska.

E2.8.1 Introduction

The goal of the public outreach program is to provide an awareness of recreational opportunities and responsibilities to hunters, trappers, anglers and others who participate in recreational activities on USAG-AK lands.

Many nonresident military (those who have lived in Alaska for less than a year) hunters, anglers, and trappers need education on hunting bears and moose, caring for meat, outdoor survival, ethics, and other recreational opportunities.

Specific objectives for public outreach include:

- Brief natural resources programs in at least one Restoration Advisory Board meeting per post per year.
- Improve public relations through public outreach, education and awareness.
- Create at least four natural resources television events per year, with topics chosen by Natural Resources Branch and Public Affairs Office.
- Communicate success at sustaining mission activities while preserving Army land.
- Educate land users of their environmental stewardship responsibilities.

- Ensure appropriate command group, mission, and tenant personnel, including environmental compliance officers, receive appropriate natural resources awareness training.
- Brief natural resources programs and hunting, trapping, fishing information at quarterly newcomers briefings at each post.

E2.8.2 Outreach Components

There are four components of the education, awareness, and public outreach management program.

E2.8.2.1 Awareness

Awareness is focused on making the surrounding community aware of natural resource opportunities and programs on USAG-AK. Tools to accomplish this project include the natural resources web page, the natural resources newsletter, public meetings, brochures and pamphlets, videos, posters and educational panels at the watchable wildlife viewing platforms and other recreation sites.

E2.8.2.2 Recreational User Education

The purpose of the *Recreational User Education* component is to educate those who will hunt, fish, trap, or engage in other recreational activities on USAG-AK lands. Many nonresident military (those who have lived in Alaska for less than a year) hunters, anglers, and trappers need education on hunting bears and moose, caring for meat, four-wheel drive operation, outdoor survival, ethics, etc. Some topics are common to the nation as a whole, but many are specific to the harsh conditions and opportunities of interior Alaska.

E2.8.2.3 Youth Education

USAG-AK personnel are committed to cultivating a conservation ethic in local youth. *Youth education* provides conservation education opportunities to young individuals and youth groups. Long-term changes in conservation attitudes and knowledge are important aspects to an effective conservation awareness and education program. Such long-term changes are easiest achieved by working with youth; particularly youth groups that are already involved in conservation. USAG-AK personnel work with youth groups on conservation programs and, on occasion, give talks to youth groups. Boy and Girl Scouts, in particular, need support with projects, merit badges, and conservation talks.

E2.8.2.4 Professional Communication and Training

Professional Communications and Training entails communication and interaction with other professionals in agencies and organizations inside and outside of Department of Defense. Natural Resources training will enhance the skills of USAG-AK's natural resources personnel. Additionally, information on natural resources projects occurring on USAG-AK lands will be accessible to other professionals in similar positions. Department of Defense and Army breakout sessions are held at annual meetings of the Society of American Foresters, National Military Fish and Wildlife Association, Integrated Training Area Management Workshop, and Society of Agronomy. These are among the professional societies which meet the professional development needs of USAG-AK's natural resources managers. Membership in these societies is encouraged. They publish some of the best scientific journals in their professions, and current literature review is a necessary commitment to maintain professional standards. Attending meetings for these societies provides excellent opportunities to communicate with fellow professionals.

E2.9 Conservation Enforcement

Many aspects of natural resources management require effective enforcement if they are to be successful. Such features as harvest controls, protection of sensitive areas, pollution prevention, hunting and fishing recreation, non-game protection, and others are dependent upon effective law enforcement.

Enforcement of laws primarily aimed at protecting natural resources and outdoor recreation activities are an integral part of the installation's natural resources management program. Game laws must be implemented in accordance with applicable state and federal laws and as approved by the commander in the Integrated Natural Resources Management Plan. Whenever hunting, fishing, or trapping is allowed on Army installations, enforcement of natural resources laws and regulations will be in accordance with the installation Fish and Wildlife Cooperative Plan and will be performed by Natural Resources Law Enforcement professionals and/or Provost Marshal if practicable, or as required under the Status of Forces Agreement, outside the continental United States.

E2.9.1 Introduction

The Director of Emergency Services is the senior USAG-AK law enforcement official. The director is responsible for coordination and supervision of fish and wildlife law enforcement on all Army lands in Alaska. The Provost Marshal at Fort Richardson appoints Military Police personnel to serve as Conservation Enforcement Officers. This system of fish and wildlife enforcement has been in place since establishment of the installation. The Chief USAG-AK Conservation Enforcement Officer supervises The Conservation Enforcement Program. They also coordinate and receive technical direction from the Chief of Natural Resources in accordance with Army Regulation 200-3.

USAG-AK lands have concurrent jurisdiction. It can be performed by officers with federal or state commissions. Enforcement is a joint responsibility of USAG-AK, U.S. Fish and Wildlife Service, and the Alaska Department of Public Safety (State Troopers). Citations written by USAG-AK personnel are adjudicated by the Federal Magistrate, whereas citations issued by Alaska State Troopers go through the state system for adjudication.

USAG-AK Conservation Enforcement Officers also have responsibilities directly tied to outdoor recreation; specifically the issuance of hunting, trapping, and fishing permits. The Directorate of Public Works; Morale, Welfare and Recreation; Directorate of Emergency Services; Bureau of Land Management; U.S. Fish and Wildlife Service; Alaska Department of Fish and Game all have responsibilities here.

Conservation enforcement goals all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. The conservation enforcement goals for USAG-AK are:

- Provide professional enforcement of natural resources related laws.
- Promote the interaction of conservation officers with the public.
- Enforce laws and regulations pertaining to implementation of the natural resources program.
- Provide high quality opportunities for hunting and fishing.
- Protect sensitive species and wetlands.
- Use enforcement personnel to enhance the overall natural resources program.
- Reduce the number of natural resource-related violations during 2007-2011.
- Increase public awareness of USAG-AK's commitment to conserving the environment during 2007-2011.
- Increase the coverage and frequency of conservation enforcement activities in USAG-AK.
- Increase the number of contacts with the public during 2007-2011.

E2.9.2 Conservation Enforcement

Conservation enforcement on Fort Richardson includes enforcement of all natural resource related and environmental laws, enforcement of trespass, interaction with the public, and conservation enforcement officer training. Effective law enforcement is critical to natural resources conservation and the continuance of hunting, trapping, and fishing programs on a sustained basis. Trespass is often the first step to most illegal range activity and reducing illegal trespass could also reduce illegal range activity. Conducting conservation enforcement is required by Public Law 86-797 (Sikes Act) to implement the Integrated Natural Resources Management Plan.

Fish and wildlife enforcement on Fort Richardson was the responsibility of the Fort Richardson Military Police until 1999. During 1999, a change in the Military Police unit structure removed all Fort Richardson Military Police game wardens from fish and wildlife enforcement duties. In 2000, the Environmental Resources Department, through authority of the Sikes Act, implemented a contract to provide conservation enforcement. The contract law enforcement officers will report to the Provost Marshal, but are limited to conservation enforcement duties by the bounds of their contract. At the middle of 2005, the contract was discontinued and the Director of Emergency Services reinstated the Military Police Conservation Enforcement Officer, under the supervision of the Chief USAG-AK Conservation Officer.

Prior to 1999, Military Police game wardens made approximately 200 contacts with users in the field annually, most of whom were anglers. About thirty 1805 violation (external laws) notices were issued each year for violations of license requirements and bag limits. About ten 1408 violation (post regulations) notices were issued per year for infringements of post regulations. Trespassers generally had to be caught three times before an 1805 was written and the violator was sent to the federal magistrate in Anchorage.

In the past, USAG-AK experimented with training natural resources management personnel to double as environmental and natural resources enforcement officers. Two natural resources personnel at Fort Richardson obtained the required training for enforcement officers (with the exception of weapons training). Following this training, the natural resources personnel recognized that they could not adequately perform both duties concurrently. It was concluded that enforcement is a full-time job. The two personnel trained for enforcement assignments went back to full-time work as natural resources managers.

There are five components of the USAG-AK conservation enforcement program which include enforcing conservation laws, reducing theft and vandalism, interacting with the public, enforcing trespass, and conservation officer training.

Enforcement of laws primarily aimed at protecting wildlife and other natural resources is an integral part of the installation's natural resources management program. Game laws must be enforced in accordance with applicable state and federal laws and as approved by the Commander in this Integrated Natural Resources Management Plan. Enforcement of natural resource laws and regulations will be in accordance with this plan and will be performed by Natural Resource Law Enforcement professionals and/or the Provost Marshal if practicable.

E2.9.3.1 Conservation Law Enforcement

USAG-AK conservation officers are responsible for enforcing a number of laws and regulations relating to natural resources and environmental. The Sikes Act is the primary natural resource law requiring natural resource law enforcement.

The success of hunting and fishing as well as other outdoor recreation programs is highly dependent on adequate enforcement. It has been said that a regulation or policy that cannot be enforced is worse than no policy at all. Even though regulations and policies regarding natural resources on Fort Richardson are enforceable, they are not problem-free. Most of the problems seem to begin with illegal access to the post.

E2.9.3.2 Conservation Enforcement Surveillance

During the fall hunting season, USAG-AK personnel use flights to monitor any trespass within the impact areas, the Eagle River Flats, Davis Range, and other restricted areas on post.

E2.9.3.3 Trespass Enforcement

Crossing the installation boundary or the internal boundary of an off-limits area without approval constitutes trespass. Lack of boundary markers contributes to this problem. Little of the installation boundary is fenced or marked with signs. Much of the trespassing that occurs on Fort Richardson is intentional. Marking the boundary reduces accidental trespassing, but the effect on intentional trespass is minimal. Boundary marking can be effective only in concert with enforcement efforts associated with willful trespass. Fencing is better than boundary marking, but its effectiveness depends on intensive maintenance efforts. Fencing without a maintenance commitment is not cost effective. Since trespass is often the first step to more serious infractions, the overall reduction of illegal activities depends on a reduction in trespass.

Trespass is the most frequent infraction occurring on military installations, which is often the precursor to other illegal activities. Simply crossing the boundary without approval constitutes this action. Little of the post boundary is fenced or marked with signs. The post is slowly being fenced, project by project. Specific attention is focused on areas adjacent to subdivisions where trespass levels have been high. Signs have been used as markers, but most have been vandalized or stolen. In some cases, boulders have been used to block access, particularly in problem areas.

Trespass often is associated with off-road recreational vehicle activity. With the exception of snowmobiling or four-wheeling on established trails and in areas designated for their use, non-military off-road recreational vehicle activity is prohibited in most areas of the post.

Unauthorized off-road recreational vehicle activity occurs to some degree along most of the post boundary, but is of particular concern in three major areas. The southwestern boundary south of Glenn Highway is probably violated most often. This area is slowly being fenced as part of a project to secure the boundary from Glenn Highway to the base of the mountains. This fencing project was partially funded by Anchorage Water and Waste Water Utilities in exchange for a right-of-way for a 48-inch water main. The balance will be funded by USAG-AK. The other two major problem areas along the post boundary are immediately west of the town of Eagle River and, a little further north, west of the towns of Birchwood and Chugiak. All three areas are close to urban communities, and Fort Richardson is a convenient place for off-road recreational vehicle activities, with the risk of being apprehended relatively low.

Off-road recreational vehicle activity presents at least four potential problems for USAG-AK. The first is possible exposure to dangers associated with unexploded ordnance and ongoing shelling and firing. Generally, artillery and mortar firing are restricted to the Eagle River Flats Impact Area, surrounded by a 300-meter buffer zone. This narrow buffer virtually ensures that unexploded ordnance is contained within impact area boundaries. Risk increases as people get closer to the actual impact area. The point can be made that ordnance is found outside the boundary, but this rationale does not reduce the significant increase in danger to trespassers within these boundaries. Off-road recreational vehicle trespass is particularly dangerous due to the places these vehicles can go and their weight, making them vulnerable to unexploded ordnance just beneath the surface.

The second problem associated with illegal off-road recreational vehicle use is interference with ongoing military activities. The presence of unauthorized off-road recreational vehicles can disrupt military training to varying degrees depending upon the location and type of exercise being conducted. In some cases, it disrupts hundreds of troops in the field, and on small arms ranges, it can be just as dangerous as accessing an impact area. The illegal off-road recreational vehicle operator has no idea if, when, or where these ranges are being used.

The third and most critical factor to natural resources management and protection is damage caused to soils and vegetation. This may seem insignificant compared to the more obvious damage done by military maneuvers, but effects are cumulative. Off-road recreational vehicles of all kinds seem to make use of places that are relatively unaffected by military vehicles. The damage they cause to wet, boggy areas and more rugged, steep terrain can be significant. These areas, particularly the subalpine and alpine areas, are very important to the overall ecology of Alaska.

E2.9.3.4 Theft and Vandalism

Theft of military ordnance (both unexploded and debris) and other items is an important issue with the Federal Bureau of Investigation and other enforcement agencies. These agencies work with military installations where this is a serious problem. People who enter USAG-AK lands and other installations to steal military ordnance and other items are called “scrappers.” This issue is not thought to be as serious at USAG-AK as it is at some other installations in the nation.

A connection exists between theft and natural resource management. Besides the obvious direct damage caused to the ecosystem discussed in the off-road recreational vehicle section above, an atmosphere is created in which protection of natural resources becomes very difficult as fences are torn down, markers and equipment stolen, etc. The most common item stolen from USAG-AK is probably firewood.

Cultural artifacts have value both for personal enjoyment and commercial sale. Protection of cultural resources is directly related to the control of trespassers. When cultural resources are discovered, it is often important to place the general area off-limits to military training and public recreational use. Care should be taken to control accessibility of marked maps as cultural resources can be easily targeted for theft.

The Nike Hercules Missile Battery at Site Summit was officially nominated and listed on the National Register of Historic Places by the National Park Service, Washington D.C. on July 11, 1996. Vandalism in the buildings on Site Summit has been a problem since 1979 when security patrols were abandoned. Access to Arctic Valley is via Ski Bowl Road, an all weather road that is within an hour’s drive of Anchorage. From the parking lot at Alpenglow Ski Lodge, visitors can hike up the mountain to the Battery Command and Control Area and the Nike Missile Launching Pads in less than an hour. Over the years, individuals have torn off plywood covering doors and windows to gain entry. The Military Police seldom patrol the area. It will become necessary to provide better security for the missile site in the future and to increase Military Police patrols in the area. Gates on the fences around the missile launching pads should be kept closed and locked.

E2.9.3.5 Interaction with the Public

In many cases, conservation officers are the primary contact between USAG-AK natural resource management and the public. This is a very important role for the conservation officers to play, because they represent not only the conservation program but also all of USAG-AK. These contacts are an excellent opportunity for USAG-AK to accomplish public outreach, awareness, and education.

E2.9.3.6 Conservation Officer Training

Army Regulation 200-3 and the Sikes Act require effective natural resources law enforcement on military installations. There are requirements that this enforcement be closely coordinated with the natural resources organization and that enforcement be accomplished by professionally trained conservation enforcement personnel. A generally recognized requirement exists for a 40-hour-minimum annual refresher training for enforcement officers.

E3. Proposed Management

The following section details policies or procedures that have changed since the previous Integrated Natural Resources Management Plan or are new projects for 2007-2011.

E3.1 Policy

E3.1.1 USARTRAK

The U.S. Army Garrison, Alaska has established the U.S. Army Recreation Tracking (USARTRAK) system to facilitate recreational access onto military lands. All persons (civilian and military) desiring to recreate on Army lands in Alaska must obtain a Recreational Access Permit and must use the USARTRAK system (per USAG-AK Access Policy effective 15 November 2004). USARTRAK is an automated access system that allows registered users (Recreational Access Permit holders) to telephonically access range opening data and to check in to areas open to recreation.

This system for recreational access to military lands is designed to streamline both the reporting process for USAG-AK and the check-in process for the user. The old access system involved getting a hunting, fishing, trapping permit from the post, usually the Military Police; Morale, Welfare and Recreation or Natural Resource Office. This type of permit only allowed for the reporting of numbers of permits issued to users, but not total numbers of user days and type of activities. A call-in system was developed, but it did not meet the full intent of the program. USAG-AK no longer issues hunting, fishing, trapping permits. Instead, all recreational users, including firewood cutters, are issued a Recreational Access Permit.

The next step in making this USARTRAK system as user-friendly as possible is to implement a web-based check in system. Recreational users will be able to check into the area of choice, see which areas are closed, and renew their permits.

E3.1.2 Off-Road Recreational Vehicle and Motorized Vehicle Management

E3.1.2.1 Recreational Use Management Areas

USAG-AK is managed for a number of different types of public recreational use. All areas that are determined open for recreational use may be closed temporarily during periods of military use. U.S. Army Alaska Regulation 190-13 and the Fort Wainwright, Donnelly Training Area, and Fort Richardson Supplements address areas open and closed to off-road recreational vehicle use on USAG-AK lands. USAG-AK proposes the following classification system to describe recreation areas on the installation: Open Use Areas, Modified Use Areas, Limited Use Areas, Special Use Management Areas, and Closed Areas. Recreational management areas are discussed in greater detail in Volume II, Annex E, Section E2.5.6 and are delineated for each USAG-AK land area in Volume IV, Prescriptions.

E3.1.2.2 Tanana Flats Special Use Recreational Management Area

USAG-AK proposes to designate the area on Tanana Flats Training Area between Salchaket Slough, Bonnifield Trail, Willow Creek, and the Tanana River as a special use recreational management area. This area is divided in to the upper and lower fens (swamps). The Tanana Flats Special Use Management Area is open to hunting during valid state seasons. The special use management area is open to all types of off-road recreational vehicles with no restrictions for off-road recreational vehicles when soil is frozen. All off-road recreational vehicles must stay on existing trails during unfrozen conditions. Off-road recreational vehicle access into the fens (both upper and lower swamp) between 1 April and 15 July is not permitted. Motorized watercraft are permitted access with no restrictions between August 15 and April 1. Access into the fens (both upper and lower swamp) between 1 April and 15 July is not permitted. Access into the fens during 15 July and 15 August is dependent on water level. Access is permitted with no restrictions between August 15 and April 1. The Tanana Flats Special Use Recreational Management Area is open to all other recreational activities year-round.

E3.2 Procedures

Table E3-1. New Outdoor Recreation Management Standard Procedures.

Category	Standard Practice	Standard Practice Description
Planning	Outdoor Recreation Management Plan Preparation, Review, and Update	Prepare, review, and update outdoor recreation management plans.
Planning	Outdoor Recreation GIS Planning	Utilize Geographic Information System (GIS) to conduct landscape scale management of outdoor recreation resources.
Planning	Outdoor Recreation National Environmental Policy Act Documentation	Prepare, coordinate, review, and update National Environmental Policy Act documents for outdoor recreation projects, programs, policies, and management plans.
Inventory / Monitoring	Recreational Facility Survey	Conduct a survey of recreational facilities on military lands.
Inventory / Monitoring	Recreational Impact Monitoring	Conduct a survey of recreational impacts across the landscape of military lands.
Inventory / Monitoring	Trespass Structure Monitoring	Conduct a survey of trespass structures on military lands.
Project Management	Plan Outdoor Recreation Projects	Conduct project planning by inventory and identification of potential sites, project development which is accomplished using the project development worksheet, and project prioritization.

Category	Standard Practice	Standard Practice Description
Project Management	Design Outdoor Recreation Projects	Conduct project design by providing specific project designs for fuel hazard reduction, habitat improvement, cover and concealment, timber stand improvement, invasive species control, wildlife suppression, timber harvest, and firewood projects. Project designs include site plans, cost estimates, scopes of work, and bill of materials required for each project.
Project Management	Coordinate Outdoor Recreation Activities	Conduct project coordination by coordinating forestry activities by providing project planning and oversight, technical assistance and design; and coordinating National Environmental Policy Act, wetland and cultural activities related to project oversight and management.
Project Management	Outdoor Recreation Project Site Preparation	Prepare a project site for project implementation by flagging boundaries, marking trees, evaluating site conditions, etc.
Project Management	Outdoor Recreation Project Oversight	Provide project oversight by monitoring project progress and execution. Report results back to federal project manager and the Contracting Officer's representative.
Public Access	Support Recreational Access	Provide support to upgrade and maintain USARTRAK software and database. Create, staff, and implement Recreational Access Permits.
Recreational Activities	Hunting, Fishing, and Trapping	Provide hunting, fishing, and trapping support to plan and organize hunting, fishing and trapping activities on military lands.
Recreational Activities	Off-Road Recreational Vehicle	Provide off-road recreational vehicle support to plan and organize off-road recreational vehicle activities on military lands.
Recreational Activities	Other Recreational Activities	Provide support to other recreational activities, such as hiking, boating, berry picking, etc. on military lands.
Trespass Structure Abatement	Conduct Trespass Structure Abatement	Plan, organize, coordinate, and conduct trespass structure posting and removal.
Subsistence	Support Subsistence	Provide subsistence opportunities and access to subsistence users on military lands.
Outreach	Conduct Presentations/Briefings/Training	Prepare, coordinate, and conduct fish and wildlife presentations, briefings, and training.

Category	Standard Practice	Standard Practice Description
Outreach	Develop Training/Education Materials	Prepare, update, coordinate, publish, and distribute fish and wildlife training and education materials.

E3.3 Projects

Table E3-2. Proposed Projects for 2007-2011.

Project Information				Year				
Priority	Location	Standard Project Category	Project Title	FY07	FY08	FY09	FY10	FY11
H	USAG-AK	Inventory and Monitor-ing	PMO Game Warden Coordination	x	x	x	x	x
H	USAG-AK		Recreational Impact Monitoring	x	x	x	x	x
H	FWA DTA		Trespass Cabin Monitor	x	x	x	x	x
M	FWA DTA		Recreational Facility Survey	x		x		x
M	FWA DTA		Recreational Impacts Fishing		x		x	
M	DTA TFTA YTA		Survey Airstrips	x				
L	DTA GRTA TFTA YTA		Map Winter Trails		x			
H	FWA DTA FRA	Outreach	Annual Review and Input to ADFG Fishing Regulations	x	x	x	x	x
H	USAG-AK		Conservation Website	x	x	x	x	x
H	FWA DTA		Fairbanks Newsminer Hunting Edition	x	x	x	x	x
H	USAG-AK		Update Information Kiosks	x	x	x	x	x
H	FWA FRA		Newcomers Briefings	x	x	x	x	x
H	FRA FWA DTA		Outdoor Recreation Supplement	x	x	x	x	x
H	FWA		Public Room Updates	x	x	x	x	x

Project Information				Year				
Priority	**Location**	**Standard Project Category**	**Project Title**	**FY07**	**FY08**	**FY09**	**FY10**	**FY11**
H	FWA DTA FRA		Range Control Coordination	x	x	x	x	x
H	FWA DTA		Recreation User Group Meetings	x	x	x	x	x
H	USAG-AK		Recreation Access Permits	x	x	x	x	x
H	FWA DTA		USARTRAK Brochure	x	x	x	x	x
M	DTA		DTA Stocked Lakes Brochure		x			
M	FWA DTA FRA		Write Fairbanks Newsminer AK Post Stories	x	x	x	x	x
M	FWA		Fort Wainwright Eielson Air Force Base Stocked Lake Brochure	x				
M	FWA DTA		FWA Post TV Notices	x	x	x	x	x
M	FWA DTA		PAO Radio Spots	x	x	x	x	x
M	FWA DTA		Rec Outreach at Public Events	x	x	x	x	x
L	FWA		Becoming an Outdoor Woman	x	x	x	x	x
L	FWA		Chena River Canoe Trail	x				
L	FWA DTA		Interpretive Panels			x		
L	FWA		Kids Fishing Day	x	x	x	x	x
L	FWA DTA		Recreation Surveys	x	x	x	x	x
L	FWA DTA		Viewing Platform Material Update			x		
H	USAG-AK	Planning	Drafting of USAG-AK 200-3 Conservation Enforcement	x	x	x	x	x
H	FWA DTA	Project Manage-ment	Vehicle, Equipment Maintenance	x	x	x	x	x
M	FWA		Horseshoe Lake	x				
M	FWA		River Road Pond		x			
L	FWA		Badger Pit Park Plan Input	x	x			
L	FWA		Chena River Boat Launch/Park		x			
L	DTA		Donnelly Dome Hiking Trail			x		

Project Information				Year				
Priority	**Location**	**Standard Project Category**	**Project Title**	**FY07**	**FY08**	**FY09**	**FY10**	**FY11**
L	FWA		Manchu Lake Boardwalk			**x**		
L	FWA DTA		Stocked Lakes	**x**	**x**	**x**	**x**	**x**
H	USAG-AK	Public Access	USARTRAK Support	**x**	**x**	**x**	**x**	**x**
H	FRA	Recreational Activities	Moose Hunt Orientation	**x**	**x**	**x**	**x**	**x**
H	FRA		Moose Hunt Proficiency Shoot	**x**	**x**	**x**	**x**	**x**
H	FWA DTA		Off-Road Vehicle Management	**x**	**x**	**x**	**x**	**x**
H	FWA DTA	Trespass Structure Abatement	Trespass Cabin and Camps Removal	**x**	**x**	**x**	**x**	**x**

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U.S. Army
Garrison
Alaska

2007-2011
Integrated
Natural
Resources
Management
Plan

VOLUME II, Annex F.
Rare, Threatened and Endangered
Species Management

Final March 30, 2007
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F1. Introduction

F1.1 Purpose and Objectives

F1.1.1 Purpose

The purpose of this plan is to guide the rare, threatened, and endangered species management program on U.S. Army lands in Alaska. This program is responsible for ensuring that these species and their habitats are managed on a sustainable basis. Rare, threatened and endangered species monitoring on U.S. Army Garrison Alaska (USAG-AK) lands entails monitoring avian, mammal, and plant species and protecting their associated sensitive habitat. There is one known federally endangered species on USAG-AK lands, the Cook Inlet beluga whale (*Delphinapterus leucas*).Monitoring efforts involve conducting surveys and protecting, conserving, and enhancing habitat for this species and for rare and other species of concern. Rare, threatened and endangered species monitoring contributes to our natural resources program goals of stewardship, military training support, compliance, quality of life, and integration.

The USAG-AK Ecosystem Management Plan identifies management of these species in detail including management guidelines and implications for department and military training. Conducting endangered and threatened species management is required by the Endangered Species Act, Public Law 106-65 (Military Land Withdrawal Act) as mitigation for the Land Withdrawal Legislative Environmental Impact Statement and Public Law 86-797 (Sikes Act).

F1.1.2 Objectives

The U.S. Army Alaska is committed to managing rare, threatened and endangered species as well as species of concern.

- Conduct regular surveys of rare, uncommon and priority species on USAG-AK lands.
- Protect and conserve endangered, threatened, rare, uncommon and priority species on USAG-AK lands.
- Conserve habitat for rare, sensitive, uncommon, and/or conservation priority species.
- Continue surveying for threatened and endangered species.
- If any listed or candidate species are confirmed, develop a monitoring program that meets their needs.
- Identify and delineate rare, threatened and endangered species and their habitats.
- Conduct appropriate Section 7, Endangered Species Act consultation for any actions that may impact endangered species.

F1.2 Biological Diversity

It is an Army goal to systematically conserve biological diversity on Army lands within the context of its mission. Natural ecosystems can best be maintained by protecting the biological diversity of naturally occurring organisms and the ecological processes that they contribute to and with which they interact. The Army also recognizes the importance of habitat management, the key to effective conservation of biological diversity, in the protection of listed, proposed, and candidate species. Conserving native species in numbers and distributions that provide a high likelihood of continued existence is a crucial element of biological diversity. Conserving and restoring biological diversity minimizes the number of species that must be protected as threatened and endangered. To the greatest extent practicable, Garrison Commanders and Army natural resource planners and managers at all levels will develop and implement

policies and strategies to assist, in cooperation with other landowners, in achieving the following objectives:

- Maintenance of viable populations of the nation's native plants and animals throughout their geographic range.
- Maintenance of natural genetic variability within and among populations of native species.
- Maintenance of functioning representative examples of the full spectrum of ecosystems, biological communities, habitats, and their ecological processes.
- Implementation of management solutions, which integrate human activities with the conservation of biological diversity.
- Increased scientific understanding of biological diversity and conservation.
- Public awareness and understanding of biological diversity.
- Encouragement of private sector development and application of innovative approaches to the conservation of biological diversity.

Relative to the rest of the world, Alaska's ecosystems still remain largely intact with minor habitat loss and fragmentation. Detecting sensitive species early, minimizing habitat loss and employing a broad based ecosystem-wide perspective on natural resource management strengthen our ability to maintain healthy populations of Alaska's native species and minimize the necessity of costly reactive management (Schoen 2004). Closely evaluating and monitoring federal candidate and sensitive species and identifying species of concern are effective and proactive management tools for minimizing declines to target species.

F1.3 Surveys

Identifying and documenting the location of listed, proposed, and candidate species on an installation is crucial to effectively balancing mission and conservation requirements. Failure to properly inventory listed and proposed species can lead to violation of the Endangered Species Act and costly disruption of military operations and construction activities upon discovery of such species. Installations will conduct initial, thorough inventories of plants, fish, wildlife, and habitat types on installation lands, using scientifically accepted methodology. Installations will conduct a 100 percent inventory of suitable habitat for listed, proposed, and category 1 candidate species that may occur on the installation. Prior to conducting inventories, installations will coordinate with the USFWS and the NMFS for guidance on appropriate field survey methodology and individuals and organizations qualified to conduct surveys. Inventories are to be conducted at least every ten years, or sooner, if required by Endangered Species Management Components. Records of inventory data will be maintained permanently.

F1.4 Management Planning

This plan details programmatic guidelines for sustaining viable populations of sensitive species. The terms "rare, uncommon, priority, species of concern" are used in this document to describe Alaska's sensitive species.

F1.5 Interagency Cooperative Management

The U.S. Army Alaska recognizes that the key to successfully managing sensitive species includes the involvement of area agencies and stakeholders. An example of a regional interagency management effort is the cooperation between Fort Richardson and the Alaska office of The Nature Conservancy, other state government agencies, and interested individuals to produce an eco-regional assessment for the Cook Inlet

Basin Ecoregion. This eco-regional assessment will identify important areas of biodiversity in the region (areas of biological significance) and will outline a plan for broad scale conservation efforts aimed at the entire Cook Inlet Basin Ecoregion. Many other cooperative management efforts exist and these are described in greater detail in other documents (U.S. Army Alaska 2001a, 2001b; Schick et al. 2003).

F1.6 Summary

Alaska has very few federally designated endangered or threatened species. However, USAG-AK has taken proactive approaches, developed rigorous strategies and created adaptive management based programs to minimize the potential for our species to become threatened or endangered. The U.S. Army ecosystem management program identifies rare, uncommon, and priority species and species of concern. The fish and wildlife management program, invasive species management program and special interest areas management program help to ensure continued effective management on U.S. Army lands in Alaska for years to come.

Prevention is the best strategy for endangered species management. Early detection of species at risk provides managers with more options and greater flexibility in designing and conducting successful recovery programs. Quick action and flexibility also reduce the need for costly crisis management and its potential for adversely affecting human activities and disrupting local or regional economies. Effective conservation in Alaska will require long-term planning and cooperation among wildlife managers, land management agencies, and resource users (Schoen 2003). The programs mentioned above and their associated plans, as well as the information in this plan, encompass these principles and provide a solid framework for rare, threatened and endangered species management on U.S. Army Alaska lands.

F2. Rare Threatened and Endangered Species Management

F2.1 Threatened and Endangered Species

As of 22 December 2008, the Cook Inlet beluga whale was listed as endangered. This species is present within the boundaries of Fort Richardson, feeding on a variety of fish species within Eagle River, which flows out to Knik Arm through the Eagle River Flats Impact Area.. The following section provides guidelines for the management of this species.

F2.1.1 Army Policy on Listed Species

The purpose of this section is to describe USAG-AK requirements of the Endangered Species Act and procedures for implementing regulations of the U.S. Fish and Wildlife Service and NMFS (50 Code of Federal Regulations Part 402).

F2.1.1.1 Balancing Mission Requirements

The Army is committed to being a leader in conserving listed species. Department of Army personnel at all levels must ensure that they carry out mission requirements in harmony with the requirements of the Endangered Species Act of 1973, sections 1531 to 1544, title 16, United States Code (I6 USC 1531-1544). Mission requirements do not justify actions violating the Endangered Species Act. All Army land uses, including military training, testing, timber harvesting, recreation, and grazing, are subject to Endangered Species Act requirements for the protection of listed and proposed species and critical habitat. The key to successfully balancing mission requirements and the conservation of listed species is long-term planning and effective management to prevent conflicts between these competing interests.

F2.1.1.2 Cooperation and Informal Consultation with Regulatory Agencies

In fulfilling its conservation responsibilities under the Endangered Species Act, the Army will work closely and cooperatively with the federal agencies charged with implementation and enforcement of the act: the U.S. Fish and Wildlife Service (USFWS) and the NMFS (NMFS). In planning projects and activities, installations should engage in informal consultation with the USFWS or NMFS at the earliest opportunity to ensure that proposed actions that may affect listed species or critical habitat are consistent with the requirements of the Endangered Species Act. Installations will routinely seek informal USFWS or NMFS review of installation plans. If there is any question whether an Army action may affect a listed species or critical habitat, Department of Army personnel should informally consult with the NMFS or USFWS to utilize their professional expertise in evaluating the potential impacts of the proposed action and decide the need for formal consultation. Working closely and cooperatively with the USFWS and NMFS through informal consultation to develop mutually satisfactory courses of action is in the Army's best interest. The NMFS has jurisdiction over most marine species. (See section 23a, part 222, title 50, Code of Federal Regulations (50 Code of Federal Regulations 222.23(a)) and 50 Code of Federal Regulations 227.4 for a listing of species within NMFS jurisdiction.) The USFWS has jurisdiction over all other species. "Action" is broadly defined in 50 Code of Federal Regulations 402.02 to include: measures to conserve listed species or critical habitat; promulgation of plans and regulations; granting of licenses, contracts, leases, easements, rights-of-way, and permits; construction projects; and so forth.

F2.1.1.3 Compliance with the Endangered Species Act

Department of Army personnel who violate the provisions of the Endangered Species Act or implementing USFWS/NMFS regulations are subject to both civil and criminal penalties. Criminal violations are punishable by a fine up to $50,000 and imprisonment of up to one year for each violation. The law imposes civil and criminal penalties for the knowing failure to take required action (such as willful failure to consult with the USFWS or NMFS when legally required) and for the commission of prohibited acts (such as "taking" a listed species). Department of Army personnel are not immune from prosecution. Actions in violation of the Endangered Species Act or of implementing USFWS/NMFS regulations are not within the scope of the official duties and responsibilities of Department of Army personnel. Failure to comply with the Endangered Species Act can result in halting or delaying ongoing or proposed projects and activities. Proponents of Army actions will coordinate with the installation's natural resources staff early in the planning stage of projects and activities to identify potential conflicts with the conservation of listed and proposed species. The garrison engineer and the environmental directorate, where applicable, will integrate endangered species management and installation planning functions to avoid conflicts with Endangered Species Act requirements. Installations will enforce the protective measures specified in Endangered Species Management Components of their Integrated Natural Resources Management Plan by the issuance of regulations punishable under the Uniform Code of Military Justice. Installations will designate and train law enforcement personnel to enforce these regulations.

F2.1.2 Endangered Species Act Requirements

The Endangered Species Act imposes five primary requirements on federal agencies: (1) conserve listed species, (2) do not take actions that would jeopardize listed species or cause destruction or adverse modification of critical habitat, (3) consult on actions that may affect listed species or critical habitat or confer if proposed, (4) conduct biological assessments for major construction activities, and (5) do not "take" listed species.

F2.1.2.1 Requirement to Conserve Listed Species

Section 7(a)(1) of the Endangered Species Act requires the Army to carry out programs for the conservation of listed species. “Conservation,” as defined by the Endangered Species Act, means the use of all methods and procedures that are necessary to bring any listed species to the point where protections provided pursuant to the Endangered Species Act are no longer necessary. Therefore, the Army has a responsibility to take affirmative measures to increase, as well as to avoid actions likely to jeopardize, listed species. This annex is the Army’s primary means of implementing the Endangered Species Act requirement to conserve listed species.

F2.1.2.2 Requirement not to “Jeopardize” Listed Species or Cause “Destruction or Adverse Modification” of Critical Habitat

Section 7(a)(2) of the Endangered Species Act requires the Army to ensure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. “Jeopardize” means to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of the survival and recovery of a listed species by reducing its reproduction, numbers, or distribution. “Destruction or adverse modification” of critical habitat is, for instance, an action that adversely modifies any of those physical or biological features that were the basis for determining the habitat to be critical (50 Code of Federal Regulations §402.02). Irrespective of any opinion, action, or inaction by the U.S. Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS), the Army is responsible for ensuring that its actions do not jeopardize listed species or result in the destruction or adverse modification of critical habitat.

F2.1.2.3 Requirement not to “Take” Listed Fish and Wildlife Species or to Remove or Destroy Listed Plant Species

Under Section 9 of the Endangered Species Act, “take” means to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct,” with respect to listed fish or wildlife. This includes significant habitat modification or degradation that kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (“harm”) and actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering (“harass”) (50 Code of Federal Regulations 17.3). Section 9 further makes it unlawful to remove and reduce to possession any listed plant from areas under federal jurisdiction or to maliciously damage or destroy any listed plant in such areas.

F2.1.2.4 Requirement to “Consult” and “Confer”

Formal consultation under Section 7(a)(2) of the Endangered Species Act is a formal procedure that takes place between USFWS or NMFS and another federal agency. 50 Code of Federal Regulations part 402 sets out detailed consultation procedures. Formal consultation is not required if the action agency determines that the action will have no effect on the listed species or critical habitat, or if the action Agency receives written concurrence from USFWS or NMFS that the action is not likely to adversely affect any listed species or critical habitat. Additionally, an action agency must confer with USFWS or NMFS whenever an action is likely to jeopardize any species proposed for listing as threatened or endangered under the Endangered Species Act (proposed species) or to result in the destruction or adverse modification of proposed critical habitat. Informal consultation with the USFWS or NMFS is always appropriate to clarify an action command’s Endangered Species Act responsibilities.

F2.1.2.4.1 Formal Consultation

Installations must review all activities at the earliest opportunity to determine whether any action may affect listed species or critical habitat. Formal consultation with the USFWS or NMFS is required whenever the Army determines that a proposed action or ongoing action may affect, beneficially or adversely, a listed species or critical habitat. Formal consultation, however, is not required if it is determined by the Army that the action will have no effect on the listed species or critical habitat, or if the Army receives written concurrence from the USFWS or NMFS that the action is not likely to adversely affect any listed species or critical habitat. Early entry into informal consultation with the USFWS is key to resolving potential problems and establishing the foundation to address issues in a proactive and positive manner and is the preferred method of consultation. Without the written concurrence of the USFWS or NMFS or a recorded "no effect" determination, consultation is mandatory.

The formal consultation process begins with a written request to USFWS or NMFS to initiate formal consultation. The process results in the issuance of a biological opinion by the USFWS or NMFS to the agency. Written requests for consultation must contain the information required by 50 Code of Federal Regulations 402.14(c), including the biological assessment, if prepared, and other relevant materials, such as environmental impact statement or environmental assessment. Per the requirements, the Army provides USFWS or NMFS with the most current and the best scientific and commercial data available during the consultation process. If reasonably available data are not provided for formulation of a biological opinion, the USFWS or NMFS can request that the agency obtain the available data or conduct additional surveys if existing surveys were not adequate. The consultation clock does not begin until USFWS or NMFS receives all the necessary data. Prior to initiating formal consultation, the Army may choose to await the results of relevant non-Army studies or conduct additional studies if current data is not sufficient to assess the potential impacts of an action.

Installations will coordinate with Installation Management Agency in conducting biological assessments and informal consultation preliminary to initiating formal consultation. Before initiating formal consultation, installations will forward through Installation Management Agency channels a summary of the proposed action and all of the documents they intend to submit to the USFWS or NMFS (for example, biological assessment, biological evaluation) to Headquarters, Department of Army. Headquarters, Department of Army will review proposals for formal consultation and supporting documents and provide comments.

F2.1.2.4.2 The "May Affect" Determination

The Army will use informal consultation with the USFWS or NMFS and a biological assessment, if applicable, or biological evaluation in assessing whether an action may affect a listed species or critical habitat. The presence of a listed species in the area directly or indirectly affected by the action (action area) will normally result in a "may affect" determination. Where a listed species or critical habitat is present in the action area, a "no affect" determination should be made only if the USFWS or NMFS concurs through informal consultation. Installations will document USFWS or NMFS concurrence. A "may affect, likely to adversely affect" determination does not necessarily mean that the installation will receive a jeopardy biological opinion.

Installations should engage in informal consultation with the USFWS or NMFS at the earliest opportunity. Even where the installation makes a "may affect" determination, continued informal consultation may be productive. Modifications agreed to through informal consultation may avoid the need for formal consultation.

Biological Assessment

Section 7(c) of the Endangered Species Act and the implementing regulations (50 Code of Federal Regulations 402.12) requires the Army to conduct biological assessments for major construction activities, which are activities that will significantly affect the quality of the human environment as referred to in the National Environmental Policy Act of 1969.

For such major construction activities, the Endangered Species Act requires installations to request concurrence on a submitted list of proposed and listed species and proposed and designated critical habitat that may be present in the action area or to request such a list from the USFWS or NMFS. The USFWS and NMFS have 30 days in which to concur with the submitted list or provide the requested list.

If a listed species or critical habitat may be present in the action area, installations must begin a biological assessment within 90 days of receipt of the list to avoid having to re-verify the species list with the USFWS or NMFS before commencing the biological assessment. Installations must complete the biological assessment with a determination of effect within 180 days unless a different period is agreed to by the USFWS or NMFS.

If the installation determines that a listed species or its habitat does not occur or does not have the potential to occur in the action area and the USFWS or NMFS concurs in the determination, a biological assessment is not required and the consultation process ends.

A biological assessment, however, is not required if only proposed species or habitat is present, unless the listing or designation becomes final. While not required, installations are encouraged to complete biological assessments for proposed species and habitats.

Once the biological assessment process begins, the installation may not enter into any contract for construction or begin construction before it completes the biological assessment and, if required, formal consultation.

Installations must submit the completed biological assessment to the USFWS or NMFS for review. The USFWS or NMFS must provide a written response within 30 days, concurring or nonconcurring in the findings of the biological assessment.

Installations have the option of initiating formal consultation concurrently with the submission of the assessment. If a biological assessment is not required, installations will prepare a written biological evaluation documenting its determination of the effect or no effect of an action on listed species and critical habitat. Biological evaluations should set forth the biologically supportable rationale for the installation's determination (see below).

Biological assessments should include the following information:

- The results of an on-site inspection of the action area to discover if listed or proposed species are present or occur seasonally.
- The views of recognized experts on the subject species and its habitat.
- A review of the literature and other information on the species and its habitat.
- An analysis of the effects of the action on the species and habitat, including consideration of cumulative effects, and the results of any related studies.
- "Cumulative effects" under the Endangered Species Act include those future nonfederal (state, local, or private) activities that are reasonably certain to occur in the action area.

- Coordination/mitigation measures that will reduce/eliminate adverse impacts to listed or proposed species.
- A determination of whether the action is “likely to adversely affect” or “not likely to adversely affect” listed species.
- For proposed species, a determination of whether the action “is likely to jeopardize” or “is not likely to jeopardize” the continued existence of proposed species.
- A determination of whether the action is likely to result in the destruction or adverse modification of a critical habitat or a proposed critical habitat.
- An analysis of alternative actions considered by the action proponent.

Biological Evaluation

For actions not classified as major construction activities, initiation of formal consultation will require the Army to submit a written request to the USFWS or NMFS initiating formal consultation, which will include the necessary biological data that the Army refers to as the “biological evaluation.” The biological evaluation prepared by an installation will include, but is not limited to, the following (50 Code of Federal Regulations 402.14):

- A description of the action to be considered.
- A description of the specific area that may be affected by the action.
- A description of any listed species or critical habitat that may be affected by the action.
- A description of the manner in which the action may affect any listed species or critical habitat and an analysis of any cumulative effects.
- Relevant reports, including any environmental impact statement, environmental assessment, or biological assessment prepared.
- Any other relevant available information on the action, the affected listed species, or critical habitat.

F2.1.2.4.3 Commitment of Resources Pending Completion of Formal Consultation

For proposed actions that may require formal consultation, action proponents will make no irreversible or irretrievable commitment of resources that will foreclose the formulation or implementation of any reasonable and prudent alternative before completion of formal consultation or the written concurrence of USFWS or NMFS that it is not required.

F2.1.2.4.4 Conference

Installations must confer with the USFWS or NMFS on any action that is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat. Conference procedures are designed to help the action proponent in identifying and resolving potential conflicts before the species is listed or critical habitat is designated.

Upon listing of a species or designation of critical habitat, installations must review proposed actions to determine if formal consultation is necessary even if a conference has occurred. The conference process usually consists of informal discussions resulting in advisory recommendations from the USFWS or NMFS. The proponent may request, however, that the conference be conducted as a formal consultation. If the USFWS or NMFS consents, formal conference is conducted according to the procedures for formal consultation. If conducted formally, the USFWS or NMFS may adopt the opinion issued at the conclusion of the conference as the biological opinion when the species is listed or critical habitat is designated. Installations may use informal consultation and/or a biological evaluation to decide if a conference is required. A biological assessment or biological evaluation is not required for proposed species. 50 Code of Federal Regulations part 402.10 sets out detailed conference procedures.

F2.1.2.4.5 Conducting Consultation and Conference
Except for Endangered Species Management Component Plans, consultation (formal and informal) and conference with the USFWS or NMFS on installation actions will be conducted by the installation engineer or environmental directorate, in coordination with the training or testing directorate, and the environmental law specialist. Technical assistance will be available from the Installation Management Agency and Headquarters, Department of Army.

F2.1.2.4.6 Biological Opinion
The result of formal consultation is a biological opinion from the USFWS or NMFS on whether the proposed action is likely to result in jeopardy to the continued existence of the species and/or will result in destruction or adverse modification of critical habitat.

A jeopardy biological opinion includes reasonable and prudent alternatives, if any are available. Reasonable and prudent alternatives are actions identified during formal consultation that will avoid jeopardy to listed species or destruction of critical habitat. The alternatives must be consistent with the purpose of the proposed action and capable of implementation by the installation. Proposed actions cannot proceed after a jeopardy or adverse modification biological opinion except according to any reasonable and prudent alternative contained therein. Installations will coordinate with the USFWS or NMFS during formal consultation to assist with the development of reasonable and prudent alternatives. Formal consultation may also result in the issuance of a non-jeopardy or no adverse modification of critical habitat biological opinion.

Biological opinions will contain an incidental take statement if the USFWS or NMFS concludes that the agency action (or the implementation of any reasonable and prudent alternatives) and the anticipated incidental take itself, if any, will not violate Section 7(a)(2) of the Endangered Species Act. Incidental take refers to takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the action agency. If the USFWS or NMFS anticipates take, the incidental take statement will include non-discretionary reasonable and prudent measures that the installation must undertake to minimize incidental take. If the installation proceeds in compliance with the terms and conditions of the incidental take statement, then a resulting incidental take is not a violation of Section 9 of the Endangered Species Act. The USFWS or NMFS may issue a conference report in response to a request for a formal conference regarding a proposed species or proposed critical habitat. In such cases, the USFWS or NMFS may adopt the conference report as the biological opinion when the proposed species is listed or critical habitat is designated, if the project and the status of the species or habitat have not changed in the interim.

With the biological opinion, the USFWS or NMFS may provide discretionary conservation recommendations, with a request for notification of their accomplishment. Installations will carry out such recommendations unless the installation determines, in coordination with Headquarters, Department of Army that the conservation recommendations are not feasible. If found not feasible, installations will notify the USFWS or NMFS of the decision and the reasons.

If the USFWS or NMFS issues a jeopardy or adverse modification biological opinion, the installation must notify, through Installation Management Agency channels, Headquarters, Department of Army within five days and forward copies of the opinion. Unless changed through further consultation with the USFWS or NMFS, the installation will comply with the reasonable and prudent alternatives and the reasonable and prudent measures (with the related terms and conditions) in the biological opinion. The installation must notify the USFWS or NMFS of its final decision on the action.

F2.1.2.4.6 Re-initiation of Formal Consultation
Formal consultation must be reinitiated under the following circumstances:

- The amount or extent of taking specified in the incidental take statement is exceeded.
- New information reveals effects of the action that may affect listed species or critical habitat in a way or to an extent not previously considered.
- The identified action is subsequently modified in a way that causes an effect to a listed species or critical habitat that was not considered in the biological opinion.
- A new species is listed or critical habitat is designated that the action may affect the Endangered Species Management Component Plan.

F2.1.2.4.7 Emergency Consultation Procedures

Section 7 of the Endangered Species Act recognizes that an emergency (natural disaster or other calamity) may require expedited consultation (50 Code of Federal Regulations 402.05). Where emergency actions are required that may affect listed species and/or critical habitats, an installation may not have the time for the administrative work required by the consultation regulations under non-emergency conditions. Emergency consultation procedures allow the action installation to incorporate endangered species concerns into their actions during the response to an emergency.

An emergency is a situation involving an act of God, disasters, casualties, national defense or security emergencies, etc., and includes response activities that must be taken to prevent imminent loss of human life or property. Predictable events, like those covered in Emergency Use Permits issued by the Environmental Protection Agency for pesticide applications, usually do not qualify as emergencies under Section 7 of the Endangered Species Act unless there is a significant unexpected human health risk.

Procedures for Handling Emergency Consultations

The initial stages of emergency consultations usually are done by telephone or facsimile, followed as soon as possible (within 48 hours if possible) by written correspondence from the installation. This provides the installation with an accurate record of the telephone contact. This record also provides the installation with a formal document reminding them of the commitments made during the initial step in the emergency consultation. During this initial contact, or soon thereafter, the USFWS role is to offer recommendations to minimize the effects of the emergency response action on listed species or their critical habitat (the informal consultation phase). If this initial review indicates the action may result in jeopardy or adverse modification, and no means of reducing or avoiding this effect are apparent, the installation should be so advised, and the USFWS conclusions documented.

Initiating Formal Consultation

As soon as practicable after the emergency is under control, the action agency initiates formal consultation with USFWS and/or NMFS if listed species or critical habitat have been adversely affected. Although formal consultation occurs after the response to an emergency, procedurally it is treated like any other formal consultation. However, the action agency has to provide additional information to initiate a formal consultation following an emergency:

- A description of the emergency.
- A justification for the expedited consultation.
- An evaluation of the response to species and their impacts of the emergency on affected species and their habitats, including documentation of how the services' recommendations were implemented, and the results of implementation minimizing take.

Emergency Biological Opinion

After concluding formal consultation on an emergency, the services issue an emergency biological opinion. The "effects of the action" section documents the recommendations provided by the services to the action agency and the results of agency implementation of the recommendations on listed species. The

timeframe, format and contents are the same as for formal consultation. The standardized statements for formal consultation have been modified to reflect that this is, in most cases, an after-the-fact consultation. Documenting jeopardy and adverse modification biological opinions is particularly important to tracking the effect on species and habitat conditions. For USFWS, emergency biological opinions with the conclusion of "not likely to jeopardize" the species or "not likely to result in destruction or adverse modification of critical habitat" are completed at the Field Office level. However, if the conclusion is likely jeopardy or adverse modification, the consultation is elevated to the Regional Office. Such a finding may not have a reasonable and prudent alternative available, unless some further action can restore or enhance the species to a level below the jeopardy threshold. For NMFS, emergency opinions are signed in Washington by the Director, Office of Protected Resources, except where a specific region has been delegated signature authority (i.e., Northwest and Southwest regions have been delegated signature authority for anadromous fish).

Incidental Take Statement

If incidental take is anticipated during the emergency response, the services can advise the action agency during the informal consultation phase of ways to minimize take. In some circumstances, the actual or estimated take occurring from the agency's emergency response actions can be determined and should be documented in the biological opinion for future inclusion in the species' environmental baseline. The incidental take statement in an emergency consultation does not include reasonable and prudent measures or terms and conditions to minimize take, unless the agency has an ongoing action related to the emergency. Rather, an emergency consultation incidental take statement documents the recommendations given to minimize take during informal consultation, the success of the agency in carrying out these recommendations, and the ultimate effects on the species of concern through take.

Conservation Recommendations

Emergency consultations may contain conservation recommendations to help protect listed species and their habitats in future emergency situations or initiate beneficial actions to conserve the species. (Note: While the timing of "emergencies" is unpredictable, the type of emergencies that may affect listed species or critical habitat can be determined in advance.) Emergency response actions routinely practiced by responsible federal agencies are encouraged so that endangered species components can be incorporated into the emergency response where appropriate. Prior to initiation of formal consultations (after the emergency consultations), installations accomplish Installation Management Agency and Headquarters review of all documents submitted to the USFWS.

F2.1.3 Endangered Species Management Component Plan

F2.1.3.1 General Requirement

Installations will prepare Endangered Species Management Component Plans for listed and proposed species and critical habitat present on the installation, including areas used by tenant organizations. Installation Endangered Species Management Component Plans are the Army's primary means of ensuring Endangered Species Act compliance and balancing mission requirements. Army endangered species management will give first priority to the preparation and resourcing of installation Endangered Species Management Component Plans, including associated inventories. Headquarters, Department of Army and Installation Management Agency will assist installations in obtaining adequate funding and support to effectively develop and implement Endangered Species Management Component Plans. Garrison Commanders will approve Endangered Species Management Component Plans as required by this guide, within one year after the discovery of a listed/proposed species or the proposal for listing a species or proposal for designation of critical habitat, whichever occurs first.

In addition to installation Endangered Species Management Component Plans, the Installation Management Agency will consider preparing an Installation Management Agency Region Endangered Species Management Guidance for listed and proposed species present on more than one subordinate installation within its region when a species has or could have a significant impact on the installations' ability to support mission requirements. The Installation Management Agency will also consider whether limited resources could more effectively be directed toward preparation and resourcing of installation Endangered Species Management Component Plans. If prepared, the Installation Management Agency Region Endangered Species Management Guidance will contain guidance to be used by installations in preparing Endangered Species Management Component Plans. If the Installation Management Agency determines that an Installation Management Agency Region Endangered Species Management Guidance is not warranted, the Installation Management Agency will, however, issue sufficient written guidance to ensure: unity of effort, a shared research and development program, and the efficient use of Installation Management Agency resources. Where a listed species or proposed species involves more than one Installation Management Agency Region and has the potential to significantly affect Army training or readiness, Installation Management Agency may request that Headquarters, Department of Army prepare a Headquarters, Department of Army Endangered Species Management Guidance instead of or in addition to an Installation Management Agency Endangered Species Management Guidance. Installation Management Agency should forward requests to Headquarters, Department of Army. Headquarters, Department of Army will consider preparing an Headquarters, Department of Army Endangered Species Management Guidance for listed and proposed species present on installations in more than one Installation Management Agency Region when it is determined that a species has or could have a significant impact on Army mission requirements. Headquarters, Department of Army will also consider whether limited resources could more effectively be directed toward preparation and resourcing of installation Endangered Species Management Component Plans. If Headquarters, Department of Army determines that an Headquarters, Department of Army Endangered Species Management Guidance is not warranted, Headquarters, Department of Army will, however, issue sufficient written guidance to ensure: unity of effort, a shared research and development program, and the efficient use of Army resources. All proposed Endangered Species Management Component Plans and Endangered Species Management Guidance are subject to the requirements of National Environmental Policy Act, in addition to the consultation requirements of Section 7 of the Endangered Species Act.

F2.1.3.2 Installation Endangered Species Management Component Plans

Installations will prepare Endangered Species Management Component Plans for each listed and proposed species and critical habitat on the installation. They may combine Endangered Species Management Component Plans, provided the combined plans satisfy the substantive requirements in the following three paragraphs. If feasible, combining Endangered Species Management Component Plans addressing several species and focusing on management of the supporting ecosystem is encouraged. Upon approval by the Garrison Commander, the Endangered Species Management Component Plan will be made part of the installation's Integrated Natural Resources Management Plan and the cooperative plan as required by the Sikes Act.

Installation Endangered Species Management Component Plans will prescribe area specific measures necessary to meet the installations' conservation goals for the subject species and critical habitats. Endangered Species Management Component Plans will be consistent with Installation Management Agency or Headquarters, Department of Army Endangered Species Management Guidance as applicable or other Installation Management Agency or Headquarters, Department of Army guidance on the subject species, unless U.S. Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS) biological opinions require otherwise. In the latter case, installations will report inconsistencies between Installation Management Agency or Headquarters, Department of Army guidance and USFWS or NMFS opinions, through Installation Management Agency channels, to Headquarters, Department of Army, in

coordination with the Judge Advocate General. Headquarters, Department of Army will expeditiously review such reports and determine if Headquarters, Department of Army level action is necessary. Installations will not finally approve Endangered Species Management Component Plans until this Headquarters, Department of Army review is completed.

Preparation of Endangered Species Management Component Plans requires a systematic, step-by-step approach. The species' population size (current and goal), habitat (current and potential), and training and other mission requirements (present and future) must be identified. Detailed evaluation of these factors and their interrelated impacts are required as a first step in the development of Endangered Species Management Component Plans. The length and detail of installation Endangered Species Management Component Plans are dependent upon the complexity of the management problems associated with the species and its habitat. At a minimum, installation Endangered Species Management Component Plans will include the following:

- Documented survey and inventory information (including maps, written descriptions, Geographic Information System database, and so forth) on the species, including habitat distribution and the location and size of the installation population.
- A plan that addresses "special management or protection" of critical habitat.
- The installation's conservation goals for the subject species and critical habitat, established in consultation with the USFWS or NMFS.
- Objective, measurable criteria which, when met, would meet the installation's conservation goals for the listed species and critical habitat and milestones for achieving the goals.
- Area specific management prescriptions and actions necessary to meet the installation's conservation goals for the species and critical habitat.
- Means to include, as appropriate, Endangered Species Management Component Plan provisions into the installation's Integrated Training Area Management program.
- An ongoing inventory and monitoring plan.
- Estimates of the time, cost, and personnel needed to carry out those measures needed to achieve the conservation goals.
- A checklist for use by those agencies assessing installation compliance with the Endangered Species Management Component Plan. The checklist should identify actions, tasks, and steps required to effectively implement the Endangered Species Management Component Plan over its projected life; the objective milestones for achieving conservation goals; and the primary conservation measures specified in the Endangered Species Management Component Plan. Checklists are intended to be the primary tool used in assessing installation compliance with Endangered Species Management Component Plans. A well-designed checklist will serve as a stand-alone guide for those conducting the assessment. No particular format is required; however, checklists should include a brief narrative explanation for each point on the checklist and a cross-reference to the pertinent Endangered Species Management Component Plan provision.

F2.1.3.3 Installation Management Agency Endangered Species Management Guidance

The length and detail of Installation Management Agency Endangered Species Management Guidance are dependent upon the complexity of the management problems associated with the species and its habitat. At a minimum, Installation Management Agency Endangered Species Management Guidance will contain guidance to subordinate installations necessary for effective Installation Management Agency-wide management of the listed species and critical habitat, avoidance of duplication of effort, uniformity of management practices wherever feasible, efficient use of Installation Management Agency resources, and appropriate Installation Management Agency coordination and oversight.

F2.1.3.1 Headquarters, Department of Army Endangered Species Management Guidance

The length and detail of Headquarters, Department of Army Endangered Species Management Guidance are dependent upon the complexity of the management problems associated with the species and its habitat. At a minimum, Headquarters, Department of Army Endangered Species Management Guidance will contain guidance to Army installations necessary for effective Army-wide management of the listed species and critical habitat, avoidance of duplication of effort, uniformity of management practices wherever feasible, efficient use of Army resources, and appropriate Headquarters, Department of Army coordination and oversight.

F2.1.4 Preparation and Approval of Endangered Species Management Component Plan and Endangered Species Management Guidance

F2.1.4.1 Installation Level Endangered Species Management Component Plan

The installation engineer (or environmental directorate where applicable), in coordination with the testing or training directorate and the installation environmental law specialist, prepares installation Endangered Species Management Component Plan. Installations will establish working teams to draft Endangered Species Management Component Plan, each team comprised of, at a minimum, natural resources personnel, testers or trainers, and the environmental law specialist. The installation engineer identifies and arranges for other installation personnel to advise the team on funding and contracting matters. The team complies with National Environmental Policy Act and Endangered Species Act procedural requirements, including conference and consultation with the USFWS or NMFS, coordination with appropriate state agencies (state concurrence to the cooperative plan is necessary under the Sikes Act and preparation of National Environmental Policy Act documentation. The team informally consults with and receives input from the USFWS or NMFS throughout the Endangered Species Management Component Plan development process. On smaller installations, and government-owned contractor-operated facilities, where there are inadequate resources to establish a team (for example, no Staff Judge Advocate office or natural resources personnel), the responsible installation engineer coordinates with the Installation Management Agency staff for the necessary support. The installation engineer or environmental director briefs the Environmental Quality Control Committee on each proposed Endangered Species Management Component Plan and supporting National Environmental Policy Act documentation. The installation Staff Judge Advocate renders a written legal opinion stating whether the approval of the Endangered Species Management Component Plan and supporting National Environmental Policy Act documentation will be according to National Environmental Policy Act, Endangered Species Act, and regulatory requirements before the Endangered Species Management Component Plan is forwarded to the Garrison Commander for approval. An Endangered Species Management Component Plan is not effective until it and the supporting National Environmental Policy Act documentation are approved and signed by the Garrison Commander. Upon approval of the Endangered Species Management Component Plan by the Garrison Commander, the installation engineer obtains final, formal agreement from the USFWS or NMFS, and the state wildlife agency to include the Endangered Species Management Component Plan as part of the cooperative plan. (An informal agreement should be obtained during the development process). The installation engineer, in coordination with the testing or training directorate, integrates the Endangered Species Management Component Plan's provisions into Integrated Training Area Management planning resourcing. Installations will revise the installation Real Property Master Plan according to AR 210-20. Installations will forward a copy of the approved Endangered Species Management Component Plan to Headquarters, Department of Army and the Installation Management Agency engineer (or staff environmental officer where appropriate). The Installation Management Agency engineer or Installation Management Agency environmental director reviews installation Endangered Species Management Component Plans to monitor compliance with this regulation, and identifies funding and personnel

requirements to detect problems that could significantly impact on future mission requirements. Every effort will be made by Installation Management Agency to resolve identified problems and issues. The Installation Management Agency will report problems that cannot be resolved to the Office of the Director of Environmental Programs. The Installation Management Agency will retain copies of Endangered Species Management Component Plans and will make them available to other installations that could benefit from the completed work.

F2.1.4.2 Installation Management Agency Level Endangered Species Management Guidance

If prepared, the Installation Management Agency engineer (or Installation Management Agency environmental director), in coordination with the Installation Management Agency Deputy Chief of Staff for Operations and Staff Judge Advocate, prepares Installation Management Agency Endangered Species Management Guidance. Installation Management Agency will establish working teams comprised of, at a minimum, natural resources personnel, military trainers, or testers, and an environmental attorney to prepare Endangered Species Management Guidance. The team complies with National Environmental Policy Act and Endangered Species Act procedural requirements, including conference and consultation with the USFWS or NMFS and preparation of National Environmental Policy Act documentation. The Staff Judge Advocate renders a written legal opinion stating whether the approval of an Installation Management Agency Endangered Species Management Guidance and supporting National Environmental Policy Act documentation will be according to National Environmental Policy Act, Endangered Species Act, and regulatory requirements. Endangered Species Management Guidance will not become effective until approved and signed by the Installation Management Agency chief of staff. Installation Management Agency will forward a copy of Installation Management Agency Endangered Species Management Guidance to Headquarters, Department of Army, and to affected subordinate installations.

F2.1.4.3 Headquarters, Department of Army Level Endangered Species Management Guidance

Headquarters, Department of Army, in coordination with the Office of the Deputy Chief of Staff for Operations and Plans and the Office of The Judge Advocate General, prepares Headquarters, Department of Army Endangered Species Management Guidance. The Director of Environmental Programs approves Headquarters, Department of Army Endangered Species Management Guidance. As necessary, the Director of Environmental Programs may direct the formation of teams to develop Headquarters, Department of Army Endangered Species Management Guidance. The teams will operate under the operational control and direction of the Director of Environmental Programs. The team will consult with the USFWS or NMFS as required by the Endangered Species Act and prepare supporting National Environmental Policy Act documentation.

F2.1.4.4 Coordination Outside Headquarters, Department of Army

Other federal, state, and private lands are important to the survival and recovery of endangered species. Effective conservation will normally depend upon a comprehensive effort throughout the species' range. To assist in this effort, installations with listed or proposed species should encourage and support local, regional, and range-wide cooperative agreements for the conservation of these species with other federal, state, and private landowners; conservation organizations; and the USFWS or NMFS. Additionally, these installations will take the lead in promoting conservation efforts on non-Army lands surrounding installations to preclude having to sustain and recover listed species populations entirely on Army lands. Army proponents of Endangered Species Management Component Plans and Endangered Species

Management Guidance at all levels should establish and participate in joint task forces with other Department of Defense entities to develop common plans, share information and resources, and avoid duplication of efforts.

F2.1.4.5 Annual Review of Endangered Species Management Component Plans and Endangered Species Management Guidance

Proponents will review their Endangered Species Management Component Plans or Endangered Species Management Guidance annually and update them as required to meet conservation goals. Installations should conduct the annual review of Endangered Species Management Component Plans concurrently with preparation of the annual installation engineer's or environmental director's Endangered Species Management Component Plan compliance report. Except for minor changes, installations will prepare and approve revisions in the same manner as the Endangered Species Management Component Plans themselves. Minor changes may be approved by the installation engineer or environmental director, where applicable, after: coordination with the Staff Judge Advocate and training or testing directorate; informal consultation with the USFWS or NMFS; and coordination with the appropriate state agency. Minor changes include only those changes that will have no effect (considered together with all previous minor changes to the current Endangered Species Management Component Plan), beneficial or adverse, on listed or proposed species or critical habitat. The cooperative plan will be amended to reflect minor changes at least every two years.

F2.1.4.6 National Environmental Policy Act Compliance

National Environmental Policy Act, implemented by the Army under 32 Code of Federal Regulations 561, applies to actions taken in managing listed and proposed species and critical habitats. Consultation under Section 7 of the Endangered Species Act does not replace compliance with National Environmental Policy Act requirements. In preparing and staffing Endangered Species Management Component Plans, proponents must ensure that they satisfy National Environmental Policy Act requirements. Proponents will normally prepare environmental assessments for activities, including developing Endangered Species Management Component Plans and Endangered Species Management Guidance, that affect federal or state listed or proposed species or critical or proposed critical habitat (32 Code of Federal Regulations 561). National Environmental Policy Act requires an environmental impact statement if an Endangered Species Management Component Plan or Endangered Species Management Guidance will significantly affect a listed or proposed species, critical habitat or proposed critical habitat, or the human environment (See 32 Code of Federal Regulations 651). To avoid unnecessary delay, proponents should provide complete National Environmental Policy Act documentation for early inclusion with recommendations or reports on Endangered Species Management Component Plans and Endangered Species Management Guidance. Consultation, conference, and biological assessment procedures under Section 7 of the Endangered Species Act should be consolidated with National Environmental Policy Act procedures to the maximum extent feasible. Simultaneous compliance with National Environmental Policy Act and Endangered Species Act procedures minimizes duplication of effort and avoids delay. Proponents may combine Endangered Species Act and National Environmental Policy Act documentation to reduce paperwork (such as the biological assessment and environmental assessment) so long as the requirements of both statutes are met. Generally, an installation should determine the effect of a proposed action on listed species or critical habitat according to Endangered Species Act Section 7 before completing National Environmental Policy Act documentation. Proponents will not avoid consultation with the USFWS or NMFS to facilitate completion of National Environmental Policy Act documentation.

F2.1.4.7 Monitoring Compliance with and Effectiveness of Endangered Species Management Component Plans

Installations will use the following means to monitor compliance with and the effectiveness of Endangered Species Management Component Plans. Those conducting assessments will, at a minimum, use the checklist contained in each Endangered Species Management Component Plan. Installations will ensure that external and internal environmental audits conducted according to paragraph 5-1, Army Regulation 200-1, *Environmental Protection and Enhancement*, thoroughly assess compliance with, progress under, and the effectiveness of Endangered Species Management Component Plans. Prior to commencing assessments, the installation engineer or environmental director will provide assessment teams with Endangered Species Management Component Plan checklists and explain their use and purpose.

F2.1.4.8 Annual Review

During the fourth quarter of each calendar year, the installation engineer or environmental director will make a written report to the Garrison Commander. The report will be reviewed by the installation Staff Judge Advocate and the Environmental Quality Compliance Committee before it is sent to the Garrison Commander. The report will include information on: the status of listed and proposed species and their habitats on the installation, progress toward completion of any incomplete Endangered Species Management Component Plans, progress toward installation conservation goals, actions taken to implement Endangered Species Management Component Plans, contacts with the USFWS or NMFS, Endangered Species Act violations, problem areas, compliance with Installation Management Agency and Headquarters, Department of Army guidance, changes to Endangered Species Management Component Plans, and any other information necessary for reviewers to make an independent assessment of installation compliance with and the effectiveness of Endangered Species Management Component Plans in balancing conservation with other mission requirements. If the report concludes that the installation is not in full compliance with the Endangered Species Management Component Plan or the Endangered Species Management Component Plan is not effective in meeting installation goals, the report will enumerate the deficiencies and contain recommendations for resolving the deficiencies. Garrison Commanders will approve and sign annual Endangered Species Management Component Plan reports. Installations will forward approved reports to the Installation Management Agency for review and approval. Reports must be received by the Installation Management Agency by 31 December. If an installation is not in full compliance with an Endangered Species Management Component Plan, the Endangered Species Management Component Plan is not effective in meeting the installation's goals, or another endangered species management problem is indicated, the Installation Management Agency will coordinate with Headquarters, Department of Army, and other organizations, as necessary, to develop an effective solution.

F2.1.5 Recovery Plans and Proposed Designation of Critical Habitat

F2.1.5.1 Recovery Plans

Recovery plans developed by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFW) guide the USFWS and NMFS in consultations with other agencies under Section 7 of the Endangered Species Act. The Army should actively participate in the development of recovery plans, whenever possible, to ensure that the USFWS or NMFS and the recovery teams appointed by the USFWS or NMFS know and consider Army interests. For listed species present on Army installations, the Army should make a request to the USFWS or NMFS to provide for Army representation on recovery teams. For recovery plans affecting only one Installation Management Agency Region/Major Command, except as provided in the paragraph below, the Installation Management Agency will coordinate Army participation in the development process and the submission of formal comments to the draft recovery plan. For recovery plans affecting more than one Installation Management

Agency Region/Major Command, Headquarters, Department of Army will coordinate Army participation and official comment. Installations and Installation Management Agency will coordinate with Headquarters, Department of Army before officially commenting on draft recovery plans. In cases where Headquarters, Department of Army determines that a proposed recovery plan may significantly affect Army interests, it will coordinate Army participation in the development process and the submission of formal comments to the draft recovery plan.

F2.1.5.2 Designation of Critical Habitat

The USFWS and the NMFS ultimately determine critical habitat designation and proposal for designations are published in the Federal Register. This provides the opportunity, usually 60 days, for affected installations to submit comments on the proposed action. Providing comments on critical habitat designation, before or after it is proposed, provides installations the opportunity to communicate to USFWS/NMFS the potential economic and military mission impacts. On 24 November 2003, the President signed the National Defense Authorization Act for FY 2004 (Public Law 108-136). Contained within this bill are a number of environmental provisions that have amended the Endangered Species Act. The 2004 amendments to the Endangered Species Act include two provisions to exclude designation of critical habitat on lands used by the Army:

Section 4(a)(3)(B) is not discretionary and mandates that the Secretaries of Interior and Commerce exclude designating Critical Habitat on "…any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan [Integrated Natural Resources Management Plan] prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation."

Installations should ensure their Integrated Natural Resources Management Plans (INRMP) meet the following so they are considered to provide a benefit:

- The INRMP provides a benefit to the species. To determine whether a plan provides a benefit to the species, assess the INRMP's potential contribution to species conservation, giving due regard to those habitat protection, maintenance, and improvement projects and other related activities specified in the plan that address the particular conservation and protection needs of the species for which critical habitat would otherwise be proposed. Thus, the INRMP address the maintenance and improvement of the primary constituent elements important to the species and manages for the long-term conservation of the species. These benefits must maintain or provide for an increase in the species' population, or the enhancement or restoration of its habitat within the area covered by the plan (i.e., those areas deemed essential to the conservation of the species). Examples of a benefit include: reducing fragmentation of habitat, maintaining or increasing populations, insuring against catastrophic events, enhancing and restoring habitats, buffering protected areas, or testing and implementing new conservation strategies.

- The INRMP provides certainty that it will be implemented. In order to provide the necessary assurances regarding implementation, the plan must demonstrate that its objectives can be accomplished; there is adequate funding to implement the plan; the plan has obtained all the necessary authorizations; there is an anticipated timeline for implementation of the conservation effort as demonstrated by an implementation schedule; and the INRMP provides assurances that the conservation measures in the plan will be effective.

- The plan includes biological goals (broad guiding principles for the program) and objectives (measurable targets for achieving the goals); quantifiable, scientifically valid parameters that will

demonstrate achievement of objectives, and standards for these parameters by which progress will be measured; provisions for monitoring and, where appropriate, for adaptive management; and provisions for reporting progress on implementation (based on compliance with the implementation schedule) and effectiveness of the conservation effort (based on evaluation of quantifiable parameters) are provided; and a description of a temporal duration sufficient to implement the INRMP and achieve the benefits of the plan's goals and objectives.

Section 4(b)(2), discretionary, has been amended to allow the Secretaries of Interior and Commerce to preclude designation of critical habitat on a military facility if they conclude that the benefits of such designation are outweighed by the impact on national security. Such exclusion could not occur if failure to designate an area as critical habitat would result in the extinction of the species concerned.

It is imperative that installations prepare comments on the mission impacts of any critical habitat being proposed for designation on the installation. Though critical habitat proposed on non-essential lands of an installation may not impact mission, there is no guarantee such lands may not be mission-critical in the future. The ability to maintain flexibility in use of our land is paramount to the Army's mission to organize, train, and support a land combat force. When commenting, installations should include discussions of both exemptions discussed below, unless the 4(a)(3) exclusion is not available.

To ensure an Endangered Species Act 4(a)(3)(B) exclusion of proposed critical habitat now and possibly into the future, an installation's INRMP should provide for the benefit of listed species through the enhancement and/or restoration of habitat utilized by federally listed species occurring on or near the installation. Benefit is to be defined as those management/conservation actions or inactions that are necessary to sustain population levels on-site and support the recovery of the listed species on or contiguous to the installation. When commenting on proposed designation of critical habitat, installations should be instructed to:

- Provide information on population size and acres of habitat utilized by the listed species.
- Address the benefits of planned management/conservation activities or policies on listed species.
- Clearly identify those actions specifically being implemented to benefit the listed species.
- Include summary of the benefits that the INRMP and other management documents (i.e., Master Plan, Pest Management Plan, and Integrated Training Area Management Plan) will provide the listed species.

To obtain an Endangered Species Act 4(b)(2) exemption of critical habitat, the benefits of designation to a species have to be outweighed by cost/impact to military mission. A critical habitat exclusion is permitted even if an installation does not have an approved INRMP. When commenting on proposed designation of critical habitat, installations should be instructed to:

- Demonstrate current actions being taken by Army for conservation. For example, installations should discuss actions being taken as a result of an Endangered Species Management Component Plan, Biological Opinion, Biological Assessment, Integrated Natural Resources Management Plan, and/or Army Compatible Use Buffer; and emphasize the impacts to national security. Identify potential mission impacts of a critical habitat designation by providing information on the specific military missions that could be affected and the changes to those activities that may be required as a result of Section 7 requirements, and the overall influence such mission restrictions could have on military readiness. Discuss any of the following that are applicable:
    - National Security
    - Soldier Training Days, Time, Place, Intensity
    - Installation Importance Army-wide

- Economic Cost
- Project Delay
- Opportunity Cost

F2.1.5.2.1 Coordination/Responsibilities–Installation Management Agency/Major Command/Installation

Establish a process for providing comments on national security and economic impacts of critical habitat designation prior to the publishing of a proposed rule. Comment on all proposed critical habitat designations that have the potential to impact land use on the installation. Interact with the installation Public Works Directorate, Range Control/Training Directorate, Office of the Staff Judge Advocate, and Natural Resources Staff. Prepare a summary of costs related to critical habitat avoidance.

Coordinate comments and cost summary up the Installation Management Agency chain to Headquarters, Department of Army. (Addressees are to notify Headquarters, Department of Army if any Tier 1 installations within areas identified as potential critical habitat do not have an adequate Integrated Natural Resources Management Plan). Work closely with USFWS and NMFS during the critical habitat designation rulemaking process to ensure that USFWS/NMFS understand mission requirements and impacts. Once final comments are approved by Headquarters, Department of Army, the installation will submit to USFWS/NMFS.

F2.1.5.2.2 Coordination/Responsibilities–Headquarters, Department of Army
Maintain master list of critical habitat designations that impact Army lands. Notify Installation Management Agency of upcoming proposals. Personnel should subscribe to the Federal Register Review distributed by the U.S. Army Environmental Center on a semi-monthly basis for current and upcoming listing actions. Provide supplemental comments.

F2.1.6 Notice of Endangered Species Act Violations

Installations will immediately report, by telephone or electronic means, through Installation Management Agency to Headquarters, Department of Army, any violation or suspected violation of the Endangered Species Act. A written report will be made within seven days. Violations include failure to formally consult or prepare a biological assessment as required by the Endangered Species Act, taking of listed species, and so forth. Written reports will include:

- A detailed factual summary of the violation(s) or suspected violation(s).
- Copies of any relevant correspondence from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service.
- A summary of any command actions taken in response to the violation(s) or suspected violation(s).

F2.1.7 Awareness Training Program

On installations with listed species or critical habitat, training and testing directorates, in coordination with the installation engineer (or environmental directorate where appropriate), will establish a mandatory, ongoing training program for personnel who may have contact with listed species or their habitats. Testing directorates are responsible for ensuring that users of test ranges receive appropriate awareness training. Specific requirements for training and implementation are to be identified in the Endangered Species Management Component Plan. The training will, at a minimum, cover the following topics:

- Identification of listed species and markings that identify restricted areas.
- Actions necessary to avoid injury to listed species and their habitat.
- The pertinent requirements of the Endangered Species Act and applicable regulations.
- The importance of protecting listed species and biological diversity.
- The Army policy that mission accomplishment must be consistent with the conservation of listed species and critical habitats

Installations are encouraged to use films, videos, posters, and other training aids as part of these programs. Installations should involve the USFWS or NMFS regional and field offices in the development and implementation of training programs.

F2.2. Rare, Sensitive, Candidate and Species of Concern

F2.2.1 Candidate and State Listed Species

F2.2.1.1 Candidate Species and Species at Risk

Species that are candidates for federal listing as threatened or endangered are not protected under the Endangered Species Act. Installations will consider decisions that may affect candidate species, as they may be listed in the future. Installations will avoid taking actions that result in the need to list candidate species as threatened or endangered. Installations are encouraged to develop Endangered Species Management Component Plans for candidate species and to participate in conservation agreements with the USFWS. Affirmative action to conserve candidate species can preclude the need to list such species. At a minimum, installations will document the distribution of candidate species on the installation and monitor their listing status. Early planning and coordination with the USFWS or NMFS will avoid conflicts with mission requirements and speed development of an Endangered Species Management Component Plan if the species is formally proposed for listing. Species at risk are those species that are candidates under the Endangered Species Act and/or are considered to be critically imperiled (global rank of G1 or T1) or imperiled (global rank of G2 or T2) and have not been federally listed. Installations are encouraged to consider conservation efforts towards species that could be listed under the Endangered Species Act if population declines occur or continue. Proactive measures could prevent the listing of species or prepare the installation in the case that the species is listed in the future.

The Army's policy is to proactively manage species at risk in order to prevent Endangered Species Act (Endangered Species Act) listings that could severely degrade military readiness. Army species at risk are official candidates for Endangered Species Act listing, classified by NatureServe as critically imperiled or imperiled on a global scale, and/or a concern for Endangered Species Act listing in the foreseeable future. Listing of any of these species pursuant to the Endangered Species Act could have a significant impact on military missions. Implementing proactive measures to prevent the listing of a species at risk will be beneficial to both the Army and the species. The resources needed to proactively manage all species at risk are beyond the Army's budgetary means. Therefore, the Army must focus scarce resources on those species at risk which, if listed, would most adversely impact vital Army missions.

There are three Army species at risk for Alaska. They are the Alaska starwort (*Stellaria alaskana*), G3; *Oxytropis tananensis*, G2G3;and the rusty blackbird (*Euphagus carolinus)*, G4;.. Managing species at risk is a critical requirement. USAG-AK must prioritize species at risk management requirements within allocated resources to ensure that species at risk requirements are adequately addressed.

The objective of the Army species at risk initiative is to focus conservation efforts on species at installations that have an Army-wide strategic and enduring mission capability and where there are

indications that the listing of a species at risk may be imminent due to population declines, instability, threats, etc. Long-term commitment to species at risk funding is paramount to precluding the need to list species, so priority species at risk should not be changed drastically each year. The following considerations will assist in selecting and prioritizing species at risk for installation funding:

- Listing of the species would have a significant adverse impact on the installation's mission. The trainers and testers should assist in determining the degree of mission impact from such listing.
- The species should meet the definition of a species at risk (paragraph 3) and be identified in enclosure 2.
- There should be evidence that management of the species on site and/or off site could preclude the need to list the species and/or conservation efforts for the species could greatly benefit the installation mission by preparing the installation for a possible listing of the species requirements.
- There should be a level of support from outside agencies, private landowners and/or non-governmental organizations to advance the protection/management of the species at risk.
- The installation mission allows for implementing strategies to prevent or support efforts to prevent listing the species.
- Consider the percentage of the species found on site or contiguous to the installation and the quality of the habitat to support the species. This could be an indication of the potential importance of the installation for the conservation of the species and to preclude possible listing.
- Consider the percentage of the species found on or contiguous to other Army or DOD installations and the quality of the habitat to support the species. This could be an indication of the potential importance of other installations in the conservation of the species and prevention of a possible listing.

During 2007-2011, USAG-AK will coordinate with the USFWS to assist in the determination of the significance of USAG-AK lands for the conservation and sustainability of the species and the imminence of a listing of that species.

F2.2.1.2 State Listed Species

Army installations must be sensitive to those species listed as endangered or threatened under state law, but not federally listed. State, but not federal, listed species are not protected under the Endangered Species Act. Whenever feasible, installations should cooperate with state authorities in efforts to conserve these species. There is no requirement for Endangered Species Management Component Plans for State-listed species. Installations, however, will identify state-listed species in the installation’s cooperative plan and set forth agreed conservation measures. Additionally, National Environmental Policy Act normally requires an environmental assessment for activities affecting state-listed species.

The State of Alaska Species of Special Concern list developed by Alaska Department of Fish and Game includes the following species:

- Aleutian Canada goose[1, 2] *(Branta canadensis leucopareia)*
- American peregrine falcon[2] **(Falco peregrinus anatum)*
- Arctic peregrine falcon[2] *(Falco peregrinus tundrius)*
- Northern goshawk *(Accipiter gentilis laingi)* (Southeast Alaska population)
- Spectacled eider[1] *(Somateria fischeri)*
- Steller's eider[1] *(Polysticta stelleri)*
- Olive-sided flycatcher[4] *(Contopus cooperi)*
- Gray-cheeked thrush *(Catharus minimus)*
- Townsend's warbler *(Dendroica townsendi)*

- Blackpoll warbler *(Dendroica striata)*
- Brown bear *(Ursus arctos horribilis)* (Kenai Peninsula population)
- Steller sea lion[1, 3] *(Eumetopias jubatus)*
- Harbor seal *(Phoca vitulina)*
- Beluga whale[3] * *(Delphinapterus leucas)* (Cook Inlet population)
- Bowhead whale[3] *(Balaena mysticetus)*
- Sea Otters *(Enhydra lutris)* (Soutwest Stock[1])
- Chinook salmon[1] *(Oncorhynchus tshawytscha)* (Fall Stock from Snake River)

[1] Federally listed as threatened
[2] Downlisted from Alaska Endangered Species List
[3] Federally listed as endangered
[4] Category 2 candidate species under federal Endangered Species Act
* Documented occurrence on USAG-AK lands.

F2.2.1.3 Special Status Fauna

F2.2.1.3.1 Fort Wainwright Special Status Fauna

No federally listed threatened or endangered animals are resident on Fort Wainwright.

The USFWS, Office of Migratory Bird Management maintains a list of *Migratory Nongame Birds of Management Concern in the United States*. Species listed for Alaska that have been documented on Fort Wainwright are trumpeter swan, common loon, northern harrier, northern goshawk, olive-sided flycatcher, alder flycatcher, gray-cheeked thrush, and blackpoll warbler.

Eighteen species confirmed on Fort Wainwright are included on the Boreal Partners in Flight Working Group as target or priority species for monitoring because of declines in populations noted across the Americas. There are no legal requirements to manage these species although all migratory bird species are afforded some protection under the Migratory Bird Treaty Act (Ruth Gronquist, Bureau of Land Management, personal communication).

F2.2.1.3.2 Fort Richardson Special Status Fauna

Marine Mammals

USAG-AK's marine mammal conservation and management goals include but are not limited to:

- Minimize impacts to marine mammal species from military training
- Minimize impacts to marine mammal habitat
- Protect and enhance marine mammal food sources and associated habitat
- Monitor occurrence of marine mammals on Army controlled waters and lands
- Evaluate the impacts of training on marine mammal species

Marine mammal conservation and management goals and the measures taken to meet those goals are listed in Table 2-8.

- **Table 2-8. Marine Mammal Conservation Measures**

Goal	Conservation Measure	Authority
Minimize impacts to marine mammal species from military training	Live-fire activities may never intentionally target wildlife.	Federal and State Law reflected in USARAK Regulation 350-2
	Harassment of fish and wildlife is prohibited. Any action that disturbs fish and wildlife is considered harassment by federal and Alaska State law. Harassment includes such things as pursuit with vehicles or aircraft, feeding, and shooting of wildlife. Vehicles, watercraft and aircraft, including helicopters, may not be used to herd/chase wildlife off the ranges or training areas. Individuals who harass fish and wildlife are subject to prosecution.	Federal and State Law reflected in USARAK Regulation 350-2
	USARAK units will not fire munitions outside military reservation boundaries (Army Policy and USARAK Regulation 350-2).	USARAK Regulation 350-2
	Dedicated impact areas (i.e. ERF Impact Area) are permanently off limits to maneuver training and all recreation.	USARAK Regulation 350-2
	USARAK units will not intentionally fire into Eagle River at any time or within specified habitat protection buffers around Eagle River when belugas are present in the river. The habitat protection buffers are defined for each weapon system and munitions type.	2007-2011 INRMP
	USARAK units will not fire into a specified habitat protection buffer along the Eagle Bay shoreline in ERF Impact Area, the size of which is based on habitat protection goals.	2007-2011 INRMP
	USAG FRA will place new targets outside of the defined habitat protection buffers and will cease using any old targets within these areas.	2007-2011 INRMP
	USARAK units will cease firing HE munitions into ERF Impact Area during the peak waterfowl migration periods in the spring and fall. While this prohibition is primarily enacted to protect migratory birds, the timing of the migratory period coincides with peak beluga activity in Eagle River.	2007-2011 INRMP
	Observers will be present prior to and during training exercises to ensure that marine mammals are not present where they could be harassed or harmed due to training activities.	2007-2011 INRMP
	USAG FRA will avoid those military activities that could result in “take” as defined by the ESA, to the greatest extent possible. If “take” cannot be avoided, USAG FRA will enter into formal consultation with NMFS to obtain a permit as required by the MMPA and ESA.	ESA, 2007-2011 INRMP
Minimize impacts to marine mammals from recreational use	Explosive munitions impact areas (i.e. ERF Impact Area) are permanently off limits to recreational use.	USARAK Regulation 350-2
	USAG FRA will not provide recreational access to Knik Arm and Eagle Bay from Fort Richardson.	2007-2011 INRMP
	USAG FRA restricts rafting access to ERF Impact Area. The take out point for Eagle River rafters is 4 kilometers upstream from the mouth of the river approximately 100 meters upstream of Route Bravo Bridge.	USARAK Regulation 350-2

Goal	Conservation Measure	Authority
Minimize impacts to marine mammal habitat	USARAK units will not intentionally fire direct or indirect-fire weapons into Eagle River at any time.	USARAK Regulation 350-2
	There will be no firing across or into navigable waters unless listed in the Federal Register.	USARAK Regulation 350-2
	White phosphorous will not be fired into wetlands.	USARAK Regulation 350-2
	USAG FRA will continue water quality monitoring in Eagle River and Eagle Bay.	2004 Settlement Agreement
	Eagle River will remain unobstructed to normal passage of beluga whales and prey species through the entirety of ERF. Army activities will not cause any impedance to either ingress or egress of beluga whales or their prey species along the stretch of Eagle River from Bravo Bridge downstream to the mouth at Eagle Bay.	2007-2011 INRMP
Protect and Enhance Marine Mammal Food Sources and Associated Habitat	No tracked or wheeled maneuvering is permitted within a 50-meter buffer around all streams, lakes, and any open, flowing water located on USAG FRA lands during the summer unless crossing at a 90-degree angle to the stream. Fish spawning streams will not be crossed during summer. All appropriate state and federal permits will be obtained prior to any in-water activities occurring in anadromous waterways.	USARAK Regulation 350-2
	Stream bank restoration and erosion control projects will be conducted on North and South Post Fort Richardson as detailed in the 2007-2011 INRMP.	2007-2011 INRMP
Monitor occurrence of marine mammals on USAG FRA controlled waters and lands	Continue to work cooperatively with NMFS to monitor beluga whales in Eagle Bay and Knik Arm.	2007-2011 INRMP
	Conduct weekly monitoring during the summer to identify the presence and abundance of beluga whales in Eagle River.	2007-2011 INRMP
	Verify the presence or absence of beluga whales in Eagle River prior to firing to determine applicable prescribed habitat protection buffers for the specific training exercise.	2007-2011 INRMP

Two marine mammal species, the harbor seal and the Cook Inlet beluga whale, inhabit waters on (Eagle River) and around Fort Richardson (Eagle Bay).

Harbor Seal
Harbor seals are often observed swimming and foraging at the mouth of Eagle River and in Eagle Bay during the summer months when salmon are present in both systems.

Cook Inlet Beluga Whale
Only one federally endangered animal, the Cook Inlet beluga whale (*Delphinapterus leucas*), inhabits Fort Richardson.

Within recent years, beluga whales (*Delphinapterus leucas*) have been sighted within Eagle River Flats as far as 1¼ miles up Eagle River. Beluga whales often gather in Eagle Bay between the months of May and November (Huntington 2000). They have been observed chasing salmon up drainages along the river

bank (Quirk 1994). The Eagle River drainage is thought to be relatively unproductive but does support small runs of Chinook, coho, sockeye, pink and chum salmon, as well as resident grayling, Dolly Varden and rainbow trout (Miller and Bosch 2004). Fish surveys in Eagle Bay have identified the presence of adult and juvenile salmonids, three and nine-spine stickleback and saffron cod (Pentec Environmental 2005). Predator-prey relationships in Eagle River and Eagle Bay are poorly understood.

Eagle River Flats Background

Eagle River Flats (ERF) Impact Area is located on Fort Richardson at latitude 61° 19.05' N and longitude 149° 43.56' W. The ERF Impact Area is a 2,483-acre explosive munitions impact area situated along the northern boundary of Fort Richardson, an Army installation encompassing 61,376 acres and located in south-central Alaska adjacent to Anchorage, Eagle River, and Elmendorf Air Force Base (Figure 2-1). The Knik Arm of Cook Inlet borders the north side of the post, and Chugach State Park lies to the south and southeast. The town of Eagle River lies along the northeast border. Anchorage and Elmendorf Air Force Base form the western boundary.

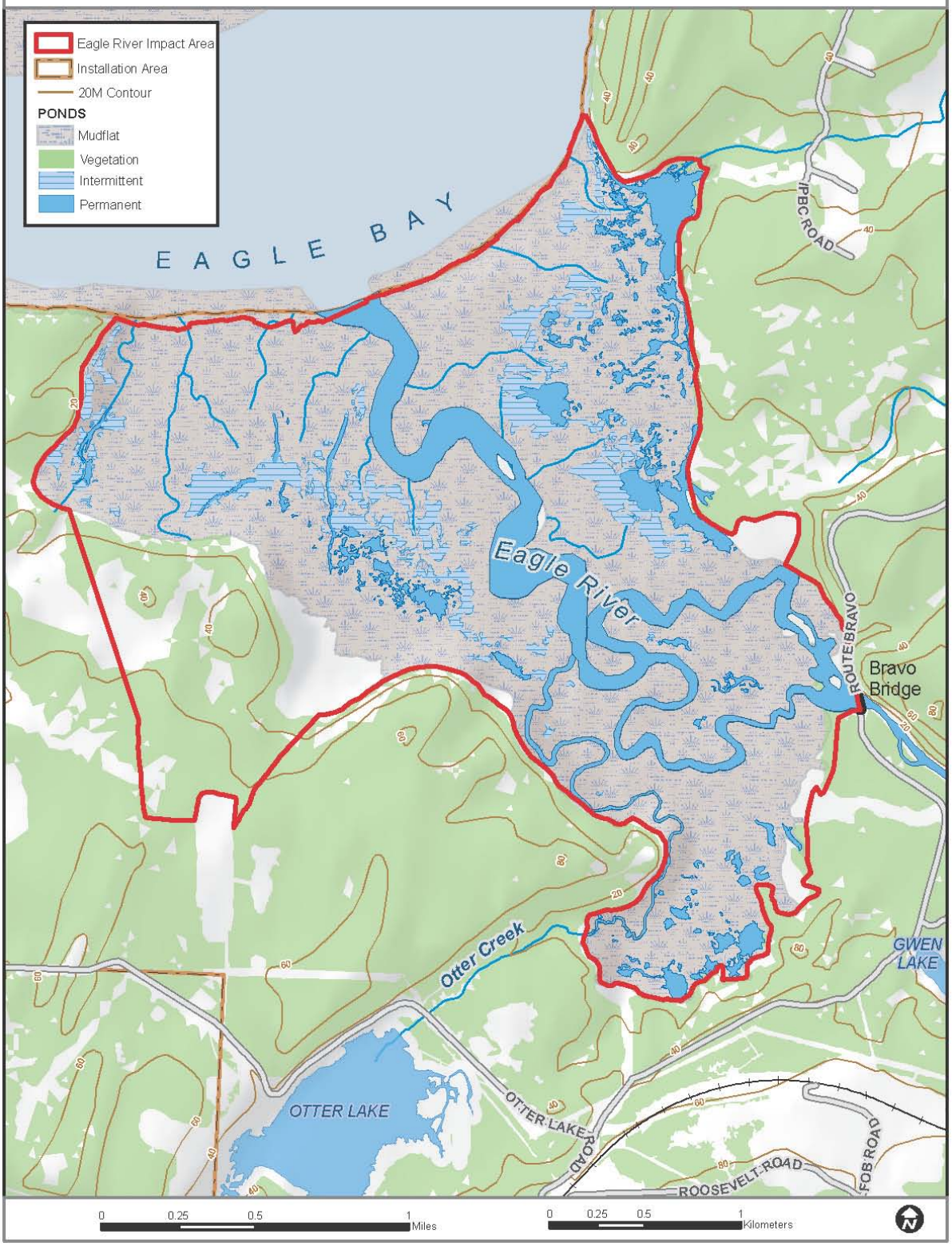
ERF Impact Area is comprised largely of a 2,160-acre estuarine salt marsh located at the mouth of Eagle River. This area is commonly known as Eagle River Flats, ERF, or simply "the flats." ERF is a lowland area surrounded by steep bluffs vegetated with upland spruce and birch forest. During summer months, most of ERF is covered with dense grasses, sedges, bulrushes, and aquatic plants. Glacially-fed Eagle River flows through the flats before discharging into Eagle Bay of Knik Arm in Upper Cook Inlet. ERF at the outflow area along the coast of Eagle Bay is about 1.6 miles wide and gradually narrows inland for approximately 2.6 miles upriver from the mouth.

A complex interaction of physical forces acts on the flats including those exerted by a high tidal range, glaciofluvial influences from Eagle River, sedimentation from the turbid waters of Knik Arm and Eagle River, and the subarctic coastal climate of south-central Alaska (Lawson *et al*. 1996). Anthropogenic influences on the flats include military training, both historic (ERF has been an Army artillery impact area since about 1945) and current (winter firing of artillery into flats), as well as activities associated with the remediation of white phosphorus residues.

ERF has been characterized into seven major physiographic zones and 15 vegetation classes (Figure 2-2) representing 67 species of vascular plants. The physiographic zones include: Coastal (littoral coastline of ERF along Eagle Bay); Riverine (Eagle River and banks); Mudflat/tidal gully (silt-covered mudflats directly bordering Eagle River and along the coast); Interior Lowland (well vegetated low embayment occupying southern 30% of ERF); Sedge Meadow (narrow band of continuous sedge meadow between mudflats along river and pond/marsh); Pond/marsh (area of lower elevation along the middle and outer edges of the flats characterized by permanently inundated ponds and associated marshes); and Border (abrupt upland border of ERF; Racine and Brouillette 1995).

Figure 2-1: Location of Eagle River Flats Impact Area, Fort Richardson, AK

Figure 2-2. ERF Impact Area Topography and Vegetative Rescources



In 1980 the presence of an unusually large number of waterfowl carcasses was observed on the flats. No other species, including marine mammals, were observed to be affected. Growing concern over these mysterious deaths led to initial environmental investigations beginning in 1982 followed by the 1987 formation of an interagency task force[1] charged with finding the cause of the mortality and recommending options for remediation (CH2M Hill 1997). Further investigations culminating in 1990 identified exposure to white phosphorus (WP) particles, deposited in ERF sediments following detonation of smoke-producing artillery ammunition, as the cause of the waterfowl mortality (Racine *et al*. 1992). Dabbling waterfowl, such as teal and mallards, and swans were the primary species affected. The primary route of exposure for dabbling ducks and swans is the incidental ingestion of the dense, water-insoluble particles while feeding in contaminated, shallow ponds. The affected birds either confuse the WP particles with their natural food items, such as seeds or insects, or accidentally ingest them along with pond sediments. In 1990, the Army stopped the use of WP rounds during training in wetlands nationwide as a result of these findings.

In 1990, the Army voluntarily implemented a temporary firing suspension of all weapon systems and munitions into ERF Impact Area to reduce waterfowl mortality. The temporary suspension of firing did not have any effect in lowering waterfowl mortality and the Army sought to resume firing. During 1991, the Army conducted an environmental assessment (EA) to determine environmental impacts related to resuming firing at ERF Impact Area. Data indicated that WP could be exposed and/or redistributed if HE rounds were used at ERF during times other than when sediments and ponds were frozen over. Based on this environmental analysis, the Army chose to limit firing of HE artillery and mortar ammunition at ERF Impact Area to 1 November through 31 March. These limitations are currently in effect.

HE munitions utilizing proximity fuzes set to explode between 100 feet and 200 feet above ground level are allowed once the majority of waterfowl have left in the fall and before they begin to arrive in the spring, and HE munitions utilizing point-detonating fuzes are allowed when ice thickness is sufficient to protect underlying sediments from disturbance (USAG Alaska 2001a, 2001b). The current requirements are: two inches of ice cover or frozen sediment to enable firing of 60-mm and 81-mm mortars; and five inches of ice cover or frozen sediment to enable firing of 105-mm howitzers or 120-mm mortars (USAG Alaska 2005a). Throughout this document, the term “unfrozen conditions” is used to refer to times when these ice conditions are not met. Use of WP at ERF is prohibited.

Additionally, the Army committed to studying, monitoring and cleaning up WP at ERF. Sediment and surface water samples were collected from various locations within ERF during 1989, 1990, and 1993. Samples were analyzed for volatile organic, semi-volatile organic, PCBs, and inorganic compounds. Trace amounts of several organic compounds were detected in sediment, but not at concentrations deemed harmful to humans or wildlife. Additionally, none of the water samples collected at the site exhibited elevated levels of any contaminants.

In 1994 ERF was designated as one of four Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) cleanup sites on Fort Richardson and given the working title of Operable Unit C (OUC). A comprehensive Remedial Investigation completed in 1996 concluded that the primary chemical of concern in OUC was WP and recommended that remedial action concentrate on WP-contaminated ponds (hot ponds) and be driven by waterfowl mortality (CH2M Hill 1997). The resulting Record of Decision (ROD) for ERF (accepted by U.S. Environmental Protection Agency [USEPA] and the Army in 1998) outlined short term and long term waterfowl mortality objectives and identified the chosen remedial treatment as the temporary draining of pond water in hot ponds to allow sediment drying and consequent

[1] The ERF task force included representatives from the U.S. Army, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, and Alaska Department of Environmental Conservation.

WP sublimation and oxidation. Those ponds that could not be drained were to be capped with a layer of gravel approximately 60 to 80 cm thick laid over a geotextile layer, to prevent waterfowl access and protect WP from disturbance. Remedial action began in the spring of 1999 and will be completed in the spring of 2010. Results to date show the successful remediation of nearly all previously identified hot ponds (totaling over 56 acres) with only a small number remaining to be capped in the 2009-2010 winter season. Estimated bird mortality on ERF has decreased significantly during the remediation period. The Army's success in active treatment (pond pumping and ditching) of WP-contaminated areas has reduced waterfowl mortality rates to lower than the long-term remedial action goals established in the ROD.

In addition to monitoring waterfowl mortality on ERF, much work was done to identify possible movement of WP into Eagle River and Knik Arm. WP particles are persistent in saturated, low oxygen sediment like that found in ERF (Racine *et al*. 1992) and may be re-suspended and potentially transported by tidal activity. Although trace amounts of WP have been detected in tidal gully sediments (but not in the water) all sediment and water samples from Eagle River and Knik Arm have been WP-free (CH2M Hill 1997; Collins *et al*. 2002).

In accordance with a National Pollution Discharge Elimination System[2] (NPDES) permit application accepted by the USEPA in 2002, the Army also voluntarily collected and analyzed water samples taken from Eagle Bay in order to monitor the discharge of ERF for other chemical constituents of military munitions. Six years of data collected from 2002 through 2008 indicated no difference between the water released from ERF and that of the background system in Goose Bay (USAG Alaska 2003, 2005b, 2006a, 2006b, 2007b).

White phosphorus is reported to moderately bioconcentrate in aquatic organisms but exhibits much lower bioconcentration factors[3] when compared with other toxic chemicals. Rapid depuration of white phosphorus from contaminated cod was observed once the fish were removed from water contaminated with white phosphorus and placed into clean water (summarized in *Sciences International* 1997).

A series of three studies conducted on the flats found no significant evidence of bioaccumulation in either fish (sticklebacks) or macroinvertebrates collected in areas with known WP contamination (USAEHA 1993 and 1995; Sparling 1994) and concluded that WP was not affecting ERF macroinvertebrate diversity, species richness or numbers per unit area (USAEHA 1995). Additionally, in 2007 and 2008, USAG-AK personnel conducted fish tissue sampling within the tidally affected waters of Eagle River. In 2007, a total of 54 samples of adult (sockeye N=12; coho N=5; chum N=6; pink N= 3, Chinook N=1) and juvenile (coho N=27) salmon were sent to the U.S. Army Center for Health Promotion and Preventative Medicine (USACHPPM) laboratories for screening for the munitions residues, 2,4-Dinitrotoluene, 2,4,6-Trinitrotoluene, and RDX. Results from this screening showed no presence of munitions residues in the samples[4]. In 2008, samples of bottomfish and smelt (saffron cod, starry flounder, snailfish, eulachon and rainbow smelt) were sent to USACHPPM for analysis of the same analytes. Results from these analyses were negative for all tested contaminants.

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[2] NPDES as implemented by the Clean Water Act. Primacy for administering this program in Alaska was recently delegated from the USEPA (Region 10) to the Alaska Department of Environmental Conservation.

[3] Bioconcentration factor (BCF) is the ratio of a given chemical concentration in the tissues of an organism vs. the concentration of that same chemical in the surrounding water. For instance, a fish that exhibits a BCF of 10 for chemical X, has incorporated 10 times the concentration of X than is found in the surrounding water. Examples of reported BCFs of white phosphorus include: Atlantic Cod (*Gadus morhua*) BCF=44 (whole body); Atlantic Salmon (*Salvo salvur*) BCF=22 (muscle) (summarized in *Sciences International* 1997).

[4] One sample of juvenile coho muscle did show elevated levels of RDX. A duplicate sample from the same fish however, was sent to the lab and returned with levels of RDX below the detection limit. The assumption was made that the initial sample had been contaminated sometime between the field and the lab.

Cook Inlet Beluga Whale

Beluga whales are circumpolar in distribution and occur in seasonally ice-covered arctic and subarctic waters. Belugas occur along the coast of Alaska, except the Southeast panhandle region and the Aleutian Islands. Five distinct stocks are currently recognized in Alaska: Beaufort Sea, eastern Chukchi Sea, eastern Bering Sea, Bristol Bay, and Cook Inlet (Angliss and Outlaw 2005). The Cook Inlet stock is the smallest and most isolated in Alaska, based on the degree of genetic differentiation between this stock and the four others (O'Corry-Crowe *et al*. 1997).

The range of Cook Inlet belugas has been defined as the waters of the Gulf of Alaska north of 58° N and freshwater tributaries to these waters, based on available scientific data in 2000 (65 FR 34590, 31 May 2000; MMPA Sec. 216.15(g)). Few beluga sightings occur in the Gulf of Alaska outside Cook Inlet. Laidre *et al.* (2000) summarized available information on prehistoric to current distribution of belugas in the Gulf of Alaska, and, with the exception of Yakutat, sightings have been rare and sporadic given the extent of the survey efforts. Of 169,550 cetacean sightings recorded in the Gulf of Alaska prior to the year 2001, excluding Cook Inlet, only 44 were beluga (Laidre *et al.* 2000), indicating they are extremely rare in the Gulf of Alaska outside Cook Inlet. Calkins (1989) described belugas in Cook Inlet, Prince William Sound, Yakutat Bay, and throughout the coastal waters of the Gulf of Alaska, from the northern portions of Kodiak Island to Yakutat.

Beluga whales in Cook Inlet declined dramatically between 1994 and 1998, from an estimated 653 whales to an estimated 347 whales. After receiving several petitions to list the Cook Inlet population of beluga whales as endangered under the Endangered Species Act (ESA), the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) completed a Status Review of the Cook Inlet beluga whale (*Delphinapterus leucas*) in November 2006. In this review NMFS reaffirmed that the Cook Inlet beluga whale is a Distinct Population Segment (DPS) and determined it is in danger of extinction throughout its range. In a proposed rule dated 20 April 2007 NMFS officially proposed listing the Cook Inlet beluga whale as endangered under the ESA. The rule designating the Cook Inlet beluga whale as endangered was finalized on 22 October 2008 and took effect on 22 December 2008. NMFS is currently undertaking another rulemaking process to designate critical habitat for the species, though no final determination has been made regarding this issue.

Description and Taxonomy

Beluga whales, members of the family Monodontidae, are small, toothed whales that are white in color as adults. Beluga calves are born dark to brownish gray and lighten to white or yellow-white with age. Adult Cook Inlet beluga whales average between 12 and 14 feet in length, although native hunters have reported some may reach as much as 20 feet (Huntington 2000). Adult beluga males may weigh up to 3,300 pounds while females are typically smaller, weighing up to 3,000 pounds (Nowak 2003). The cervical vertebrae in belugas are not fused, allowing them to turn and nod their heads. Instead of a dorsal fin, belugas have a tough dorsal ridge. They also exhibit a relatively small head, fluke, and flippers.

Biology and Behavior

Beluga whales typically give birth to a single calf every two to three years, after a gestation period of approximately 14 months. Most of the calving in Cook Inlet is assumed to occur from mid-May to mid-July, although Native hunters have observed calving from April through August (Huntington 2000). Young belugas are nursed for two years and may continue to associate with their mothers for a considerable time thereafter (Reeves *et al*. 2002).

Belugas calves are dark brown or blue-gray, and become lighter in color as they reach adulthood. Sexual maturity can vary from 4 to 10 years for females and 8 to 15 years for males. It is believed that beluga whales may live more than 30 years, although recent discoveries pertaining to ageing techniques may lead

scientists to effectively double these estimates. Historically, it was believed that beluga whales deposited two growth layer groups in their teeth per year. Recent studies, however, state that only one layer is deposited per year (NMFS 2008).

Beluga whales normally swim about 2 to 6 miles per hour, but when pursued, can attain a speed of 14 miles per hour. While they usually surface to breathe every 30 to 40 seconds, radio-tracking studies show that they also routinely dive for periods of 9.3 to 13.7 minutes and to depths of 66 to 1,140 feet, presumably for feeding (Nowak 2003).

Beluga whales have a well-developed sense of hearing and echolocation. Most sound reception takes place through the lower jaw, which is hollow at its base and filled with fatty oil. Sounds are conducted through the lower jaw to the middle and inner ears, then to the brain. Belugas can hear over a large range of frequencies, from about 40 Hz to 150 kilohertz (kHz) (Au 1993; Johnson 1967; Johnson *et al*. 1989; Scheifele 1987; White *et al.* 1978). Their most acute hearing occurs at frequencies between about 9 kHz and 90 kHz. Beluga whales conduct communication and echolocation at relatively high frequencies where they have a lower hearing threshold and greater hearing sensitivity. Studies have shown belugas to emit communication calls with an average frequency range from about 2.0 to 5.9 kHz. Echolocation is generally conducted at frequencies greater than 40 kHz. Studies have shown that belugas generally produce signals with peak frequencies of 40 to 120 kHz during echolocation, and the intensity of the signal can change with location and background noise levels. Echolocation is presumably used to avoid obstacles and to search for prey (Nowak 2003).

Belugas are known to produce a variety of sounds. Vocalizations can be heard above water and include low liquid trills, whistles, and clicks. Because of their loquacious nature, beluga whales are sometimes called sea canaries (Nowak 2003).

Belugas are extremely social animals that typically interact together in close, dense groups. Groups of 10 to more than 100 whales have been observed in Cook Inlet. It is unknown whether these represent distinct social divisions (NMFS 2008) although Reeves *et al*. (2002) mentioned the groups are often of the same sex and age class. Traditional knowledge also suggests that belugas maintain family groups (Huntington 2000).

Population Abundance and Trend

According to NMFS (2008), the Cook Inlet population of beluga whales has probably always numbered fewer than several thousand animals, but in recent years has declined significantly from its historical abundance. It is difficult, however, to accurately determine the magnitude of decline due to the paucity of information on the beluga whale population that existed in Cook Inlet prior to development of the region, or prior to modern subsistence whaling by Alaska Natives. With no reliable abundance surveys conducted prior to the 1990s, scientists must estimate historical abundance based on what little data exist. Relying on a survey conducted in portions of Cook Inlet during 1979, Calkins (1989) estimated a population of 1,293 beluga whales. This overall abundance estimate provided by Calkins represents the best available information on historical abundance.

Comprehensive, systematic aerial surveys of beluga whales in Cook Inlet began in 1993 with the goal of determining the overall abundance and population trend for the species. A decline in abundance of around 47 percent, from an estimate of 653 whales to 347 whales, was documented between 1994 and 1998 (Hobbs *et al.* 2000). After legislative measures were established in 1999 to regulate subsistence harvests, NMFS expected that the population would grow at a rate between 2 and 6 percent. Abundance estimates from aerial surveys (1999-2008) indicate this level of growth did not occur. Looking at the population estimates since the regulation of subsistence harvests (1999-2008) NMFS (2008) has documented a population decline of 1.5 percent per year. Based on 2008 aerial surveys, NMFS calculated an overall

abundance estimate of 375 whales for the Cook Inlet population. A precise comprehensive statistical assessment of population trend is not possible given differences in survey methods and analytical techniques prior to 1994. A straight comparison of the 1,293 beluga estimate from 1979 to the 375 belugas estimated for 2008 would indicate a 71 percent decline in 30 years, but with unspecified confidence.

Within Knik Arm, beluga abundance is highly variable. Fourteen years of aerial surveys conducted during the first weeks of June by NMFS show beluga abundance ranging from 224 to 0 whales (NMFS 2008). Surveys conducted by boat in 2004 reported variable abundance counts in Knik Arm for August through October; 5-130 whales in August, 0-70 whales in September, and 0-105 whales in October (Funk *et al*. 2005).

Cook Inlet Beluga Whale Habitat

Beluga whales generally occur in shallow, coastal waters, often in water barely deep enough to cover their bodies (Ridgway and Harrison 1981). While it is difficult to quantify the importance of various habitats in terms of the health, survival, and recovery of the Cook Inlet beluga whale, NMFS believes certain areas are particularly important. As part of their conservation strategy detailed in the 2008 Conservation Plan, NMFS assigned relative values to habitats in Cook Inlet based on beluga whale usage (NMFS 2008). Three "valuable habitat" types were stratified and characterized as follows (Figure 3-1):

(1) Type 1 Habitat – This habitat region encompasses all of upper Cook Inlet northeast of a line three miles southwest of the Beluga River across to Point Possession. Type 1 habitat is considered the most valuable due to the high concentrations of beluga whales, which use these areas from spring through fall for foraging and nursery habitat. This region is characterized by shallow tidal flats, river mouths, and estuarine areas. Type 1 habitat also has the greatest potential for anthropogenic impacts to the Cook Inlet beluga whale population.

(2) Type 2 Habitat – This habitat region is located south of Type 1 habitat and north of line at 60.2500 north latitude. It also follows the tidal flats south along the west side of the Inlet into Kamishak Bay and down to Douglas Reef, and includes an isolated section of Kachemak Bay. Type 2 habitat includes areas with known high fall and winter use, as well as some areas of less concentrated spring and summer use.

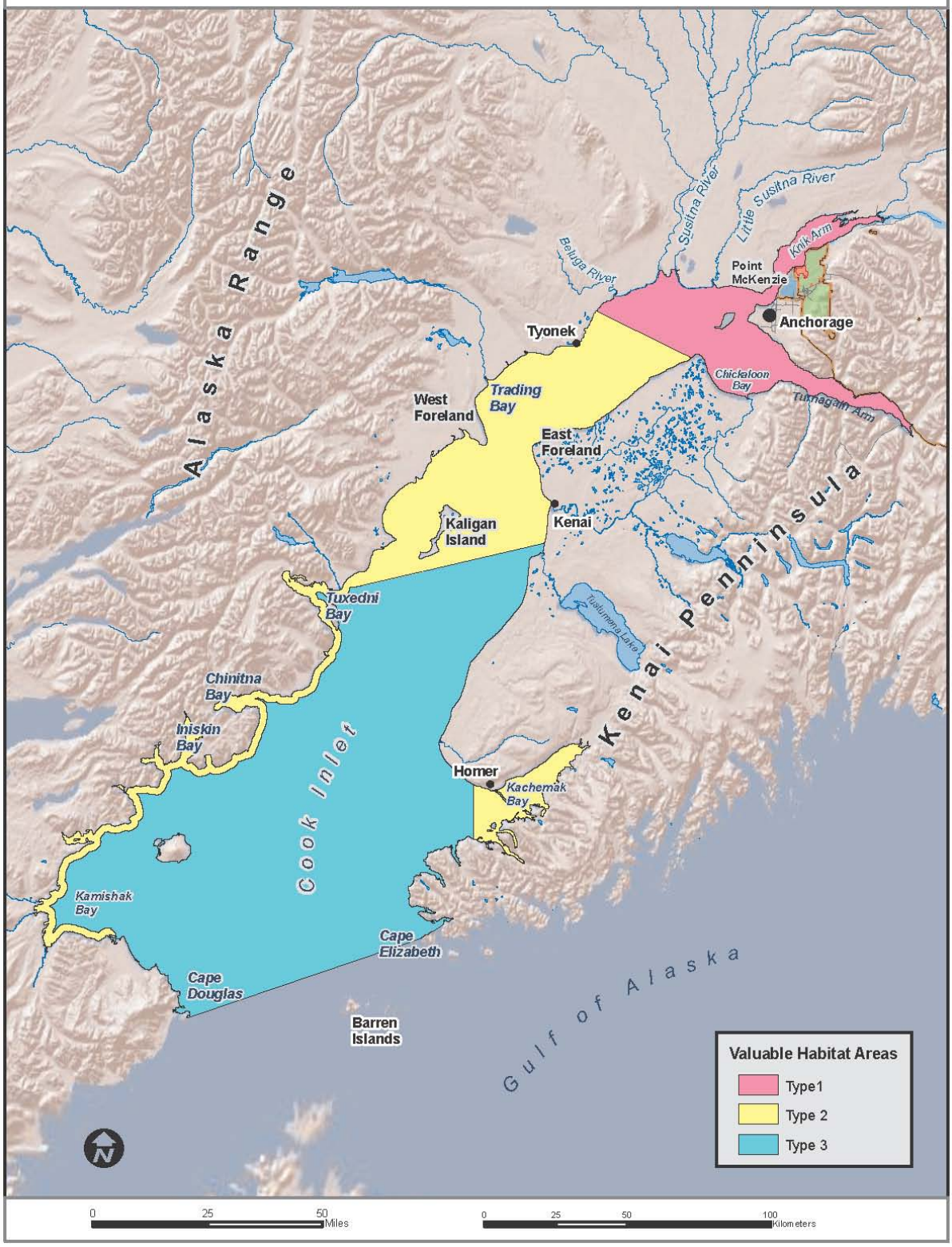
(3) Type 3 Habitat – This habitat region encompasses the remaining portions of Cook Inlet south of 60.2500 north latitude to a southern boundary stretching from Cape Douglas to Elizabeth Island. This region includes the areas of known historical usage by beluga whales.

The upper Cook Inlet, including all marine waters within the action area of this Biological Assessment, is designated "Type 1" habitat, a designation indicating the most valuable habitat type for Cook Inlet beluga whales.

Distribution

Little information is available on the distribution of beluga whales in Cook Inlet prior to 1970; however, in the 1970s and 1980s, beluga sightings occurred across much of mid and upper Cook Inlet (Calkins 1984). For instance, sightings in the Kenai River area were common, and beluga concentrations were reported in Trading Bay and Kachemak Bay (Calkins 1984). Systematic aerial surveys have been conducted by NMFS during summer months since 1993. These surveys show that in the 1990s the summer distribution diminished to only the northernmost portions of Cook Inlet (Rugh *et al.* 2000).

Figure 3-1: Valuable Habitat Areas Identified for Cook Inlet Beluga Whales



To identify current Cook Inlet beluga habitat use, particularly in winter, NMFS researchers conducted a satellite tracking project from 1999 through 2003 (AFSC 2009). Satellite positioning tags were placed on 18 beluga whales between 1999 and 2002. All tagged whales remained in Cook Inlet during the observation periods indicating that belugas occupy Cook Inlet year round and do not engage in the seasonal migrations exhibited by northern beluga populations. The majority of the activity recorded during these tracking studies occurred in Upper Cook Inlet, north of the Forelands, with occasional use of areas as far south as Chinitna Bay.

In the Knik Arm of Cook Inlet, beluga whales generally are observed arriving in May and often using the area all summer, feeding on various salmon runs and moving with the tides. There is more intensive use of Knik Arm in August and through the fall, coinciding with the coho run. Beluga whales often gather in Eagle Bay between the months of May and November (Hobbs *et al*. 2005) and have been observed in Eagle River from June to November as far inland as 1¼ miles upstream (CH2M Hill 1997). The whales gather elsewhere on the east side of Knik Arm and sometimes in Goose Bay (about 4 miles from ERF Impact Area) on the west side of Knik Arm. They often retreat to the lower portion of Knik Arm during low tides (NMFS 2008).

Feeding Habitat

According to NMFS (2008), beluga whales in Cook Inlet often aggregate near the mouths of rivers and streams where salmon runs occur during summer and fall. Their winter distribution does not appear to be associated with river mouths, as it is during the warmer months, but instead with the deeper waters in mid Inlet. Fish surveys in Knik Arm have identified the presence of adult and juvenile salmonids, 3 and 9-spine stickleback and saffron cod among other species (Pentec Environmental 2005). These studies suggest the following list of prey items for belugas in the Knik Arm:

April – eulachon, saffron cod

May – eulachon, Chinook salmon, saffron cod

June – Chinook salmon, saffron cod (questionable)

July – Pink, chum, sockeye and coho salmon

August – coho salmon, saffron cod

September – saffron cod, longfin smelt

October – saffron cod, longfin smelt

November – saffron cod

The stomach contents of 21 Cook Inlet belugas harvested or stranded in Cook Inlet between 1995 and 2007 found the following species (Hobbs *et al*. 2008):

April – invertebrates [polychaetes, shrimp (*Crangon franisconrum*) and crab (*Chionoecetes bairdi*)], saffron cod, Pacific cod, walleye pollock, eulachon, and salmon species

May – Pacific cod and salmon species

June – no prey items identified

July – invertebrate species, coho salmon and salmon species

August – longnose sucker, yellowfin sole, chum salmon, coho salmon and salmon species

September – saffron cod, cod species, coho salmon and salmon species

October – invertebrate species, Pacific staghorn sculpin, saffron cod, walleye pollock, cod species, yellowfin sole, starry flounder, chum salmon and salmon species

November – no prey items identified

USAG-AK personnel sampling the mouth of Eagle River in 2007 and 2008 collected 3-spine stickleback, 9-spine stickleback, saffron cod, starry flounder, snailfish spp, rainbow smelt, eulachon, adult salmonids of all species, and sand shrimp.

Salmon escapement numbers and commercial harvest have fluctuated widely throughout the last 40 years and there is no clear correlation between salmon runs and beluga whale population numbers. Dense concentrations of prey appear essential to beluga whale feeding behavior, but the relationship between beluga whale concentrations and salmon concentrations is not fully known (NMFS 2008). Because beluga whales do not always feed at the streams with the highest runs of fish, water depth and fish density may be more important than sheer numbers of fish in their feeding success (NMFS 2008). The channels and shallow water at some river mouths may concentrate salmon and funnel them past waiting beluga whales.

Breeding and Calving Habitat

Very little is known about beluga whale breeding behavior, and it is difficult to identify beluga breeding habitat with any certainty. It is thought that the shallow waters of the upper Inlet may provide important calving and nursery areas (NMFS 2008). The shallow tidal flats provide warmer water temperatures, which may benefit newborn beluga calves that lack the thick insulating blubber layer of adults. Alaska Natives described calving areas within Cook Inlet as the northern side of Kachemak Bay in April and May, off the mouths of the Beluga and Susitna River in May, and in Chickaloon Bay and Turnagain Arm during summer (Huntington 2000).

USAG-AK Beluga Whale Monitoring in Eagle Bay and Eagle River

The Army has historically taken an interest in the beluga whale and has recorded sightings over the past two decades. In recent years, more intensive field surveys for beluga whales have been conducted from June through October. In 2005, USAG-AK developed standard operating procedures and protocols for monitoring beluga whales in and around ERF Impact Area. In 2008 the survey methodology was modified to allow for the collection of more statistically rigorous data. Section 3.3.1 details the observation protocols used from 2005-2007 and 2008-present.

Survey Methodology

2005-2007

Field surveys for beluga whales took place from June through October at Cole Point (training area 415) or Observation Point Fagen (training area 407). When whales were observed from the observation points, survey personnel requested clearance to enter the ERF Impact area from Fort Richardson Range Control. Once clearance was granted, survey personnel proceeded to a pre-cleared area overlooking the mouth of the Eagle River and commenced data collection. Information collected included date, time, observer, location, optics used, environmental conditions, bearing to whale group, number of whales, activity, grid position of group, direction of travel, and notes on other wildlife present, aircraft, or general comments on beluga behavior, etc. In addition to observations, photographic or video-graphic documentation was obtained when feasible.

While this approach did provide valuable observations on beluga presence and behavior, it did not provide a means for rigorous statistical analysis of the data collected. Thus, in 2008 the methodology was modified in an attempt to collect more statistically meaningful data.

2008-Present

Whale observations are carried out using a systematic sampling design consisting of a group follow protocol and focal group sampling method. Observers follow a group of whales over the course of a 20 minute sampling round using binoculars and/or high powered spotting scopes. Group activity is defined as what most (>50%) of a whale group is engaged in during the course of the sampling round. The various categories of whale behaviors are strictly defined prior to sampling to minimize any ambiguities and variation between observers. Whales are classified as white, gray or calf and the location of whale groups at the start and end of each sampling round is classified using a grid superimposed on a map of Eagle Bay and Eagle River.

Use of the modified sampling protocol has several limitations that should be mentioned. The quantification of whales into color classes is always biased towards "white" animals due to easier detectability, and is heavily influenced by prevailing survey conditions (e.g. visibility, precipitation, light conditions). Calves may be underrepresented due to difficulty in distinguishing between young and "gray" animals, especially at long distances. Because calves frequently surface in very close contact with the cow, often on the side opposite from the observer, they can be difficult to observe. Group follow protocol may also be biased towards more obvious behaviors or more visible animals. Moreover, behavioral sampling is limited to activities above the water line due to the extreme turbidity of Knik Arm. Finally, military training on nearby ranges can prevent access to ERF Impact Area, thus disrupting the distribution of summer and fall observations.

USAG-AK supplements its visual observation data by deploying remote, color, motion-sensitive cameras with infrared illumination at low light to collect presence/absence data on belugas during times when observers are not present. A minimum of two cameras are deployed on the north bank of Eagle River – one at the mouth facing SSW (perpendicular to water flow) and one approximately 200 meters upstream from the mouth (facing west). Cameras are set on time-lapse mode with a one minute time increment between shots and with the motion-detection feature also enabled. Camera times are synched with each other and all other devices used to record time during the observational period (watches, video cameras, etc). Each camera is checked for obvious external problems (alignment change, lens fouling, etc.) daily when possible, and serviced (change card and batteries) every two weeks.

USAG-AK technicians download the data from the camera cards onto a dedicated external hard drive and back up on a redundant drive. Upon removal of a camera from the field, images from each card are analyzed as soon as possible, within two weeks at maximum. . Analyses are performed by either one experienced team member who has analyzed at least one full season's worth of camera data (or at least 30,000 images), or alternatively by two team members who have as individuals analyzed less than 30,000 images each. In analyzing the data, team members scroll through a series of photos looking primarily for presence of beluga whales and harbor seals in the river. They then compile data indicating camera number, folder name, starting time and date of the folder, presence of beluga(s) or other marine mammals, any other unusual event (e.g. boat passage, other mammalian presence, etc.), and the date and end time of each folder. Entries regarding the presence of a beluga include notations of date, time, image number, number of whales, color of whales and tidal state. Analysts also note whether observers were present on the flats during the dates covered in a folder, and if so, during which times. All data collected is entered into a Microsoft Access database saved on the two external drives mentioned above.

Results of Beluga Whale Monitoring Efforts on Fort Richardson, 1988 – Present

Limited information is available on beluga whale monitoring efforts by USAG-AK staff from the 1980s, 1990s, and early 2000s. Table 3-1 lists incidents of beluga whale sightings recorded by USAG-AK personnel from 1988 and 1991. Personnel have maintained more complete records for beluga whale observations from 2005 to the present.

Beluga Whale Sightings In or Near ERF Impact Area from 1988 and 1991

Date	Location[1]
September 1988	Drainage slough northwest corner of Eagle River Flats
18 June 1991	Eagle Bay
26 June 1991	Knik Arm near Goose Bay
13 July 1991	Eagle Bay and mouth of Fire Creek
5 August 1991	Eagle Bay/Eagle River mouth
9 August 1991	Approximately 0.6 miles up Eagle River
20 August 1991	Knik Arm near Eagle Bay
23 August 1991	Eagle Bay (about 20-25) and approximately 1.25 miles up Eagle River
29 August 1991	Eagle Bay and approximately 0.6 miles up Eagle River
31 August 1991	1.25 miles up the Eagle River[2]
21 September 1991	Mouth of Eagle River
11 October 1991	Eagle Bay near mouth of Eagle River
21 October 1991	Approximately 0.3 miles up Eagle River
12 November 1991	Mouth of Eagle River

Source: Gossweiler 1991.
[1]All but one sighting was from either fixed wing aircraft or helicopter.
[2]Ground observation.

USAG-AK biologists conducted beluga whale monitoring surveys in and around ERF Impact Area on 10 occasions during the 2005 field season from June through October, but they did not observe whales during these surveys. Four additional aerial surveys conducted in August, September, and October of the same year resulted in multiple beluga whale sightings in the Knik Arm adjacent to the ERF Impact Area (Clevenger 2006).

During 2006, staff conducted surveys on 19 days from May through October. Beluga whales were observed during three of these surveys, each occurring during late August and early September. A maximum of eight belugas were sighted at one time in the river itself while a maximum of 15 to 20 belugas were sighted in Eagle Bay. Observed beluga activity in Eagle River included traveling (58% of observations noted), milling (32% of observations), feeding or suspected feeding (7%) and other activities including one incident of spyhopping (coming out of the water vertically and momentarily staying out of the water) and one interaction with a harbor seal (2%). Observed beluga activity in Eagle Bay was predominantly traveling (86% of observations noted). Milling accounted for 14% of the observations. Feeding activity was suspected if fish were observed in close proximity to a whale or if an unusual amount of subsurface activity was observed. The majority of beluga activity in Eagle River occurred within the first 0.3 miles of river (river miles) upstream from Eagle Bay although two whales were observed traveling up to 0.75 miles upstream (river miles) (Garner 2007). Table 3-2 summarizes beluga observations from 2005 and 2006.

Beluga Whale Sightings In or Near ERF Impact Area in 2005 and 2006

Date	Location
August 22, 2005	Adjacent to Eagle River Flats[1]
September 6, 2005	Adjacent to Eagle River Flats[1]
October 4, 2005	Adjacent to Eagle River Flats[1]
October 14, 2005	Adjacent to Eagle River Flats[1]
August 29, 2006	Eagle Bay, Mouth of Eagle River, Eagle River
August 30, 2006	Eagle River
September 7, 2006	Mouth of Eagle River

Sources: Clevenger 2006 and Garner 2007.
[1]Beluga whales were not sighted within Eagle Bay, the mouth of Eagle River, or within Eagle River.

USAG-AK also conducted beluga whale surveys in Eagle River and Eagle Bay from May through October 2007. The results are shown below in Table 3-3. Beluga whales were sighted on 43% of all observation days and the mean number of whales counted over the course of the field season was 7.5 individuals.

Beluga Sightings in Eagle Bay and Eagle River in 2007

Date	Number of Belugas	Activity	Location
15 June 2007	2	Travelling	1 mile northeast of mouth of Eagle River
16 June 2007	2	Travelling	Eagle Bay
18 July 2007	1	Feeding	Eagle River
3 August 2007	12	Milling	1 mile northeast of mouth of Eagle River
7 August 2007	30	Milling	Mouth of Eagle River
8 August 2007	27	Milling	Mouth of Eagle River
9 August 2007	31	Feeding	Mouth of Eagle River
10 August 2007	33	Travelling	North end of Eagle Bay
11 August 2007	20	Milling	Mouth of Eagle River
13 August 2007	35	Travelling	Moving from Eagle River into Eagle Bay
15 August 2007	15	Milling	Eagle River
17 August 2007	22	Milling	Eagle River
20 August 2007	10	Milling	Near mouth of Eagle River
21 August 2007	6	Travelling	1/2 mile southwest of Eagle River mouth
24 August 2007	26	Milling	1 mile northeast of mouth of Eagle River
27 August 2007	23	Milling	1/2 mile north of Eagle River mouth
30 August 2007	11	Travelling	Moving out of Eagle River to the south

Date	Number of Belugas	Activity	Location
10 September 2007	21	Milling	300 yards out from Eagle River mouth
14 September 2007	12	Milling	Near mouth of Eagle River
16 September 2007	7	Milling	1 mile north of Eagle River mouth
23 October 2007	14	Travelling	1 mile southwest of Eagle River mouth

The table below lists the results of the most recent beluga whale survey conducted by USAG-AK wildlife biologists from June through November 2008. Beluga whales were sighted on 38% of all observation days and the mean number of whales observed during the field season was 13.6 individuals.

2008 Beluga Sightings in Eagle Bay and Eagle River

Date	Number of Belugas	Activity	Location
28 July 2008	12	Milling	Eagle Bay
29 July 2008	15	Travelling	Eagle Bay
30 July 2008	24	Travelling	Eagle Bay
31 July 2008	8	Milling	Eagle Bay
4 August 2008	13	Diving	Eagle Bay
11 August 2008	34	Travelling	Eagle River
12 August 2008	24	Diving	Eagle River
13 August 2008	36	Milling	Eagle River Mouth
18 August 2008	66	Milling	Eagle River
19 August 2008	33	Travelling	Eagle River
20 August 2008	68	Travelling	Eagle River
21 August 2008	4	Travelling	Eagle Bay
29 August 2008	45	Travelling	Eagle River Mouth
1 September 2008	18	Diving	Eagle Bay
7 September 2008	8	Diving	Eagle River
8 September 02008	15	Diving	Eagle River
9 September 2008	18	Milling	Eagle River
10 September 2008	16	Milling	Eagle River
11 September 2008	28	Diving	Eagle River
13 September 2008	17	Milling	Eagle River
15 September 2008	38	Travelling	Eagle River
17 September 02008	12	Travelling	Eagle River

Date	Number of Belugas	Activity	Location
18 September 2008	17	Milling	Eagle River
25 September 2008	28	Travelling	Eagle River Mouth
29 September 2008	8	Travelling	Eagle River
30 September 2008	15	Travelling	Eagle River
8 October 2008	10	Milling	Eagle Bay
9 October 2008	6	Milling	Eagle Bay
28 October 2008	23	Travelling	Eagle River
30 October 2008	21	Travelling	Eagle Bay
6 November 2008	14	Travelling	Eagle Bay
13 November 2008	2	Diving	Eagle River

Cook Inlet beluga whale habitat as inferred from 2007 sightings in Eagle Bay and Eagle River.

Other Special Status Fauna
A delisted species, the American peregrine falcon (*Falco peregrinus anatum*), is known to migrate through the area. Though not found during the last raptor inventory (Schempf 1995), it was recorded during field studies at Eagle River Flats in May and August 1991–1992 (CH2M Hill 1994). Another delisted species, the Arctic peregrine falcon (*Falco peregrinus tundrius*), has not been observed but could also potentially occur on Fort Richardson.

Another federally delisted species, the bald eagle (*Haliaeetus leucocephalus*), is common locally. Although its status does not apply in Alaska, it is afforded special protection by USAG-AK in accordance with the Bald Eagle Protection Act (Quirk et al. 1978). In the raptor inventory (Schempf 1995) bald eagles were the most frequently seen species.

Two other avian species, the trumpeter swan *(Cygnus buccinator*) and the golden eagle (*Aquila chrysaetos*), are of special concern for wildlife management on Fort Richardson. As the world's largest waterfowl species, the trumpeter swan is a migrant on Fort Richardson, stopping in Eagle River Flats during both spring and fall migrations. The golden eagle is a resident of the alpine habitats of the post. (Quirk et al. 1978).

F2.2.1.3.3 Donnelly Training Area Special Status Fauna
The American peregrine falcon (*Falco peregrinus anatum*) was delisted in 1999. Raptor surveys conducted in 1998 determined there is limited peregrine falcon nesting habitat on Donnelly Training Area (Anderson et al. 1998). However, a nest was documented on Donnelly Training Area in 2004 on a bluff above the Delta River and peregrine falcons have occasionally been seen during migration.

The U.S. Forest Service lists the trumpeter swan (*Cygnus buccinator*) and osprey (*Pandion haliaetus carolinensis*) as sensitive species. Trumpeter swans nest on Donnelly Training Area and surveys have documented increases in nesing populations across Alaska including on USAG-AK lands (Ajmi and Payne 2006). Ospreys have been documented on Donnelly Training Area during migration.

Four passerines listed as species of special concern by the state of Alaska have been confirmed on the withdrawn lands. They are the olive-sided flycatcher (*Contopus borealis*), gray-cheeked thrush (*Catharus minimus*), Townsend's warbler (*Dendroica townsendii*), and blackpoll warbler (*Dendroica striata*). All of these species have been documented breeding on Donnelly Training Area. An annual Breeding Bird Survey route and periodic updates to other bird surveys are used to monitor these species on Donnelly Training Area.

Eighteen species confirmed on Fort Greely and Donnelly Training Area are included on the Boreal Partners in Flight Working Group as target or priority species for monitoring because of declines in populations noted across the Americas. There are no legal requirements to manage these species although all migratory bird species are afforded some protection under the Migratory Bird Treaty Act (Ruth Gronquist, Bureau of Land Management, personal communication).

F2.2.1.4 Special Status Flora

F2.2.1.4.1 Fort Wainwright

A comprehensive survey of rare plants was included as part of the floristic inventory for Fort Wainwright conducted in 1995. Only one plant species on the federal endangered species list is known to occur in Alaska. Its current and historic range does not include Fort Wainwright, and a report released in 1996 indicated that there are no federally listed endangered or threatened plant species on Fort Wainwright (Tande et al. 1996).

There are, however, 16 vascular plant species of concern that are known to occur on Fort Wainwright. These plants are being tracked by the Alaska Natural Heritage Program because they are thought to be uncommon or rare in Alaska and/or uncommon or rare globally (Alaska Natural Heritage Program 2006). These species are listed below in Table F2-1 and are documented in the survey results of Tande et al. (1996).

There are no legal ramifications from these listings, rather they are generated by the Alaska Natural Heritage Program to help track the occurrence of these taxa across the state. The rare designation does not indicate known threats to these species, but represents the rather few collections known for each taxa in Alaska. All of these taxa are ranked for management priority in the ecosystem management program for Fort Wainwright.

Table F2-1. Rare Plant Species Occurring on Fort Wainwright, Alaska.

SPECIES	ALASKA NATURAL HERITAGE PROGRAM RANKINGS as of 2006	
	GLOBAL*	STATE**
Apocynum androsaemifolium	G5	S2S3
Artemisia laciniata	G4?	S2
Carex crawfordii	G5	S1
Ceratophyllum demersum	G5	S1
Cicuta bulbifera	G5	S1S2
Cryptogramma stelleri	G5	S2S3
Festuca lenensis	G4G5	S3
Glyceria pulchella	G5	S2S3
Lycopus uniflorus	G5	S1
Minuartia yukonensis	G4?	S3

SPECIES	ALASKA NATURAL HERITAGE PROGRAM RANKINGS as of 2006	
	GLOBAL*	STATE**
Myriophyllum verticillatum	G5	S3
Oxytropis tananensis	G2G3Q	S2S3
Pedicularis macrodonta	G4Q	S3
Rorippa curvisiliqua	G5	S1
Rosa woodsii var. woodsii	G5T5	S1S2

* Alaska Natural Heritage Program Rare Species Global Rankings

G3 Either very rare and local throughout its range or found locally in a restricted range (typically 21-100 occurrences)

G4 Apparently secure globally

G5 Demonstrably secure globally

G#G# Global rank of species uncertain; best described as a range between the two ranks
G#T# Global rank of species and global rank of the described variety or subspecies of the species
Q Taxonomically questionable

? Inexact

** Alaska Natural Heritage Program Rare Species State Rankings

S1 Critically imperiled in state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state (typically 5 or fewer occurrences, or very few remaining individuals or acres)

S2 Imperiled in state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state (typically 6 to 20 occurrences, or few remaining individuals or acres)

S3 Rare or uncommon in the state (typically 21-100 occurrences)

S4 Apparently secure in state, with many occurrences

S#S# State rank of species uncertain; best described as a range between the two ranks

F2.2.1.4.2 Fort Richardson

A comprehensive survey of rare plants was included as part of the floristic inventory for Fort Richardson conducted in 1994. A report released in 1995 indicated that there are no federally listed endangered or threatened plant species on Fort Richardson (Lichvar et al. 1997). There is, however, one former category 2 candidate species, *Taraxacum carneocoloratum*, found in alpine areas of the Chugach Mountains. This plant has been discovered at an increasing number of sites in Alaska, and its candidate status may be reevaluated.

There are also 20 vascular plant species of concern that are known to occur on Fort Richardson. These plants are being tracked by the Alaska Natural Heritage Program because they are thought to be uncommon or rare in Alaska and/or uncommon or rare globally (Alaska Natural Heritage Program 2006). These species are listed below in Table F2-2 and are documented in the survey results of Lichvar et al. (1997). Many of these plants are alpine natives and this ecosystem is also the most vulnerable to the effects of military training. There are no legal ramifications from these listings; rather they are generated by the Heritage Program to help track the occurrence of these taxa across the state as more botanical work is conducted. The categories listed do not indicate known threats to these species, but they do represent the rather few collections known for each taxa in Alaska and the geographic distribution of those collections. All of these taxa are listed for management in the ecosystem management program for Fort Richardson.

Table F2-2. Rare Plant Species Occurring on Fort Richardson.

SPECIES	ALASKA NATURAL HERITAGE PROGRAM RANKINGS in 2006

	GLOBAL*	STATE**
Aphragmus eschscholtzianus	G3	S3
Arnica ovata	demonstrably secure	critically imperiled
Carex deweyana	G5	S2?
Cassiope lycopodioides var. *cristapilosa*	G4T2	S1
Douglasia alaskana	G3	S3
Draba ruaxes	G3	S3
Eleocharis kamtschatica	G4	S2S3
Eleocharis quinqueflora	G5	S1
Eriophorum viridcarinatum	G5	S2
Glyceria striata var. *stricta*	G5T5Q	S2
Minuartia biflora	demonstrably secure	imperiled
Myriophyllum verticillatum	G5	S3
Najas flexilis	G5	S1S2
Oxytropis huddelsonii	G3	S2S3
Papaver alboroseum	G3G4	S3
Phalaris arundinacea	G5	S3
Saxifraga adscendens ssp. *oregonensis*	G5T4T5	S2S3
Stellaria umbellata	G5	S2S3
Taraxacum carneocoloratum	G3Q	S3
Thlaspi arcticum	G3	S3
Viola selkirkii	G5?	S3
Zannichellia palustris	G5	S3

* Alaska Natural Heritage Program Rare Species Global Rankings

G3 Either very rare and local throughout its range or found locally in a restricted range (typically 21-100 occurrences)

G4 Apparently secure globally

G5 Demonstrably secure globally

G#G# Global rank of species uncertain; best described as a range between the two ranks
G#T# Global rank of species and global rank of the described variety or subspecies of the species
Q Taxonomically questionable
? Inexact

** Alaska Natural Heritage Program Rare Species State Rankings

S1 Critically imperiled in state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state (typically 5 or fewer occurrences, or very few remaining individuals or acres)

S2 Imperiled in state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state (typically 6 to 20 occurrences, or few remaining individuals or acres)

S3 Rare or uncommon in the state (typically 21-100 occurrences)

S4 Apparently secure in state, with many occurrences

S#S# State rank of species uncertain; best described as a range between the two ranks

F2.2.1.4.3 Donnelly Training Area

Interior Alaska has no federally listed threatened, endangered, or candidate plant species. Seventeen species collected during a floristic inventory of Donnelly Training Area (Racine et al. 2001) were vascular plants being tracked by the Alaska Natural Heritage Program's Biological Conservation

Database for interior Alaska. The following table (Table F2-3) is based on the Alaska Natural Heritage Program's Vascular Plant Tracking List, which was last updated April 18, 2006 by Robert Lipkin and published on their website (Alaska Natural Heritage Program 2006).

Table F2-3. Rare Plant Species Occurring on Donnelly Training Area.

SPECIES	ALASKA NATURAL HERITAGE PROGRAM RANKINGS in 2006	
	GLOBAL*	STATE**
Artemisia laciniata	G4?	S2
Carex atratiformis	G5	S2
Carex crawfordii	G5	S3
Carex deweyana	G5	S2?
Carex eburnean	G5	S3
Carex sychnocephala	G4	S1
Cryptogramma stelleri	G5	S2S3
Draba incerta	G5	S2S3
Glyceria pulchella	G5	S2S3
Phlox hoodii	G5	S1S2
Phlox sibirica ssp. *richardsonii*	G4T2T3Q	S2?
Potamogeton obtusifolius	G5	S2S3
Salix setchelliana	G4	S3
Saxifraga adscendens ssp. *Oregonensis*	G5T4T5	S2S3
Sisyrinchium montanum	G5	S1
Stellaria alaskana	G3	S3
Viola selkirkii	G5?	S3

* Alaska Natural Heritage Program Rare Species Global Rankings

G3 Either very rare and local throughout its range or found locally in a restricted range (typically 21-100 occurrences)

G4 Apparently secure globally

G5 Demonstrably secure globally

G#G# Global rank of species uncertain; best described as a range between the two ranks
G#T# Global rank of species and global rank of the described variety or subspecies of the species Q Taxonomically questionable
? Inexact

** Alaska Natural Heritage Program Rare Species State Rankings

S1 Critically imperiled in state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state (typically 5 or fewer occurrences, or very few remaining individuals or acres)

S2 Imperiled in state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state (typically 6 to 20 occurrences, or few remaining individuals or acres)

S3 Rare or uncommon in the state (typically 21-100 occurrences)

S4 Apparently secure in state, with many occurrences

S#S# State rank of species uncertain; best described as a range between the two ranks

Rare plant surveys have been conducted on Donnelly Training Area since the floristic inventory to update knowledge of species distribution, habitat association and population status (Mason 2006). All additional surveys have been on Donnelly Training Area East and focused on species occurring in habitats on or near the road system. The Donnelly Training Area Range and Training Land Assessment program also

maintains records of rare plants located during impact assessment and vegetation monitoring. A detailed Geographic Information System database of rare plant locations has been created. Species status on Donnelly Training Area has been assessed and is used in the ecosystem management program to help guide land-use planning and rare species conservation.

F2.2.2 USAG-AK Species of Concern, Priority Species and Rare Species

Comprehensive management of species of concern, priority species and rare species on USAG-AK lands began in 2000 with the inception of the U.S. Army Alaska ecosystem management program (Schick et al. 2003). Planning for the program was initiated in 1999 and implementation started in 2002, coinciding with the implementation of the Integrated Natural Resources Management Plan (U.S. Army Alaska 2001a). The Ecosystem Management Plan is broadly-based and relies heavily on the principles of both conservation biology (Soule 1986) and landscape ecology (Forman 1995). The program follows guidance for effective ecosystem management described in Grumbine (1994), Noss and Cooperrider (1994), Kohm et al. (1996), Yaffee et al. (1996), Leslie et al. (1996), and Boyce and Haney (1997). The concept of managing complete ecosystems is a relatively new approach to land management and is largely a response to the recognition that single-species management and local-scale conservation efforts often do not serve to support the processes that keep larger ecosystems functioning. With a broader ecosystem approach to management, both the spatial and ecological scale of management efforts are greatly expanded so that management is conducted for many species over much larger geographic regions, including species of concern. Ecosystem management also recognizes that humans have been and will continue to be part of the landscape, and it endeavors to integrate human and non-human uses of the land. Importantly, ecosystem management seeks to place management actions within a larger landscape context, specifically recognizing that the effects of actions at a local scale, for example, can have larger ramifications at a landscape scale (Schick 2003).

Management of specific fish and wildlife species is covered in the Ecosystem Management Plan as well as the U.S. Army Fish and Wildlife Management Plan (in draft). The management of special interest areas is covered under the Special Interest Areas Management Plan (Stout 2000).

Detailed below are various surveys related to rare, threatened and endangered species and a brief description of survey results conducted on USAG-AK lands.

Fort Richardson: Threatened and endangered species surveys have been conducted in conjunction with other surveys since 1995. No threatened or endangered species were located in the 1995 floristic inventory (Tande et al. 1995; Lichvar et al. 1997), the 1997 wetlands inventory, the 1998 vegetation mapping project, the 2000 ecological land survey (Jorgenson et al. 2004), annual Alaska Range and Training Land Assessment monitoring (Peirce 2005), small mammal inventories (Cook 1995; Peirce 2003) or avian monitoring efforts (Cotter and Andres 2000; Andres et al. 2001). However, the newly endangered Cook Inlet beluga whale does use areas within the boundaries of Fort Richardson and is afforded greater protection under the auspices of the Endangered Species Act. Species of concern have been identified through the Ecosystem Management Plan.

Donnelly Training Area: Flora and fauna planning level surveys conducted in 1998 and 1999 identified no federal threatened or endangered species. However, rare floral species were documented as well as avian species of concern. These species and others have been prioritized for management through the Ecosystem Management Plan. Currently, many bird species of concern are being monitored on Donnelly Training Area using a Breeding Bird Survey route and other efforts that have focused on distribution and habitat use (Alaska Bird Observatory 2004; Anderson et al. 1998). Other efforts are planned to target specific bird species or their habitats. Rare plants documented on Donnelly Training Area East were the

focus of a survey done in 2004 to enhance knowledge of distribution, habitat association and population status (Mason 2006). Other species of concern or priority management species have been addressed through the Ecosystem Management Plan. Knowledge gaps or monitoring priorities have been identified and strategies to address these issues are outlined in the Ecosystem Management Plan.

Fort Wainwright: During the 1995 floristic survey of Fort Wainwright, several rare plant species were identified. No follow up surveys have been done but conservation efforts have been planned through the Ecosystem Management Plan.

Confirmed sightings of American peregrine falcons at Fort Wainwright have occurred; however, breeding status and number of individuals have not been included with the incidental observations American peregrine falcons are known to nest along and migrate through the Tanana River valley (U.S. Army Alaska 1999; U.S. Department of the Interior and U.S. Department of Defense 1994). This species was removed from the USFWS federally endangered species list in 1999, and although no nests have been identified on Fort Wainwright, suitable nesting habitat may exist. The Arctic peregrine falcon nests in tundra areas of northern and western Alaska and may also migrate through USAG-AK lands. This species of falcon was delisted on October 1994; however, if surveys indicate a reversal in recovery, listing could reoccur.

The Army consults with the U.S.Fish and Wildlife Service and will follow all regulatory management recommendations listed in the *Peregrine Falcon Recovery Plan - Alaska Population* (USFWS 1982) if an American peregrine falcon nest is found on military land.

Trumpeter swans and ospreys also occur on Fort.Wainwright's Tanana Flats Training Area and management recommendations for each occur in the Ecosystem Management Plan. Aerial surveys of Trumpeter swan locations, nesting sites and breeding success are conducted annually.

The olive-sided flycatcher, gray-cheeked thrush, Townsends warbler and blackpoll warbler all occur on Fort Wainwright and are listed in the Ecosystem Management Plan as species of concern (in addition to Alaska Department of Fish and Game species of concern designation). They are found in a variety of habitats, including open woodlands, forest burns, boreal bogs, muskegs, and shrub habitats and mature white spruce and mixed species forests (Udvardy 1988).

Boreal Partners in Flight identified additional species of concern in 2005, including the rusty blackbird, varied thrush, solitary sandpiper, and lesser yellow-legs as well as various species affiliated with boreal wetland habitat, many of which have been documented on Fort Wainwright

F2.2.3 Rare, Threatened and Endangered Species Monitoring

Rare, threatened and endangered species monitoring on USAG-AK lands entails monitoring avian, mammal, and plant species and protecting sensitive habitat. Because there is only one federally endangered or threatened species on FRA lands (Cook Inlet beluga) monitoring is concentrated on whale activity in and around the Eagle River Flats and involves conducting surveys and protecting, conserving, and enhancing habitat. Surveys, protection, conservation and habitat enhancement for rare, uncommon, or priority species also occurs throughout USAG-AK.

The Alaska Natural Heritage Program's Plant Tracking Database is used to guide efforts to conserve uncommon plant taxa, and the National and Boreal Partners in Flight Program's listings of conservation priority species are used for uncommon or declining bird species. The Alaska Department of Fish and Game has developed a list of mammals and other species considered to be endangered or species of

concern by the State of Alaska. The University of Alaska Fairbanks Museum is also developing a list of mammal species of concern for Alaska (Jarrel, personal communication).

Monitoring is accomplished through the Ecosystem Management Plan, flora and fauna planning level surveys, Alaska RTLA surveys, aerial monitoring and other monitoring programs. Rare, uncommon, or priority species and their habitats found on USAG-AK lands are identified and delineated through these planning level surveys and monitoring efforts.

F2.2.4 Priorities for Rare, Threatened and Endangered Species Management

The determination of which species to manage on USAG-AK lands was not done in any systematic way until the Ecosystem Management Plan was implemented in 2002. Prior to the Ecosystem Management Plan, species were selected primarily based on input from federal and state management agencies (e.g., U.S.Fish and Wildlife Service and Alaska Department of Fish and Game) or, in the case of moose and caribou, because of their status as large and economically important game species. Under the Ecosystem Management Plan, a protocol was established to determine whether or not a species should be managed based on considerations generated from an ecosystem approach to management, and in addition, a priority ranking system was created to determine which species of those selected are most important for management. Rare and uncommon species and species of concern fall under these priority species (Schick et al. 2003).

All species included in the Ecosystem Management Plan are objectively ranked and prioritized for management. The ranking process determines which species to manage, based on considerations of maintaining species viability and ecosystem integrity. The necessary tasks required to establish this selection process are completed (see below), but the process will continue to be refined as input is received from reviewers of the Ecosystem Management Plan and area stakeholders.

To be included for management in the Ecosystem Management Plan, a species must occur in at least one of four categories. All rare, threatened, and endangered species fall under the below categories:

(1) the species is of conservation concern, as determined largely by population declines noted broadly throughout the species range (not necessarily in Alaska) or from conservation priority species lists produced by the USFWS, Alaska Department of Fish and Game, and specialist working groups (for birds, the national Partners-in-Flight Watch List, the Alaska Audubon Watch List, Boreal Partners-in-Flight Working Group, Alaska Shorebird Working Group, and Alaska Loon Working Group, and for vascular plants, the Alaska Natural Heritage Program),
(2) the species has socioeconomic importance as a locally hunted game animal,
(3) the species is ecologically important in ecosystems as a predator, or
(4) the species is ecologically important in ecosystems as prey.

Currently, the management priority species list generated for Fort Richardson contains 94 species comprising 35 birds, 32 mammals, 4 fish, 1 amphibian, and 22 vascular plants. For Donnelly Training Area the list contains 97 species comprising 34 birds, 33 mammals, 5 fish, 1 amphibian, and 24 vascular plants. For Fort Wainwright the list contains 90 species comprising 36 birds, 31 mammals, 6 fish, 1 amphibian, and 16 vascular plants. Short lists were developed to focus management to 25 high priority species on Fort Richardson, 21 high priority species on Donnelly Training Area and 23 high priority species on Fort Wainwright (Appendix A). The species on these lists are deemed most important for management and overlap with federal and state species of concern lists.

This prioritization process uses a set of ten ranking criteria that address each species' biology and ecology relative to its response to human-induced disturbances and alterations of habitats (high ranking species are

likely to be less common and/or more susceptible to impacts). Each species was given a score of 1–3 for each ranking criteria and values were summed for all ten criteria, which resulted in high values for high-priority management species. This short list of high priority management species will be used in most cases for impact assessment and conflict resolution in land-use issues.

Once priority species are identified, habitat preference data are determined and created to maintain spatially explicit data for each species in a Geographic Information System. The determination of habitat preferences for the rare, threatened, endangered, priority species and species of concern is an ongoing process, and will be continually refined as additional data are discovered or new data are collected from knowledge-gap studies recommended by the Ecosystem Management Plan.

Habitat preferences (coded in a Geographic Information System as negligible/low, medium, or high use) for each rare, threatened, endangered and priority species, as well as species of concern, were assigned using the combined knowledge of many biological field workers familiar with Alaska (area agencies including USFWS, Alaska Department of Fish and Game, U.S. Forest Service, etc), local knowledge of the natural history, and published and unpublished data on habitat use per species. These data were then incorporated into ecotype (habitat) classes created for each post by ABR, Inc. (Jorgenson et al. 1998; Jorgenson et al. 1999; Jorgenson et al. 2002). The final product is a map of each species with key habitats highlighted that is used for management and land use recommendations.

F2.2.4.1 Fort Wainwright

Priority species for Fort Wainwright Main Post, Yukon Training Area, and Tanana Flats are listed below in Table F2-4.

Table F2-4. Fort Wainwright Priority Species.

Group	Species
Mammal	Wolverine
Mammal	Brown Bear
Mammal	Black Bear
Mammal	Gray Wolf
Bird	Great Gray Owl
Mammal	Little Brown Bat
Mammal	Lynx
Mammal	Marten
Mammal	Meadow Jumping Mouse
Bird	Olive-sided Flycatcher
Vasc. Plant	*Apocynum androsaemifolium*
Bird	Boreal Owl
Fish	Chinook Salmon
Bird	Common Loon
Bird	Northern Goshawk
Vasc. Plant	*Dodecatheon pulchellum ssp. Pauciflorum*
Vasc. Plant	*Festuca lenensis*
Vasc. Plant	*Minuartia yukonensis*
Bird	Sandhill Crane
Fish	Chum Salmon
Fish	Arctic Grayling

Mammal	Moose
Bird	Ruffed Grouse
Bird	Rusty Blackbird
Bird	Trumpeter Swan

F2.2.4.2 Donnelly Training Area

Priority species for Donnelly Training Area, Gerstle River Training Area and Black Rapids Training Area are listed below in Table F2-5.

Table F2-5 Donnelly Training Area Priority Species.

Group	Species
Mammal	Wolverine
Mammal	Brown Bear
Mammal	Gray Wolf
Mammal	Black Bear
Bird	Great Gray Owl
Bird	Olive-sided Flycatcher
Mammal	Meadow Jumping Mouse
Mammal	Caribou
Mammal	Little Brown Bat
Mammal	Marten
Mammal	Lynx
Vasc. Plant	*Carex sychnocephala*
Bird	Boreal Owl
Bird	Northern Goshawk
Vasc. Plant	*Dodecatheon pulchellum ssp. Pauciflorum*
Mammal	Dall's Sheep
Bird	Sandhill Crane
Mammal	Bison
Bird	Trumpeter Swan
Mammal	Moose
Bird	Sharp-tailed Grouse
Bird	Rusty Blackbird

F2.2.4.3 Fort Richardson

Priority species for Fort Richardson are listed below in Table F2-6.

Table F2-6. Fort Richardson Priority Species.

Group	Species
Mammal	Beluga Whale
Mammal	Harbor Seal
Mammal	Wolverine
Mammal	Brown Bear

Vasc. Plant	*Viola selkirkii*
Mammal	Black Bear
Mammal	Marten
Mammal	Lynx
Mammal	Gray Wolf
Mammal	Dall's Sheep
Bird	Olive-sided Flycatcher
Bird	Great Gray Owl
Bird	Common Loon
Vasc. Plant	*Taraxacum carneocoloratum*
Vasc. Plant	*Saxifraga adscendens ssp. Oregonensis*
Mammal	Meadow Jumping Mouse
Mammal	Little Brown Bat
Bird	Sandhill Crane
Bird	Boreal Owl
Mammal	Moose
Bird	Golden Eagle
Amphibian	Wood Frog
Bird	Trumpeter Swan
Bird	Bald Eagle
Mammal	Snowshoe Hare
Bird	Northern Goshawk

F2.3 Special Interest Areas

Designation of special protection status for important or fragile natural areas is an effective management tool. In accordance with AR 200-3, areas that contain natural resources that warrant special conservation efforts will be identified during the inventory and classification process. After appropriate study and coordination, such areas may be managed as “Special Interest Areas” for their unique features. Per AR 200-3, this Integrated Natural Resources Management Plan “will address the special management necessary for these areas, and all current and future land-uses will consider the uniqueness of these areas and plan accordingly to ensure conservation of their resources.”

F2.3.1 Special Interest Areas Goals

Designation of special protection status for sensitive or fragile areas is an important management tool. It is easier and more cost effective to place restrictions on the use of some areas in order to minimize damage or disturbance than to repair damage or disturbance after it has occurred.

Special interest areas management goals all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. The goals for special interest areas management are:

- Identify and provide protection for areas of special ecological or cultural concern.
- Decrease disturbance in special interest areas.
- Involve resource agencies in the planning process for special interest areas management and the public in review of the plan.

- Reduce impacts in wetlands, riparian areas, lakes, alpine tundra areas, old-growth forests, krummholz forests, and historic cultural sites.
- Reduce the impact of training and recreation activities in special interest areas.

F2.3.2 Special Interest Area Management

Special interest area management includes protecting special interest areas through regulations, map overlays showing restrictions, and actual barriers. U.S. Army Alaska Regulation 350-2, *Range Regulation*, has many general provisions to protect environmental resources, including special interest areas. The provisions include:

- National Environmental Policy Act review of actions affecting natural resources.
- Restoration of sites damaged by digging.
- Removal of wire, rope, string, concertina wire, and other training debris.
- Wildfire prevention measures.
- Preference for use of established roads and trails.
- Stream crossing requirements.
- Protection of trees.
- Prohibitions on harassment of wildlife.
- Spill prevention and containment measures.
- Hazardous materials handling procedures.
- Coordination of ground-disturbing activities with USAG-AK Natural Resources.
- Controls on outdoor recreation, including swimming, hunting, fishing, and firewood cutting.

Military mission-related restrictions within special interest areas are included in the environmental limitations overlay map and environmental awareness materials prepared for distribution to military units who use training areas. Most military mission-related restrictions involving special interest areas have been in place for some time with no significant adverse impacts on accomplishment of the mission. Physical barriers can be used to protect special interest areas. However, this is only used in extreme cases because barriers tend to draw attention to an area.

F2.3.2.1 Fort Wainwright

Fort Wainwright has several areas with special natural features. They harbor sensitive or unique wildlife species or represent unique plant communities. The following are special area categories and accompanying restrictions.

F2.3.2.1.1 Wood River and Clear Creek Buttes

Buttes near Blair Lakes and along the Wood River have cultural and ecological significance. Many of these buttes have cleared helicopter pads for military training, especially since they are on high, relatively dry ground. These buttes will be placed off-limits to ground and vegetation-disturbing activities with exception of existing helicopter pads. This restriction should not impact military training since most missions on buttes require vegetative cover for concealment.

F2.3.2.1.2 Tanana Flats Migratory Bird Special Interest Area

The area between Crooked Creek and Willow Creek in the Tanana Flats Training Area harbors undisturbed fen wetlands and significant migratory bird nesting areas. No recreational activities are permitted in this area during 1 May through 15 July annually. This area presently has no trails and no new trails may be developed in this area.

F2.3.2.2 Donnelly Training Area

Donnelly Training Area has several areas with special natural features. They harbor sensitive or unique wildlife species or represent unique plant communities. The following are special area categories and accompanying restrictions.

F2.3.2.2.1 Delta Bison Area

A 1980 cooperative agreement (Bonito 1980) designated areas as important bison calving and summer range on the West Training Area. The 1980 agreement also identified the East Training Area as important late summer and early winter range. An agreement in 1986 with Alaska Department of Fish and Game (U.S. Army 1986) also identified bison calving and summer range. USAG-AK has imposed restrictions to limit disturbance to bison calving areas from 15 April through 15 June, if bison are present.

F2.3.2.2.2 Sandhill Crane Roosting Area

The 1986 agreement with the Alaska Department of Fish and Game (ADF&G) (U.S. Army 1986) identified several areas along the Delta River on Donnelly Training Area as important for migrating sandhill cranes. Consultation with ADF&G for the military Lands Withdrawal Renewal Environmental Impact Statement identified additional areas along Delta Creek near the Delta Creek Assault Landing Strip as important for migrating sandhill cranes (Center for Environmental Management of Military Lands 1998).

The agreement limited disturbance in designated sandhill crane areas each year from 25 April through 15 May, and 1 September through 30 September when sandhill cranes are present. The Army can conduct military activities in these areas if they first consult with ADF&G.

F2.3.2.2.3 Delta Caribou Calving and Post-Calving Areas

The cooperative agreement between the Army and ADF&G (U.S. Army 1986) identified 12 parcels on Donnelly Training Area as important calving and post-calving areas for caribou. In the 1986 agreement, the Army agreed to suspend activities or operations that would adversely affect these areas during 15 May through 31 May without consultation with ADF&G. Restrictions in these areas are in effect only when caribou are present. In addition, all development and military actions in the caribou calving grounds will be conducted under winter conditions when there is sufficient snow cover and the ground is adequately frozen to minimize the damage to vegetation and soils.

F2.3.2.3 Fort Richardson

F2.3.2.3.1 Ship Creek Riparian Area

Ship Creek and its riparian habitat are important and sensitive areas on Fort Richardson, requiring protection to insure maintenance of its health and natural function. Water quality on Ship Creek is of utmost importance because any deterioration on Army lands will affect downstream locations on Elmendorf Air Force Base and in the city of Anchorage. USAG-AK's goal is to maintain Ship Creek in a condition as pristine as possible and to repair portions that may become damaged. Further development, beyond that already approved for the golf course expansion, will not occur in the riparian area. Tree cutting will be prohibited. Clearing for the golf course will be limited to that absolutely necessary for course construction. Troops and other authorized users will continue to have "pass through" access.

F2.3.2.3.2 Eagle River Flats

The Eagle River Flats is a 2,140 acre estuarine salt marsh located at the mouth of Eagle River on Fort Richardson. Glacially-fed Eagle River flows through the flats before discharging into Eagle Bay of Knik Arm in Upper Cook Inlet.

The flats have been characterized into seven major physiographic zones and 15 vegetation classes (representing 67 species of vascular plants). The physiographic zones include: Coastal (littoral coastline of Eagle River Flats along Eagle Bay), Riverine (Eagle River and banks), Mudflat/tidal gully (silt-covered mudflats directly bordering Eagle River and along the coast), Interior Lowland (well vegetated low embayment occupying southern 30% of Eagle River Flats), Sedge Meadow (narrow band of continuous sedge meadow between mudflats along river and pond/marsh), Pond/marsh (area of lower elevation along the middle and outer edges of the flats characterized by permanently inundated ponds and associated marshes) and Border (abrupt upland border of Eagle River Flats) (Racine and Brouillette 1995).

A complex interaction of physical forces acts on the flats including those exerted by a high tidal range, glaciofluvial influences from Eagle River, sedimentation from the turbid waters of Knik Arm and Eagle River and the subarctic coastal climate of south-central Alaska (Lawson et al.1996). Anthropogenic influences on the flats include military training, both historic (Army artillery impact area since 1949) and current (winter firing of artillery into flats), as well as activities associated with the remediation of white phosphorus residues (see below).

The combination of these forces and influences presents a complex and dynamic environment to organisms living within and around Eagle River Flats. Despite this challenging physical environment, this area supports a variety of birds (approximately 68 species), mammals, fish and macroinvertebrates (approximately 30 species of benthic macroinvertebrates) (Racine et al. in press) and is an important staging area for spring and fall migrations of thousands of waterfowl.

In 1980 the presence of an unusually large number of waterfowl carcasses was observed on the flats. Growing concern over these mysterious deaths led to the 1987 formation of an interagency task force[5] charged with finding the cause of the mortality and recommending options for remediation (CH2M Hill 1997). Investigations conducted in subsequent years identified exposure to white phosphorus particles, deposited in Eagle River Flats sediments following detonation of smoke-producing artillery ammunition, as the cause of the increased waterfowl mortality (Racine et al. 1992). The primary route of exposure for dabbling ducks and swans is thought to be the ingestion of the dense, water-insoluble particles while feeding in contaminated shallow ponds. In 1990, the Army stopped use of white phosphorus rounds during training in wetlands nationwide as a result of these findings.

In 1994, Fort Richardson was placed on EPA's National Priorities List under the CERCLA[6] program and Eagle River Flats was given the identifier "Operable Unit C" (OUC). OUC includes the Eagle River Flats and an associated gravel pad where historic destruction of military ordinance was conducted (Open Burn/ Open Demolition Pad). A comprehensive Remedial Investigation completed in 1996 concluded that the primary chemical of concern in OUC was white phosphorus and recommended that remedial action concentrate on hot ponds and be driven by waterfowl mortality (CH2M Hill 1997).The resulting Record of Decision (ROD) for OUC (accepted by EPA and the Army in 1998) outlined short-term and long-term waterfowl mortality objectives and identified the chosen remedial treatment as the temporary draining of pond water in white phosphorus-contaminated ponds (hot ponds) to allow sediment drying and consequent white phosphorus sublimation and oxidation. Remedial action began in the spring of 1999 and has resulted in the successful remediation of all previously identified hot ponds (totaling over 56 acres) with the exception of a few recently discovered pools that will be treated in 2006. Estimated bird mortality on Eagle River Flats has decreased significantly during this time period.

[5] Eagle River Flats task force included representatives from the U.S. Army, U.S. Environmental Protection Agency, USFWS, Alaska Department of Fish and Game and Alaska Department of Environmental Conservation.
[6] Comprehensive Environmental Response , Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act of 1986

In addition to monitoring waterfowl mortality on Eagle River Flats, much work has been done to identify possible movement of white phosphorus into Eagle River and Knik Arm. White phosphorus particles are persistent in saturated, low oxygen sediment like that found in Eagle River Flats (Racine et al. 1992) and may be resuspended and potentially transported by tidal activity. Although trace amounts of white phosphorus have been detected in tidal gully sediments (but not water), all sediment and water samples from Eagle River and Knik Arm have been white phosphorus-free (CH2M Hill 1997; Collins et al. 2002).

In accordance with stipulations outlined in a NPDES[7] permit approved by the EPA in 2002, the Army also collects and analyzes water samples taken from Eagle Bay in an effort to monitor the discharge of Eagle River Flats for other chemical constituents of military munitions. Three years of data indicates no difference between the water released from Eagle River Flats and that of the background system (Goose Bay) (USAG-AK 2006).

Two marine mammals utilize the ERF via Eagle River, the endangered Cook Inlet beluga whale and the harbor seal (protected under the Marine Mammal Protection Act).

F3. Proposed Management

F3.1 Policy

F3.1.1 Threatened and Endangered Species Policy

The Cook Inlet beluga whale, a newly designated endangered species does use areas within the boundaries of Fort Richardson. USAG-AK will follow procedures listed in Section F2 to minimize the impact of Army activities on this species.

F3.1.2 Rare and Sensitive Species Management Policy

Rare and sensitive species will be managed in USAG-AK lands through the ecosystem management program as described in this Integrated Natural Resources Management Plan (INRMP). While there is no special protection for these species under federal law, USAG-AK will consider them priority species under ecosystem management.

F3.1.3 Special Interest Area Policy

USAG-AK will continue to manage special interest areas during the period 2007-2011. Areas are designated as “Special Interest Areas” if they contain unique or sensitive habitats or species which require different or additional rules for management and use. USAG-AK proposes to create one new area in Tanana Flats Training Area and proposes to delist several other areas designated in previous INRMPs. These areas are being removed from special interest area not because of the lack of sensitivity of species or habitats (or a loss of importance), but because the rules for managing and protecting those sensitive species or habitats are no different than the rules for everywhere else in USAG-AK. This INRMP will only continue to designate special interest areas where the rules for protection are truly different for that particular area.

F3.1.3.1 Create New Special Interest Areas for 2007-2011

[7] National Pollutant Discharge Elimination System as authorized by the Clean Water Act. U.S. Environmental Protection Agency (Region 10) is the authorized permitting agency for the Alaskan NPDES program.

The 2007-2011 update of the INRMP proposes to create a Tanana Flats Migratory Bird Special Interest Area. The area between Crooked Creek and Willow Creek in the Tanana Flats Training Area harbors undisturbed fen wetlands and significant migratory bird nesting areas. No recreational activities are permitted in this area during 15 April through 15 July annually. This area presently has no trails and no new trails may be developed.

F3.1.3.2 Delist Previous Special Interest Areas

This INRMP proposes to delist the following areas previously designated as special interest areas in previous INRMPs. The areas no longer considered special interest areas are Sage Hill on Fort Wainwright Main Post, Granite Tors in Yukon Training Area, moose calving areas on Tanana Flats, moist tundra areas on Fort Wainwright and Donnelly Training Area, Dall sheep habitat and water body protective zones on Donnelly Training Area, and old-growth forest areas, Krummholz areas, alpine tundra areas, cultural resource areas, Eagle River corridor, other riparian areas, lakes, other wetlands, Glenn Highway greenbelt, McVeigh Marsh Waterfowl Refuge, Otter Lake and Otter Creek Wildlife and Recreation Area, Gwen Lake Wildlife and Recreation Area, Clunie Lake Wildlife and Recreation Area, Waldon Lake Wildlife and Recreation Area, North Fork Campbell Creek anadromous fish stream, and Chester Creek anadromous fish stream on Fort Richardson. Once again, this delisting does not indicate that USAG-AK does not consider these resources important. These resources are already protected by existing USAG-AK policy and management. However, since these resource areas are not being managed and protected by additional or different rules, regulations and policies, it is misleading to continue to designate them as special interest areas.

F3.2 Procedures

Table F3-1. New Rare, Threatened, and Endangered Species Standard Procedures.

Category	Standard Practice	Standard Practice Description
Survey and Monitoring	Conduct Rare, Threatened, and Endangered F&W Species Surveys	Conduct rare, threatened, and endangered fish and wildlife species surveys on military lands.
Management	Special Interest Areas	Designate and manage appropriate areas as special interest areas.

F3.3 Projects

Table F3-2. The Following Projects are Proposed for 2007-2011.

Project Information				Year				
Priority	Location	Standard Project Category	Project Title	FY07	FY08	FY09	FY10	FY11
H	USAG-AK	Survey and Monitoring	Conduct T&E Species Survey	x	x	x	x	x
H	USAG-AK	Management	Erect signs designating boundaries of Special Interest Areas	x	x	x	x	x
H	FRA	Monitoring	Beluga monitoring and	x	x	x	x	x

Project Information				Year				
Priority	Location	Standard Project Category	Project Title	FY07	FY08	FY09	FY10	FY11
			management					
H	FRA	Monitoring	Beluga acoustical monitoring				x	x
H	FRA	Monitoring	Beluga/prey tissue testing	x	x	x	x	x
H	FRA	Monitoring	Eagle Bay acoustical measurements		x	x	x	x
H	FRA	Monitoring	Beluga Prey monitoring		x	x	x	x
H	FRA	Education	Beluga public education				x	x
H	FRA	Monitoring	Beluga photo identification			x	x	x

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U.S. Army
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VOLUME III, SUPPLEMENTS

SA. ECOSYSTEM MANAGEMENT

The goal of the ecosystem management program is to maintain ecosystem function and species diversity at a landscape scale, and to provide an environment where Soldiers can train to a high level of military readiness. All types of land use, by humans and wild species, are considered components of ecosystems, and the program seeks to avoid land use conflicts by proactive planning. Adjacent land owners and other stakeholder interests are sought for inclusion in the program with the understanding that local management decisions can affect the larger landscapes encompassing Army lands in Alaska.

SA1. Introduction

An ecosystem approach to the management of military training lands has been clearly stated and endorsed by the Department of Defense (1996). Because it is extremely difficult to obtain additional military training land, it is imperative that the military maintain its current land base in good condition and with intact ecosystems. In addition to the obvious benefits to community relations and to ensure the future use of such lands for military training, it is also important for the military to have non-degraded landscapes to use as part of its training regime. It is essential for the complete training of military personnel that a mix of training occurs in both (simulated) urban environments and unaltered natural landscapes with natural terrain features. Because of these concerns, the military has a strong vested interest in maintaining natural landscapes and fully functioning ecosystems on its training lands.

In an effort to conduct land management from an ecosystem-wide perspective, the USAG-AK (U.S. Army Garrison, Alaska) ecosystem management program was created. Planning for the program was initiated in 1999 and implementation started in 2002, coinciding with the implementation of the Integrated Natural Resources Management Plan for 2002–2006 (U.S. Army Alaska 2001). The ecosystem management program is broadly-based and relies heavily on the principles of both conservation biology (Soule 1986) and landscape ecology (Forman 1995). It variously follows the recommendations and experiences of a number of authors working in ecosystem management, including Grumbine (1994), Noss and Cooperrider (1994), Kohm et al. (1996), Yaffee et al. (1996), Leslie et al. (1996), and Boyce and Haney (1997). The concept of managing complete ecosystems is a relatively new approach to land management and is largely a response to the recognition that single-species management and local scale conservation efforts do not, in many cases (despite the best intentions of land managers), serve to support the processes that keep larger ecosystems functioning. With broader ecosystem approaches to management, both the spatial and ecological scale of management efforts is greatly expanded so that management is conducted for many species over much larger geographic regions. Ecosystem management also recognizes that humans have been and will continue to be part of the landscape, and it endeavors to integrate human and non-human uses of the land. Importantly, ecosystem management seeks to place management actions within a larger landscape context, specifically recognizing that the effects of actions at a local scale, for example, can have larger ramifications at a landscape scale.

This management plan describes the goals, policies, and operating procedures of the USAG-AK ecosystem management program.

SA1.1 Program Purpose

The ecosystem management program is designed to provide the overall structure and perspective under which land management activities will be conducted at USAG-AK. USAG-AK maintains that only by

making land use decisions within the context of the entire landscape (and also in recognition of adjacent land areas managed by other entities, see Section SA4, Ecosystem Management Program Procedures) can reasonable decisions be made for the future. One of the primary functions of the ecosystem management program is to provide a set of landscape-scale tools to aid in making land use decisions. Essentially the ecosystem management program acts as a filter for land management and land alteration proposals by placing them in an ecosystem and larger landscape perspective. Another important function of the Ecosystem Management Program is that it directly specifies a continuum of land use types ranging from areas of intensive human use to areas where use by wild species is the dominant form of land use. These land use designations are superimposed over a landscape mosaic of vegetation types. The maintenance and improvement of this landscape mosaic by active or passive management (as appropriate) is a primary goal of the ecosystem management program, and to this end, the program also serves as a source of ideas for specific land management projects.

SA1.2 Program Goals and Objectives

The overall goal of the ecosystem management program is to maintain an environment in which Soldiers can train to a high-level of military readiness and to maintain natural landscape features and ecosystem integrity at a broad landscape scale. The set of specific program objectives to be accomplished in pursuit of this goal are:

- Work with the Integrated Training Area Management program to integrate landscape-scale land management efforts with the needs of military training.
- Promote recreational use in ways that do not compromise the military mission or the maintenance of ecosystem integrity.
- Engender support for the protection of natural landscapes and ecosystem processes required for the training and testing necessary to maintain military readiness.
- Incorporate the concept of conservation of ecosystem integrity in the Integrated Natural Resources Management Plan process, the Integrated Training Area Management program, and other planning protocols.
- Promote the general use of proactive planning methods to avoid prolonged controversy over land use proposals and environmental compliance processes.
- Continue to upgrade the process used to target priority species to be managed.
- Outline inventory and monitoring needs to determine current levels of species diversity and to monitor population sizes of selected management priority species.
- Outline habitat-use studies needed to increase the accuracy of habitat preference data used in impact assessment and conflict-resolution procedures.
- Outline habitat management projects that may be needed to maintain the desired landscape scale habitat mosaic (so as to promote species diversity and desired population sizes for a suite of management priority species).
- Continue to fine-tune the landscape-scale impact assessment and conflict-resolution procedures so that multiple species can be more easily assessed.
- Incorporate measures of habitat fragmentation and habitat connectivity into impact assessment and conflict-resolution procedures.
- Coordinate natural resources program with other management agencies and conservation organizations with similar interests.
- Encourage internal and external stakeholders to become involved in the ecosystem management process as it develops.
- Promote management relationships with adjacent landholders so that larger, regional-scale efforts at land management can become a reality.

SA1.3 Program Justification

The many activities prescribed under ecosystem management as necessary for the long-term conservation of ecosystem integrity constitute a large commitment. USAG-AK believes strongly in the ecosystem approach to land management and is willing to make this commitment. Although ecosystem management is not mandated by law, its implementation is a proactive approach that will help in the process of complying with existing environmental laws such as the Endangered Species Act, Sikes Act, Clean Water Act, and the National Environmental Protection Act.

SA2. Elements of Ecosystem Management

SA2.1 Ecosystem Integrity

Relative to traditional land management activities on military lands (focused on game and fish), ecosystem management formalizes a more ecologically comprehensive approach to land management, and seeks to maintain ecosystem integrity across large landscapes. The concept of ecosystem integrity, sometimes referred to as biodiversity, includes both biological diversity as well as the ecological and evolutionary processes that contribute to the maintenance of functioning ecosystems and the creation of biological diversity itself. Ecosystem integrity also encompasses several ecological levels and geographic scales, from ecosystem diversity, community diversity, species diversity, to genetic diversity (Noss and Cooperrider 1994). The primary methods ecosystem management uses to maintain ecosystem integrity are to manage for a large number of species, manage for a variety of habitats and structural vegetation types, and to maintain natural landscape features. If these are accomplished, natural ecosystem processes should continue on the landscape.

It would be incredibly difficult, of course, to directly manage for every important species in the ecosystem (even if funds were available), so some selection process is needed. The USAG-AK ecosystem management program strives to make the selection of species for management as objective as possible, and selects species that represent different levels of ecological importance, rarity and endangerment, and socioeconomic importance (see Section SA4, Ecosystem Management Program Procedures). The ecosystem management program primarily uses a habitat-based approach in its management of wild species, largely because without available habitat, the perseverance of species over time is impossible. In addition, by maintaining and/or improving habitats for target species, an assemblage of species and ecosystem processes not specifically targeted for management will also benefit, thus approaching the goal of maintaining ecosystem integrity.

SA2.2 Spatial Scale

One of the essential elements of ecosystem management is to manage at spatial scales large enough to encompass the meta-populations of many of the larger plants and animals, and to allow for seasonal movements and inter-generational dispersal between habitats. This necessitates management at large, regional spatial scales. In the early stages of the USAG-AK ecosystem management program, the program will be concerned mostly with the ecological effects occurring within the Army property boundaries. This is a self-imposed limitation so that managers can focus on the mechanics of managing for many species simultaneously. Using these artificial (not ecologically defined) boundaries means that, at the current time, the ecosystem management program really only encompasses complete ecosystems for some of the smaller resident species. This will change as the ecosystem management program fully embraces a broader ecosystem approach, expands its geographic scope, and invites adjacent landowners to join in the program.

SA2.3 Human Land Use in Ecosystem Management

The basic strategy of the ecosystem management program, in attempting to both maintain ecosystem integrity and promote military training, is to integrate the use of the land by a large number of species, including humans. Critical to this ecosystem management program and a common theme in many ecosystem management programs (Grumbine 1994, Yafee et al. 1996), is the treatment of human land use as a component of the ecosystem. Under ecosystem management, humans are not viewed as outsiders, but as members of ecosystems, just as other wild species are members of ecosystems. That is, human land use is not seen as something artificial but rather as simply another ecosystem component to be managed. Just as wild species have preferences for habitats, so the military and the recreationist have habitat preferences, based on the type of training or hunting or fishing being conducted. Ecosystem management simply addresses facts such as these directly, and in the USAG-AK ecosystem management program, human use of the land is included in the land management model at the start (see Section SA4, Ecosystem Management Program Procedures).

SA3. Ecosystem Users

Under the ecosystem management program, USAG-AK will promote the use of Army lands by humans (primarily military training and recreation, see below) and also take direct steps to maintain a high level of ecosystem function. The primary users of the USAG-AK ecosystems are briefly described below.

SA3.1 Human Use

USAG-AK is on public domain land withdrawn for military purposes and therefore, among human users, the military has primary use of the land. The Integrated Training Area Management program exists to spread that use across the landscape in areas that fit best the type of training being conducted. This minimizes disturbance to the ecosystem from the military mission. Military use, however, does not occur at all locations at all times of year. This allows for recreational users, subsistence users, and commercial users to utilize USAG-AK lands in varying degrees.

SA3.1.1 Military

The military uses the landscape of USAG-AK in various ways. At a broad scale, lands can be separated into urban areas and training areas. Urban areas include most of the developed areas where housing, offices, and support services are located. Training areas are utilized for maneuver training and weapons training. Maneuver training requires large blocks of land as space is needed for ground and air combat forces to practice movements and tactics. Different units may work in support of one another (combined arms) or a unit may operate on its own. Areas used for maneuver training include bivouac sites, drop zones, landing zones, artillery and mortar firing points, and other miscellaneous training sites. Weapons training also has land-based requirements. Weapons training occurs primarily on firing ranges, and munitions from firing ranges land in surface danger zones or impact areas.

SA3.1.2 Recreation and Subsistence

Resource-gathering activities such as hunting, trapping, fishing, firewood cutting, and berry picking all have land-based requirements. Other recreational activities such as off-road vehicle use, skiing, boating, and bird watching, although non-consumptive, also have land-based requirements.

SA3.1.3 Natural Resources Management

There are a number of natural resources management land uses that have spatial components and land-based requirements. These include forest management, fish and wildlife management, habitat management, wetlands management, watershed management, fire management, endangered species management, special interest areas management, pest management, and minerals management. In addition, the management of cultural resources also has a spatial component.

SA3.1.4 Commercial

Commercial timber sales are the primary commercial use that has a spatial component and land-based requirement.

SA3.1.5 Rights-of-way, Easements and Leases

There are a number of existing rights-of-way, easements, and leases on USAG-AK lands. For example, the Glenn Highway at Fort Richardson, the Alaska Department of Fish and Game fish hatchery at Ship Creek (Fort Richardson), the Trans-Alaska Pipeline System through Donnelly Training Area, various powerlines, and outgrants all have land-based requirements.

SA3.2 Land Use by Wild Species

At least 158 bird species, 38 mammals, 16 fish, and 1 amphibian have been recorded or are probable on USAG-AK lands (U.S. Army Alaska 2001). The number of plant species occurring is large for a northern locality, primarily reflecting the diversity of habitats available, from rocky alpine to lowland bogs and aquatic areas. For vascular plants alone, over 600 taxa have been collected in the area (Racine and Lichvar 1996; Fort Wainwright Land Condition Trend Analysis data 2003). All of these species, of course, depend on habitats available on USAG-AK.

SA4. Ecosystem Management Program Procedures

There are seven major procedures or components that are integral to the successful execution of the ecosystem management program:

- Inventory and monitoring of biological resources
- Selecting priority species for management
- Habitat-based approach to management
- Habitat preference information for management priority species
- Evaluating conflicts in land use issues
- Specification of the land use mosaic
- Regional management efforts

Descriptions of each of these components of the ecosystem management program, their objectives, methods, and critical tasks for implementation are presented below.

SA4.1 Inventory and Monitoring of Biological Resources

The monitoring of biological resources at USAG-AK started in the mid-1970s with the implementation of annual Alaska Department of Fish and Game efforts at monitoring the moose population on post. Systematic efforts at biological inventories only started in earnest in the mid-1990s with the advent of

DOD Legacy Resource Management Program funds that were used to inventory birds and mammals and vascular plants (Anderson et al. 2000; Racine and Lichvar 1996). Also at that time, the Land Condition Trend Analysis (now known as Range and Training Land Assessment) program was implemented to monitor vegetation and land condition. Under the ecosystem management program, these efforts will be expanded to update inventories, as needed, and especially to implement monitoring efforts for selected management priority species.

SA4.1.1 Inventory and Monitoring, Goals and Tasks

The primary goals of the inventory and monitoring component of the ecosystem management program are to determine the current assemblage of species that use USAG-AK lands, track the influx and spread of invasive species, and to quantify and evaluate trends in population sizes of selected management priority species. These efforts will be restricted to birds, mammals, and vascular plants. These goals will be achieved by the application of specific inventory and monitoring projects tailored to the needs of the ecosystem management program.

Inventory efforts will be conducted only periodically, as needed, and will be focused on determining the presence of species expected to occur in the area, but not yet documented. For monitoring, at least initially, species of high conservation concern will be preferentially selected for study. These inventory and monitoring projects will either be coordinated in-house by USAG-AK natural resources staff, utilizing seasonal employees, or contracted to other government agencies or the private sector, as appropriate, considering the circumstances and availability of funds.

SA4.1.2 Inventory and Monitoring, Methods

Inventory and monitoring will be conducted following standard methods as appropriate for the species group under study. USAG-AK natural resources personnel have strong applied skills and experience studying birds, mammals, and vascular plants and, in consultation with experts on the taxa or group being studied, will determine the best methods to use in each study.

SA4.2 Selecting Priority Species for Management

The determination of which species to manage was not done in any systematic way until the ecosystem management program was implemented in 2002. Previous to the ecosystem management program, species were selected primarily based on input from federal and state management agencies (e.g., U.S. Fish and Wildlife Service and Alaska Department of Fish and Game) or, in the case of moose and caribou, because of their status as large and ecologically important game species. Under the ecosystem management program, a protocol was established to determine whether or not a species should be managed based on considerations generated from an ecosystem approach to management, and, in addition, a priority ranking system was created to determine which species, of those selected, are most important for management.

SA4.2.1 Priority Management Species, Goals and Tasks

The goal in selecting species for management is to use a reasonably objective method to determine which species to manage, a method that is based on considerations of maintaining ecosystem integrity in the larger ecosystems that occur on and around USAG-AK lands. The necessary tasks required to establish this selection process have already been completed (see below), but the process will continue to be refined as input is received from reviewers of the ecosystem management program and stakeholders.

SA4.2.2 Priority Management Species, Methods

To be included for management in the ecosystem management program, a species must occur in at least one of four categories:

- The species is of conservation concern, as determined largely by population declines noted broadly throughout the species range (not necessarily in Alaska) or from conservation priority species lists produced by the U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, and especially specialist working groups (for birds, the national Partners-in-Flight Watch List, the Alaska Audubon Watch List, Boreal Partners-in-Flight Working Group, Alaska Shorebird Working Group, and Alaska Loon Working Group, and for vascular plants, the Alaska Natural Heritage Program,).
- The species has socioeconomic importance as a locally hunted game animal.
- The species is ecologically important in ecosystems as a predator.
- The species is ecologically important in ecosystems as prey.

For example, the management priority species list generated for Fort Wainwright contains 36 birds, 31 mammals, 6 fish, 1 amphibian, and 16 vascular plants. Each of these species was prioritized to determine its relative priority for management. This prioritization process involved using a set of ten ranking criteria that address each species' biology and ecology relative to its response to human-induced disturbances and alterations of habitats (high ranking species are likely to be less common and/or more susceptible to impacts). Each species was given a score of 1–5 for each ranking criteria and the (unweighted) values were summed for all ten criteria, which resulted in high values for high priority management species. With these priority rankings in hand, the large set of 90 selected species (above) was reduced to a manageable "short list" of 23 high priority species deemed most important for management. This short list of high priority management species for each post will be used in most cases for impact assessment and conflict resolution in land use issues (see below).

SA4.3 Habitat-based Approach to Management

As mentioned above, because it is nearly impossible to monitor populations of all the important species occurring in any single ecosystem, the ecosystem management program primarily relies on a habitat-based approach to management (augmented by monitoring efforts for a few select species, see Section SA4.1, Inventory and Monitoring of Biological Resources, above). The advantages of a habitat-based approach are (1) habitats are extremely important in that they are critical for the continued survival of animal and plant populations, (2) habitats can be directly managed to improve, restore, or create habitats for some species, primarily by manipulating vegetation, and (3) when habitats for target species are maintained and/or improved, other non-target species and interactions among species (i.e., ecosystem processes) will be indirectly managed.

SA4.3.1 Habitat-based Management, Goals and Tasks

The goals and tasks for the habitat-based approach to management have already been achieved in that the approach has been defined and is currently in use (see below). The approach will continue to be refined, however, as input is received from reviewers of the ecosystem management rogram and stakeholders.

SA4.3.2 Habitat-based Management, Methods

The central method in using a habitat-based approach to management is to produce accurate landcover (habitat) data for the area, as management can only be as good as the landcover data that is used in

management decisions. For this purpose, the primary landcover data are the ecotype classes derived from ecological land surveys and classifications of each post (Jorgenson et al. 1999, 2001, 2003). The ecotypes represent not only vegetation types, but also incorporate ground surface forms and geomorphology to more accurately depict habitat classes. Flexibility also is built into the production of ecotype classes (in a Geographic Information System) so that ecotypes can be broken down into their constituent parts, allowing a customized creation of habitat types for any particular species, if needed.

SA4.4 Habitat Preferences of Management priority Species

Critical to the ecosystem management program are data for each of the management priority species that indicate their use of habitats. These data are used to determine which habitats are important for each species and which are not, and the data play a pivotal role in impact assessments and in helping to resolve land use conflicts (see Section SA4.5 below).

SA4.4.1 Habitat Preferences, Goals and Tasks

The goal of the habitat preferences component of the Ecosystem Management Program is to determine the habitat preferences for each management priority species and create and maintain spatially explicit data for each species in a Geographic Information System. This goal has only been partially achieved to date. For instance, although habitat preference data have been coded for each of the approximately 100 management priority species at each post, Geographic Information System data have only been created for the species on the management priority short list (25 species for Fort Richardson, 23 for Fort Wainwright and 21 for Donnelly Training Area). The determination of habitat preferences for the management priority species is an ongoing process, and will be continually refined as additional data are discovered (that were not used previously) or new data are collected from habitat use studies recommended by the ecosystem management program.

SA4.4.2 Habitat Preferences, Methods

Habitat preferences for each management priority species were assigned using the combined knowledge of many biological field workers familiar with Alaska and local knowledge of the natural history. Because quantitative data are lacking in almost all cases, habitat preferences were assigned qualitatively in three broad use categories (negligible/low, medium, or high use). The methods used to determine habitat preferences were simply to gather as much published and unpublished data on habitat use as possible for each species and then to equate those data to the ecotype (habitat) classes by Jorgenson et al. (1999, 2001, 2003). For resident species, habitat preferences were assigned for habitats used during both the summer and winter months, and, for migrant birds, preferences were assigned primarily for breeding habitats and, in the case of waterfowl and shorebirds, migration staging habitats as well. The methods and problems encountered in determining habitat preferences for the management priority species are discussed in detail by Schick (2003). For many species there is a paucity of data on habitat use, and in these cases habitat preference information was assigned primarily by using the local field experience and best professional judgment of USAG-AK staff and others (e.g., U.S. Fish and Wildlife Service and Alaska Department of Fish and Game staff) who have worked on USAG-AK lands and surrounding environments.

SA4.5 Evaluating Conflicts in Land Use Issues

One of the important components of the ecosystem management program is the protocol designed specifically to infuse spatially-explicit data into the process of making land use decisions. Using this protocol, whenever a land alteration activity is proposed, a quantification is made of the extent of loss (or gain) of preferred habitats for a number of high priority management species. Notably, these losses (or gains) in habitat areas are then evaluated on a landscape basis, using metrics from landscape ecology, to

assess the overall impact to habitats for the set of species being evaluated. This protocol is typically used to evaluate proposed alterations of the landscape from construction activities or habitat management activities, but it also can be used in advance of other land use activities (i.e., recreational use and military training use which do not involve land alteration) to determine where conflicts in land use between humans and wild species are likely to occur and where they may be avoided. In the latter case, the protocol serves in a proactive role, providing data to land managers who may want to avoid the scheduling of activities in which land use conflicts are likely to occur.

SA4.5.1 Evaluating Land Use Conflicts, Goals and Tasks

The goals and tasks necessary for implementation of the protocol to help resolve conflicts in land use activities have already been achieved in that the protocol has been defined and is currently in use (see below). The protocol will, of course, continue to be refined as managers evaluate it's effectiveness in helping to resolve land use conflicts, or hopefully, in avoiding them altogether.

SA4.5.2 Evaluating Land Use Conflicts, Methods

The first step in the protocol to evaluate land use conflicts is to determine which species should be evaluated. All analyses done to date have used a subset of the high-priority management species determined for each post (see Section SA4.2.2 above). This approach to the selection of species to be evaluated (which was designed primarily to limit the number of Geographic Information System analyses needed for a particular evaluation) resulted in no analyses being conducted for some species of increasing conservation concern (e.g., blackpoll warbler). Future analyses will use a broader range of species (selected from the full list of roughly 100 management priority species) and analyses will be conducted specifically for those management priority species that have been shown to be experiencing population declines in some part of their range and/or for which habitats are rare or difficult to recreate.

To evaluate potential conflicts whenever there are proposed changes in land uses or proposed land alterations on Army lands, the data layers representing each selected species' habitat preferences are used (see Section SA4.4.2 above). In the first step, the method involves nothing more than sequentially overlaying the proposed changes to the landscape (in a Geographic Information System) on top of each of the data layers representing the preferred habitats for the managed species. With these data in hand, USAG-AK can determine what habitats are likely to be affected and how many acres would be involved. In the second step, the predicted changes in habitats for each species can be evaluated by quantifying the amount of preferred habitat remaining for each species elsewhere on post (a landscape-scale assessment) and also assessing the geographic pattern of those habitat patches. That is, in addition to changes in total habitat acreage, the potential effects of habitat fragmentation on both the size and connectivity of remaining habitat patches can be taken into account to help decide whether a proposed habitat change may be biologically significant or not. Such analyses are readily conducted with Geographic Information System data using the FRAGSTATS software package (McGarigal and Marks 1995).

Note that these evaluations of potential conflicts in land use issues will not eliminate the hard choices that have to be made, but they will provide much needed data for a number of species that have traditionally been overlooked in such land use decisions. These data will also provide a larger, landscape and multi-species perspective from which to make land use decisions.

SA4.6 Specifying the Land Use Mosaic

Another critical component of the ecosystem management program is the direct specification of human land uses for each part of the post. Here is where designations are used to set aside areas for intensive use by humans and where other designations result in the primary use of the land by wild species.

SA4.6.1 Specifying Land Use Mosaic, Goals and Tasks

The overarching goal for designating a range of human land use areas is to promote the use of the land for military training and also promote use by wild species. The patterns of human land use were, in a very real sense, inherited from the land uses of previous generations, and through the ecosystem management program, managers have circumscribed and explicitly defined these land uses spatially and these data are now maintained in a Geographic Information System. The ecosystem management program will be the vehicle for managers to use to direct future patterns of land use on post. The primary task involved in this land use designation process is one of annually evaluating the land use pattern, at a landscape scale, to ensure that the pattern of land use is consistent with the maintenance of the desired vegetation mosaic. The desired vegetation mosaic is one that is conducive to sustaining ecosystem integrity and also allows for military training.

SA4.6.2 Specifying Land Use Mosaic, Methods

The primary method used to designate land use types was to first determine how the military (the primary human land user) uses each portion of each post. This was done using a combination of aerial photo interpretation, field data, and information derived from the Range Control office (the entity charged with scheduling all training events). These data were collected first as part of the Range and Training Lands Assessment program, and have been adapted for the ecosystem management program. For example, approximately 83% (768,463 acres) of the land at Fort Wainwright is designated as foot use only. This means there is only sporadic activity by humans in these areas and indicates, in effect, that the primary land use in these areas is by wild species. These foot-use areas have received very little habitat alteration and ecosystem integrity there remains high. In contrast, less than 1% (5511 acres) of Fort Wainwright is designated as urban and is reserved for intensive human use.

To maintain this land use mosaic in a form that is conducive to sustaining ecosystem integrity, the ecosystem management program will hold annual meetings to evaluate whether there has been any significant change in the land use pattern over the previous year. Formal analyses of land use patterns, using metrics from landscape ecology, will be employed to objectively determine differences in land use patterns among years. Key variables to be evaluated will be habitat fragmentation, habitat patch size, and habitat connectivity. The vehicle used to monitor changes in the land use pattern is the Range and Training Land Assessment program, which is charged with sampling vegetation and land condition in each of the land use types discussed here.

SA4.7 Regional Management Efforts

This component of the ecosystem management program involves USAG-AK's efforts to manage its lands with an explicit understanding of the broader, landscape ecological contexts in which those lands function. Efforts at broader-scale management of the region in which each post exists will require communication and cooperation with adjacent land owners and stakeholders. This component of the ecosystem management program is in the early stages of development but some progress has already been made (see Section SA4.7.2 below).

SA4.7.1 Regional Management Efforts, Goals and Tasks

The primary goal of regional management efforts is to fully embrace an ecosystem approach to management, especially with respect to the larger mammals that use large tracts of land during their life histories. The tasks for regional management efforts are varied, but most involve communication with

adjacent landowners and stakeholders to develop working relationships, with the ultimate goal of coordinating shared land management efforts at some point in the future.

SA4.7.2 Regional Management Efforts, Methods

There are no set methods for this component of the ecosystem management program; but rather, there is at the current time a set of projects which illustrate the work USAG-AK plans to develop under this component of the ecosystem management program.

USAG-AK also is currently working to establish a long-term monitoring program for landbirds. The goals of this monitoring program are to both collect habitat preference information to be used directly in the ecosystem management program, and also for the Army to contribute to the statewide effort at monitoring neotropical migrant and resident landbirds across the state of Alaska.

Other regional-scale projects at Fort Wainwright include cooperation with the Alaska Department of Fish and Game on prescribed burn plans for lands west of the Wood River on the Tanana Flats. Fort Wainwright and Donnelly Training Area contribute support to the restoration plan for the Fortymile caribou herd. The Fortymile caribou herd uses a broad area in eastern interior Alaska and adjacent areas in the Yukon Territory. Other Donnelly Training Area regional-scale projects include cooperation with the Alaska Department of Fish and Game on the production of grazing plots for bison.

A prime example of regional management efforts is the cooperation between Fort Richardson and the Alaska office of The Nature Conservancy, other state government agencies, and interested individuals to produce an ecoregional assessment for the Cook Inlet Basin Ecoregion. This ecoregional assessment will identify important areas of biodiversity in the region (areas of biological significance) and will outline a plan for broad scale conservation efforts aimed at the entire Cook Inlet Basin Ecoregion. A draft overview of this assessment has been published (The Nature Conservancy 2003), and in that overview, Fort Richardson is included as part of one area of biological significance (which includes the upper portions of Knik Arm and adjacent lands).

Fort Richardson also has cooperated with the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service, the Municipality of Anchorage, and other interested parties in the production of a wildlife management document that outlines a long-term plan for wildlife management within the municipality of Anchorage (Alaska Department of Fish and Game 2000). In this planning effort, the management actions on Fort Richardson were of prime concern for the management of wildlife in the Anchorage Bowl.

Finally, as part of USAG-AK's ecoregional approach to management, in the ecosystem management program process each future land management project that is contemplated will be explicitly evaluated for the role it may play in the larger ecoregion that USAG-AK lands function within. Those projects that contribute positively to overall ecoregional goals will receive a higher ranking for funding than projects with only local benefits.

SA5. Responsibilities

The development and implementation of ecosystem management is primarily the responsibility of the USAG-AK natural resources program. Permitting and coordinating the use of lands on post is the responsibility of Range Control, while the management of natural resources and recreational use is the responsibility of the Directorate of Public Works. All construction activities and land alterations are coordinated by the Directorate of Public Works. The Integrated Training Area Management program

coordinates the management of natural resources and recreational use with the use of USAG-AK lands for military training. Most commercial uses and all leases, easements, and rights-of-way must be permitted by the Bureau of Land Management, with concurrence by USAG-AK. Both the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game play integral roles as stakeholders and advisors in the ecosystem management process, both on the installation and in broader, regional ecosystem management efforts.

SB. SURVEY AND MONITORING

SB1. Introduction

The following section details the procedures and standard practices used by USAG-AK for survey and monitoring of its natural resources. These procedures and standard practices are grouped by program area.

SB2. Watershed Monitoring

Watershed monitoring includes procedures to survey and monitor soils, water, vegetation, and landforms across all USAG-AK lands. Baseline planning level surveys provide “fence to fence” coverage of all lands, while wetlands monitoring, soil and water quality monitoring, and Range and Training Land Assessments provide annual monitoring of the impacts of military training on USAG-AK lands.

SB2.1 Planning Level Surveys

The Sikes Act (Public Law 86-797) requires that baseline natural resource planning level surveys be completed for all military lands. The Department of the Army, in Memorandum DAIM-ED-N, 21 March 1997, required the completion of seven planning level surveys, including flora and fauna, vegetation communities, wetlands, soils, surface water and topography. The following section details the methods and procedures for completing these seven planning level surveys.

SB2.1.1 Fauna Planning Level Surveys

Conduct fauna planning level surveys of birds, fish and mammals on USAG-AK lands. These planning level surveys focus on neotropical, waterfowl, and raptor avian species, salmon, grayling, and other fish species, and small mammal species. This project is a 10-year update to determine trends in faunal biodiversity and improve the quality of the faunal database. An accurate fauna planning level surveys is required by AR 200-3 and is required to implement this Integrated Natural Resources Management Plan as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

- Complete, maintain, and update a fauna planning level survey.
- Complete, maintain, and update a planning level survey for threatened, endangered, or species of concern.

SB2.1.2 Floristic Planning Level Survey

Conduct a floristic survey on all USAG-AK lands. This project is the 10-year update to determine trends in floristic biodiversity and improve the quality of the floristic database. Floristic inventory activities set the foundation on which many decisions regarding land management are based. An accurate floristic planning level survey is required by AR 200-3, supports compliance with the Endangered Species Act, and is required to implement this Integrated Natural Resources Management Plan (INRMP)as mandated

by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

- Complete, maintain and update flora planning level survey.
- Complete, maintain, and update a threatened and endangered flora species survey.
- Identify the requirement for a floristic planning level survey.

SB2.1.3 Soils Planning Level Survey

Conduct a baseline planning level soil survey on all USAG-AK lands. Identify and map soils, correlate soils to permafrost areas, and establish relationships among terrain components. Soil surveys are essential to establishing a database for planning effective management of withdrawn public lands. Soils data are required for input into the military training and scheduling process. The soils planning level survey is required by AR 200-3, supports compliance with the Clean Water Act, and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

- Complete, maintain, and update a soils planning level survey.
- Complete a topography planning level survey.
- Identify the requirement for a soils planning level survey.

SB2.1.4 Surface Water Planning Level Survey

Conduct a 10-year update of surface water planning level survey on all USAG-AK lands. An accurate baseline surface water planning level survey is required by AR 200-3 and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

- Complete, maintain, and update a surface water planning level survey.
- Identify the requirement for a surface water planning level survey.

SB2.1.5 Topographical Planning Level Survey

Conduct a 10-year update of topographical planning level survey on USAG-AK lands. An accurate topographical planning level survey is required by AR 200-3 and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

- Complete, maintain, and update a topography planning level survey.
- Identify the requirement for a topography planning level survey.

SB2.1.6 Vegetation Communities Planning Level Survey

Conduct a 10-year update of vegetation planning level survey on all USAG-AK lands. Vegetation survey is conducted as part of an ecological land classification that synthesizes results from integrated resources studies to map ecologically sensitive portions of the landscape to facilitate land management and minimize impacts to ecosystems. The project is designed to emphasize three aspects of ecosystem management: the sensitivity and recovery of ecosystems to disturbance, permafrost distribution and relative stability, and the value of wildlife habitats. The identification of ecologically sensitive areas and threats to these areas are critical to management of the entire installation. This project will directly support the military mission by identifying locations where special precautions should be taken during

training, and thus, by default, also identifying areas where special precautions need not necessarily be taken. An accurate vegetation communities planning level survey is required by AR 200-3, supports compliance with the Endangered Species Act, and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

- Complete, maintain, and update a vegetation communities planning level survey.
- Identify the requirement for a vegetative communities planning level survey.
- Identify, locate, and map any rare or sensitive vegetation communities.
- Characterize physical and thermal properties of permafrost, analyze relationships of permafrost with other terrain components, model permafrost distribution, and assess the response of permafrost to disturbance.
- Analyze USAG-AK lands for habitat use by passerines and small mammals, and rank them to diversity of wildlife species by relative value.

SB2.1.7 Wetland Planning Level Survey

Conduct wetland planning level surveys on all USAG-AK lands. The wetland survey includes a wetland classification system based on hydro-geomorphic characteristics of vegetative communities. The project includes a description of values and functions of wetlands along with management recommendations. The National Wetlands Inventory failed to detect many of the smaller wetlands, which rendered it inadequate for installation natural resources management programs. Wetland surveys are required for management of withdrawn public lands. An accurate wetland planning level surveys is required by Army Regulation (AR) 200-3 and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

- Complete, maintain, and update wetland planning level survey.
- Identify the requirement for a wetland planning level survey..

SB2.2 Soil and Water Quality Monitoring

Groundwater, surface water, and soil monitoring will be conducted to evaluate the presence of munitions residues from the impact area. Monitoring water quality is important for measuring ecosystem health. Soil and water quality monitoring evaluates water quality coming onto and leaving USAG-AK lands and identifies any potential residues leaving the impact area. Water quality monitoring is required to comply with the Clean Water Act and other environmental laws and regulations, as well as to formulate options for managing those species particularly dependent upon high water quality, as required by the Sikes Act and AR 200-3. Soil and water quality monitoring is required by Public Law 106-65 (Military Land Withdrawal Act) as mitigation for the Land Withdrawal Legislative Environmental Impact Statement and Public Law 86-797 (Sikes Act) requires that an INRMP be implemented and updated every five years.

- Annually monitor surface water as it enters and leaves USAG-AK lands to identify potential contaminants or potential contaminant migration.
- Monitor soils and sediments in streambeds along the installation boundary annually to identify potential contaminants or potential contaminant migration.
- Provide appropriate agencies results of sampling studies.

SB2.3 Wetlands Monitoring

Purpose – establish protocol for monitoring training-related disturbance in wetlands.

1) Obtain schedule of training events from the Range Facility Management Support System.

- Gather information on size of units, location and specific activity.
- The Range and Training Land Assessment Coordinator will check the Range Facility Management Support System schedule once per week and determine monitoring scheme.

2) Classify training events according to potential impact on wetlands (severity of damage and number of acres).

- High impact - major training events, e.g., Northern Edge, Operation Hurricane, and training exercises involving Engineers.
- Moderate to High impact – vehicular maneuver with no surface disruption and/or activities occurring during critical times such as spring break-up or maneuver across frozen but not snow-covered wetlands.
- No to Low impact – foot maneuver activities, e.g. "Expert Infantry Badge" training and orienteering.

3) Establish different levels of monitoring based on frequency, duration, and intensity of training events.

- For High impact events – monitor 50% of exercise duration (includes initial set-up, spot-checking activities and placements, and clearing of areas).
- Spot-check activities involving engineers.
- For Moderate to High impact events – Spot-check maneuver/ training activities during break-up.
- For No to Low impact events – limited monitoring will be conducted on a case-by-case basis.

Disturbed areas will be identified during or shortly after the exercise. Range and Training Land Assessment crews will verify total disturbance acreage. In the following years, Range and Training Land Assessment crews will survey these disturbed/reclaimed areas as distinct land use polygons.

4) Compile monitoring information in an annual report. (The U.S. Army Corps of Engineers may require this report depending on which wetland permits are currently in effect. Reports for Fort Wainwright, to include Donnelly Training Area, will go to the Fairbanks Regulatory office and reports for Fort Richardson will go to the Anchorage Regulatory Office. Additional information may be required.) The report shall include at a minimum:

- Amount of wetland damage (to be compiled and updated on a monthly basis)
- Amount of wetland reclamation (designated as an immediate fix or potential revisit depending on severity of damage)
- Maps showing location and extent of new and cumulative damaged areas (obtained from Global Positioning System points)
- Photos of training activity wetland damage
- Results/comments from U.S. Army Corps of Engineers field visits to areas with heaviest damage

5) Communication with Range Control.

Each unit commander will receive multiple copies of the environmental limitations overlays from Range Control. Individuals will be instructed on the use of the overlays at each Range Briefing; in the Environmental Handbook; in the revised version of AR 350-2, *Range Regulation*; and directly from Range Control before each exercise.

The point of contact between Range Control and Natural Resources will be the Integrated Training Area Management or Range and Training Land Assessment Coordinator.

SB2.4 Range and Training Land Assessment

The U.S. Army's Range and Training Land Assessment program is the monitoring component of the Integrated Training Area Management program, which seeks to maintain a balance between the use of training lands to maximize military preparedness and the conservation of biologically diverse and functioning ecosystems. These two aspects of land use are not always mutually exclusive, however, as combat training can require the use of non-degraded lands to provide realistic combat situations. To this end the Range and Training Land Assessment program in Alaska is designed to provide data to military trainers on the condition of their training lands with respect to both the ecological condition of the land and the condition of the land in terms of its potential to support training. This information is necessary for decisions to be made regarding the location and timing of training events, and also to provide information necessary to prioritize which sites are in need of restoration. In short, the Range and Training Land Assessment data serve as the primary tool used in land management decisions with respect to military training. These data also provide general botanical information about the post and are the focal point of a long-term monitoring program to evaluate the ecological health of the training areas.

In addition to gathering data on the ecological condition of training lands, the Integrated Training Area Management program coordinates the collection of baseline information such as plant and animal species inventories, soils and wetlands surveys. These data are necessary (e.g., endangered species habitat maps, wetlands maps) as inputs into the decision-making process for scheduling training events. They also provide basic biological and physical data that can be drawn upon when natural resource management decisions must be made.

The Range and Training Land Assessment program was formerly called Land Condition Trend Analysis. During the fall of 2004, the program name was changed to more accurately reflect coordinator job duties. The position and program objectives remain the same.

In the field portion of the Range and Training Land Assessment program, we will conduct surveys in various land use areas with the primary goal of quantifying the land condition in each area. These land use areas are defined by military training activities and are referred to as map polygons. The procedures for sampling each land use area include (1) delineating and mapping the polygons to be sampled (from aerial photography), (2) determining the number and location of transects and sample points to be recorded, and (3) recording the actual data at each sample point. We will be conducting primarily the procedures that fall in category 3.

The daily routine in the field consists of calling in to Range Control to get access to the area we want to work in, finding the start of the transect, navigating to the sample point, taking a representative polygon photo at the sample point (one per polygon), recording a Global Positioning System location for the sample point, and then collecting the rest of the data as follows. We will be recording all our data on hand-held computers, running a customized program that provides multiple screens in which to enter the data. First we will record the types of land use activities that are evident within an envisioned 20m radius surrounding the sample point, and any land maintenance activities that are evident. Then we will record a series of variables we collectively call Site Restoration Priority data. These Site Restoration Priority data are also estimated for the envisioned 20m radius surrounding the sample point. Then using a Daubenmire frame we will record (1) the %age of the frame area which shows any disturbance of the ground surface and the nature of the disturbance (i.e., what caused it), (2) the %age of the frame area which has ground cover and the type of ground cover (in broad categories), (3) the canopy height (the minimum height of

plant intersections with the sampling rod) at the four corners of the Daubenmire frame, and (4) the aerial cover of the plants (herbs and shrubs) that cover any portion of the frame area; these are recorded in %age classes. Then with the clinometer we will record the % slope, slope length, and aspect for any slope which occurs across the sampling point. Next we will record the canopy cover above the sample point with the densiometer. Finally, to calculate forest stem density we will record all the trees which are counted as "in" the plot by sighting each tree trunk with a wedge prism. For each counted tree we will record the species, mortality class, and DBH (diameter at breast height). When done for the day, we have to radio Range Control and let them know we are leaving the area.

The complete methodology for Range and Training Land Assessment can be found in the Integrated Training Area Management Plan (U.S. Army Alaska 2005).

SB3. Forestry and Wildfire Monitoring

Monitoring of the forests on Army lands is accomplished through a system of permanent plots. Forest cover maps are continually updated to capture areas cleared for military mission and burned areas from wildfires. Monitoring is a tool used to assess the forest condition and manage wildfires. Vegetation type and cover is critical to maintaining aspects of military training and monitoring is used as a tool to accomplish this.

SB3.1 Continuous Forest Inventory

Inventory and monitoring of USAG-AK's forest resources provide an indicator of ecosystem integrity, biodiversity of species and habitats, and sustained production of commercially valuable forest products. In addition, inventory and monitoring help to determine areas where improvements or rehabilitation are needed to maintain ecosystem integrity and to support military training activities. Inventories are conducted by forestry crews from the USAG-AK Natural Resource Forestry Office with equipment purchased for the purpose of conducting these inventories. Two hundred sixty five forest inventory and analysis plots and forest health monitoring plots are located throughout the forested areas of USAG-AK's training lands to date. Plot establishment and measurement procedures follow U.S. Department of Agriculture Forest Service forest inventory and analysis and forest health monitoring guidelines (U.S. Forest Service 2005). Forest inventory and analysis and forest health monitoring permanent plots are an effective method for detecting changes in forest health, composition, structure, forest fire fuel loading, and determining growth and mortality which can be applied in growth projection models. The forest inventory and analysis plots are re-measured every ten years. Forest health monitoring plots are re-measured every five years. Approximately 10% of the forest inventory and analysis plots area also forest health monitoring plots. The periodic re-measurement of permanent sample plots is statistically superior to successive independent inventories for evaluation of changes in forest conditions. Permanent plot locations and intensity are systematically stratified by forest type across the landscape. Stands are sampled to determine tree species composition, size class distribution, understory species composition, canopy cover, crown size and position, stem density, basal area, regeneration composition and density, and merchantable volumes by species.

SB3.2 Fire History Mapping

Fire history maps are updated annually by obtaining wildfire perimeters from the Bureau of Land Management, Alaska Fire Service's Geographic Information System office. Perimeters of fires smaller than 100 acres, cost, ignition point, and cause are obtained directly from the Military Zone of Alaska Fire Service. Data is consolidated with the previous years in a Geographic Information System. Two data bases are maintained, one of perimeters and one of ignition points. Wildfire and prescribe fire perimeter

data is generated from satellite imagery and/or flying the perimeter with a helicopter and recording the data in a Global Position System unit.

SB3.3 Forest Cover Type Mapping

Forest cover maps are updated annually using fire history perimeters, military construction overlays and overlays of other clearing projects. Forest stands are delineated and attributed on a Geographic Information System using a combination of air photo interpretation, heads up digitizing, and ground truth plot information. Forest stand data attributed in the Geographic Information System comes from forest inventory plot information. Forest stand maps are used for forest utilization planning, identifying specific military training area requirements, military training range location, and natural resource management concerns.

SB3.4 Fuel Hazard Assessments

Wildfire fuel hazard assessments for structures are performed to stands set by the Firewise program (Firewise 2002). All vegetation should be actively managed to reduce fire risk within 30 feet of a structure. Trees should be pruned and spaced at least 10 feet apart out to 100 feet from a structure. Standard assessment forms are used to survey structures. The forms were developed by the Bureau of Land Management, Alaska Fire Service and look at vegetation, building material, location and hazardous material storage. Assessments are updated annually with new structures. Structures are visited on a five year rotation system. Assessment data is stored in a database which is linked to a Geographic Information System with aerial and ground photos of the structures. Fuel assessments at a landscape scale look at vegetation flammability, weather, historical fire patterns, fire behavior and proximity to values at risk. Areas with continuous black spruce leading to high value locations receive the highest concern. Wildfire vegetation fuels maps are updated annually along with forest stand maps. The fuels maps reside in a Geographic Information System and are updated using wildfire and prescribe fire history data, construction and land clearing overlays, aerial photos, and ground truth plot information. Fuels maps are used for wildfire and prescribe fire planning, military training range location, and hazard fuel assessments. Fuels maps follow the Canadian Fire Behavior Prediction System fuel types (Forestry Canada Fire Danger Group 1992).

SB3.5 Wildfire Identification and Reporting

All wildfires are to be immediately reported to Range Control. Range Control will then notify the Bureau of Land Management, Alaska Fire Service and/or the military fire department.

SB3.6 Wildfire Resource Advisor

Wildfire progress monitoring is conducted by the Bureau of Land Management, Alaska Fire Service. Updates can be obtained on their web site http://fire.ak.blm.gov/. Updates for fires were suppression action is required can also be obtained by contacting the public information officer at Alaska Fire Service. The USAG-AK installation forester acts as a liaison with the wildfire incident command staff on an as-needed basis conveying land management concerns and providing institutional knowledge of the land. The USAG-AK installation forester also relays information from the wildfire command staff to the various installation directorates. This function is known as a resource advisor in the wildfire incident command system.

SB3.7 Wildfire and Prescribed Fire Monitoring

Wildfires are monitored for several years after a burn to determine vegetation response, identify erosion issues, and determine if fire suppression actions have been adequately rehabilitated. Monitoring is conducted using a combination of aircraft flyovers, photo points, vegetation plots, and permanent sample plots following forest inventory procedures. Prescribe fires are monitored to determine if burn objectives are met, determine fuel loading, and identify rotational periods between burns. Prescribe fires are used as a tool to reduce fuel loading on ranges where the risk of wildfire limits military training opportunities. Monitoring is conducted using a combination of aircraft flyovers, photo points, vegetation plots, and permanent fuel loading sample plots following procedures outlined by Brown (1976).

SB4. Fish and Wildlife Monitoring

Fish and wildlife monitoring includes procedures to survey and monitor fish and wildlife across all USAG-AK lands. The following section includes procedures, standard practices, and methods for monitoring birds, bear, moose, caribou, bison, small mammals, furbearers, fish, and beluga whales.

SB4.1 Avian Monitoring

USAG-AK uses a number of methods to monitor birds. Breeding Bird Surveys (BBS), Measuring Avian Productivity and Survival (MAPS), breeding bird checklists, point counts, constant effort mist-netting stations (off-post at Creamer's Field) and aerial surveys (trumpeter swans, Tanana Flats Training Area) are conducted (or have been conducted) to monitor avian species on USAG-AK lands.

SB4.1.1 Breeding Bird Surveys

In 2003, USAG-AK started implementation of a long-term breeding bird monitoring program as part of the Alaska Off-Road Breeding Bird Survey on all three posts. U.S. Fish and Wildlife Service was contracted to complete sampling methodology and execute data collection and data reporting.

Bird counting procedures are standardized throughout the Breeding Bird Survey program. Each route consists of 50 stops placed at 0.8-km (0.5-mile) intervals along a 39.4-km (24.5-mile) stretch of road. Routes are surveyed once each year by an observer who is familiar with the sight and song of birds in the region. At each of the stops, the observer records the number of individuals of each species heard or seen during a 3-min period; only birds detected within 0.4 km of the road are counted. Surveys begin 30 minutes before sunrise (no earlier than 0230 hr in Alaska) and are completed within 4-5 hr. Most Alaska routes are surveyed between the second and fourth weeks of June. Because of differences in the skills of observers, the same observer is encouraged to survey the route for a number of years.

Aerial monitoring of trumpeter swans and nesting locations are flown every even year in the Yukon Training Area and on areas at Donnelly Training Area. A Global Positioning System location is recorded and the nest is monitored for hatchling and fledging success when possible.

Atlas surveys are used to determine species distribution and abundance on a base-wide scale. In this survey, biologists systematically search the post for bird species throughout the months of June and July, following the methods of Andres (1995).

The Monitoring Avian Population Survey is a long-term, nationwide study designed to quantify demographic patterns in migratory bird populations.

SB4.1.2 Eagle River Flats Waterfowl Monitoring Protocol

Methodology. All Eagle River Flats waterbird surveys will be conducted by fixed-wing aircraft. Aerial transect surveys are to be patterned after standard Department of Interior aerial survey techniques. Approximately 10 parallel transects will be flown twice, in opposite directions, during each survey. Transect lines will run generally in a north/south direction from tree line on the south side of Eagle River Flats to the coast of Knik Arm on the north. Due to considerable variability of water conditions, lighting conditions, and numbers of birds on Eagle River Flats the transect endpoints are not fixed points and may vary depending on conditions. The controlling factor will be complete coverage of suitable habitat for waterbirds in Eagle River Flats with good visibility under existing conditions at the time of the survey. Surveys will be conducted at maximum altitude of 75 meters and airspeed of 100-150 km/hour. Surveys will be started on the west side of Eagle River Flats and proceed inland. The observer will sit on the right side of the airplane and count all waterbirds on the right side out to a maximum of 200 meters. The pilot will initiate the first transect at a distance from the tree line indicated by the observer, not to exceed 200 meters. At the end of the transect the pilot will turn and fly the same transect in the opposite direction, allowing the observer to count in the opposite direction using visual landmarks to mark the outside edge of that transect. The pilot will initiate the next transect at a distance not to exceed 200 meters to the side of the previously used visual landmarks and establish new visual landmarks for the next transect. This procedure will be repeated until the entire Eagle River Flats area has been surveyed.

Survey Timing – Surveys will be conducted approximately once per week from April through October as weather and airspace restrictions allow. Due to restrictions placed on air space availability over Eagle River Flats by U.S. Army training mission it is not possible to standardize survey timing to tide levels or time of day. Surveys will not be conducted before 09:00 or after 19:00 to maximize lighting conditions. Surveys will not be conducted in rain or with winds in any direction greater than 20 knots.

Data collection. The observer will use a cassette tape recorder to record all observations of waterbirds. The observer will utilize a USAG-AK Geographic Information System Eagle River Flats map with most permanent ponds identified with standard numbers from the Eagle River Flats Cold Regions Research Engineering Laboratory pond data base. The observer will identify and count birds and indicate specific area for all observations, and pond number when possible. Data will be transcribed from tapes and entered in a standard data base for analysis.

The following information will be obtained and annotated:

a. Date: dd/mmm/yyyy format, e.g., 10 Jul 2005.

b. Time: 24 hour time. Start and end times of survey periods and time of sightings using digital timepiece and accurate synchronized time obtainable from http://www.time.gov/timezone.cgi?Alaska/d/-9/java.

c. Optics: Indicate what optics if any are being utilized during the observation period.

d. Observer: Names and initials of observers.

e. Environmental conditions: To be recorded every hour including air temperature, cloud cover, precipitation, wind speed and direction, visibility.

f. Numbers of animals observed: All species are counted when possible, and when in flocks, flock size is estimated.

(1) Geese and ducks: All geese and ducks are to be identified to species when possible or labeled “unknown dabbler or unknown diver” when identification is not possible.

(2) Gulls and shorebirds: Gulls are to be recorded as large or small, and shorebirds are recorded but not classified by species.

(3) Bald eagles: Bald eagles observed in trees bordering Eagle River Flats and on Eagle River Flats are to be recorded as adults or immature.

(4) Sandhill cranes, ravens, and other raptors: Sandhill cranes, ravens, and other raptors observed are to be recorded.

(5) Beluga whales: Beluga whales observed in the river and in Eagle River Bay are to be recorded.

(6) Moose, brown and black bears, and wolves: Observations of moose, brown and black bears, and wolves within Eagle River Flats or along the shoreline are to be recorded.

g. Comments: General comments as to behavior observed, grouping etc.

h. Photographic documentation: To be obtained as is practicable.

SB4.1.3 Owl Surveys

Nationally, increasing interest concerning the distribution, population status, and habitat use by nocturnal raptors has led to the establishment of owl surveys and studies. Not much is known about the owl species inhabiting and utilizing Fort Wainwright Main Post, Tanana Flats Training Area, Yukon Training Area, or the Donnelly Training Area. For example, what species are in what areas? Many owls are seen and heard during the year, but natural resource managers know little more. Birds of prey occupy the top of the food chain and may be susceptible to environmental toxins and contaminants, making them important to monitor as indicators of environmental health. The understanding of distribution, relative abundance, and density of wildlife populations would be valuable for sound management decisions and practices on military lands.

Nocturnal behavior and the early breeding season lends to the difficulty in detecting owls when using traditional methods of monitoring bird populations (e.g., Breeding Bird Survey routes, Breeding Bird Atlases, Christmas Bird Counts, and migration monitoring). Several regions in the United States, Canada and Alaska have effectively implemented volunteer-based nocturnal surveys in an attempt to monitor owl populations.

Nocturnal raptors are top predators and can be used as indicators species for the overall health of an ecosystem. Habitat and prey needs determine the presence or absence of top predators. Management of Army lands can influence both needs. Although owls may not be of economic importance as other top predators like Lynx, they do provide valuable information on prey abundance and availability, as well as aesthetic value to many bird watchers. The surveys are an easy way to study owl populations and compare North American trends. It is recommended that Fort Wainwright maintain and perhaps expands the survey system, providing yet another source of information available for appropriate and efficient management planning. Furthermore, because the survey is standardized, it can be compared nationally and internationally with northern states and Canada. The survey can be used to study trends found in northern North America.

Goals of the Owl Monitoring Project:

U.S. Army Alaska wildlife goals, in cooperation with the U.S. Fish and Wildlife Service and Alaska Department of Fish and Game, are to maintain stable, sustainable wildlife populations on the 1.6 million acres of land under its management.

The main goal of this project is to develop a standardized protocol for monitoring owl populations in the Tanana Flats Training Area, Yukon Training Area, Donnelly Training Area and main post areas beginning in 2005.

Additional goals of this project are to:

1) Understand the distribution and abundance of owl species in the region.

2) Estimate trends in the relative abundance of owls in the area.
3) Study seasonal changes in call rates, distribution, and abundance throughout the late fall, winter, and early spring seasons.
4) Estimate habitat associations of owl species in the region.

Methods

The study requires the implementation of a standardized owl survey designed to collect data throughout the winter season along a designated trail. The following protocol have been applied nationwide and have been modified slightly for the Tanana Flats Training Area, Yukon Training Area and Donnelly Training Area.

Route distance and listening period:

- Each survey route consists of 10 survey stations spaced 1 mile (~1.6 km) apart.
- An eight-minute "passive" listening period is conducted at each designated survey point along the route. After the observer exits the vehicle, he/she should wait a minute or so before starting the eight-minute listening period. This will allow the engine to "quiet" down. The observer will document number of calls during 0-3, 3-5, and 5-8 minute periods. The observer will also record the number of calls heard per individual bird for each interval.

Distance and compass heading information:

Distances from observer to calling owls is estimated as well as compass bearings on call directions. Data recorded is used to examine species detection distances, identify ecological unit owls are calling from, and minimize double counting of individual birds. The estimated distance to the owl, the compass direction of the call from the observer, and the observer's geographical location will be plotted in ARCVIEW to determine owl locations.

Atmospheric information:

Moon phase and visibility, wind speed, cloud cover, and precipitation conditions are recorded at each survey point as well as Global Positioning System locations and the ecological unit at each point.

Survey times and projected length of route:

Owl surveys beginning one half hour after sunset should be completed within 4-5 hours. Sunset/sunrise times for the Fairbanks area can be determined from the Flight Service information network in Fairbanks, AK.

Data to be recorded:

At the start of each route, the route number and name, time, temperature, moon phase and visibility, cloud cover, precipitation level and type, wind speed, and snow cover and depth will be recorded on a data sheet, which is provided.

Wind speed and noise level will be recorded on the data sheet at each station along the route. A wind speed table and description of noise levels is provided.

SB4.1.4 Mew Gulls

Mew gulls (*Larus canus*) return to the Fort Wainwright area to nest each spring. The gulls prefer isolated or stationary platforms upon which to build and protect their nests. Islands, long-term storage containers

and stationary vehicles are consistently used on post. A large segment of military motor pool areas are found on the east side of Badger Pond, an active gravel pit. Although a %age of birds nest on the two small islands within the pond, some tend to move into the motor pool areas and attempt to build nests on the roofs or hoods of Humvees, Small units support vehicles, Strykers, and other military vehicles. Once eggs have been laid, vehicles must remain inactive, by law (Migratory Bird Treaty Act), until the chicks are fledged.

The Natural Resource Office currently advises all military units to monitor their motor pools daily during spring migration; and to remove nests while they are being built. We have also directed that once eggs are found in the nest, the affected vehicle must remain inactive until the birds have left the nest. Inactive vehicles results in loss of training opportunity for Solders.

Prior to 9/11, Fort Wainwright soldiers rarely deployed to combat situations. Post 9/11, military vehicles are required year-round for military training, and deployment. Annually, since 1997, at least one call has been received from personnel regarding active nests on their vehicles. Natural Resources personnel have applied for and obtained annual sanctions from the U.S Fish and Wildlife Service to approve permit authorized personnel within the Directorate of Public Works to relocate bird nests from vehicles using plywood or other flat items. By sliding the object under the nest, it may be moved to the most isolated area of the motor pool and left undisturbed. Up to 10 nests in a given year are permitted relocation. A nuisance gull management plan will be required by U.S. Fish and Wildlife Service starting in 2007 for continued application and permitting for depredation sanctions. Nesting control and monitoring activities are now required as part of that management plan. Observation measures were begun in 2005 and are now standard operations that occur on the Main Post of Fort Wainwright, mostly in the motor pools near Badger Pond 64˚49’N, 147˚ 36’W. Daily records are compiled by the Natural Resources Coordinator at the Environmental Resources Office, 3023 Engineer Road, Fort Wainwright, Alaska.

Fort Wainwright obtained gull depredation permits from U.S. Fish and Wildlife Service in 2004 and 2005. Previous permits were most likely obtained; however, records are currently unavailable/unknown. The purpose of this permit is to allow for the removal of occupied nests that have been established on active military equipment or vehicles. The gulls find unmoving vehicles and equipment premier nesting habitat as it is elevated aboveground level and defendable from most predators. The parking areas next to Badger Pond are also considered prime habitat, as they provide an isolated, safe place for chicks to gather prior to flight capability. When monitored properly, nest building can be deterred and equipment kept free of hindrance. On occasion, a nest might accidentally be overlooked during the monitoring and need removing. However, the priority is for preventative measures and that is where the survey serves best.

Daily surveys were initiated in 2005 to monitor mew gull nesting activities in and around historically hit motor pool areas. The purpose of monitoring was to establish timelines for nesting activity and obtain detailed information on nest removal and relocation.

In 2005, a major deployment of troops and equipment took place and on many occasions the areas to be surveyed were inaccessible. Nest and contents could not be counted properly and therefore the 2005 survey is lean on the nest activity details. Gull nest surveys were the only form of monitoring conducted during 2005. Nests were not removed during nest building and active phase. However, some nests were removed after chicks had left. Accessibility was a major issue preventing nest removal, and active nest removal was hampered by the delay of the depredation permit. Fortunately, many vehicles and necessary equipment were already removed from the parking areas and gull nesting did not hamper military operations.

Troops and equipment are now returning to Fort Wainwright, and proactive monitoring activities will prevent unnecessary vehicle downtime. Part of the management plan will now include annual submittal of

educational material along with contact information to commanding officers in charge of motor pools in March. A second reminder of the upcoming nesting season will be issued in April.

Daily monitoring will begin with first observations of gulls on main post, and continue until all nesting behavior ends for the season. Monitoring will be shared by natural resource/environmental and motor pool military personnel. Access to motorcade parking areas will be arranged and allowed for affective nest monitoring by nonmilitary personnel. A combined lock system with natural resource/environmental seasonal accessibility during the breeding season will greatly increase nest search ability, and allow for newly constructed and inactive nests to be removed in a timely manner. If access is unobtainable, and an active nest is found thereafter, the commanding officer or motor pool manager will notify the Natural Resource Office of nesting activity, and if able, the nest will be relocated. If unable, the vehicle will be unusable until the nesting behavior is completed.

Current monitoring surveys occur at the following buildings: 2295, 3015, 3421, 3425, 3475, 3477, 3479, 3480, 3485, 3490, 3492, 3494, and 3496. Surveys consist of daily walk-throughs, in which personnel document any and all nesting activity. Incomplete or unoccupied nests will be removed daily and documented. Empty nests, devoid of chicks and or eggs are defined as unoccupied. A nest is defined as occupied once an egg has been placed into the structure, and therefore only permitted personnel may remove or relocate the nest. Only ten nests may be removed or relocated during the season. Activity documented includes nest building, completion, and presence/number and location of eggs and chicks. Data is collected and assembled in an excel spreadsheet.

Annual submittal of the required monitoring surveys, and annual reports to U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, and U.S. Department of Agriculture/Animal and Plant Health Inspection Service will be conducted when breeding season is over, and personnel will begin application for new permits and required forms from all agencies before November each year, unless otherwise indicated by said agencies. Timely permitting will greatly increase the effectiveness of judicious nest removal from needed equipment and buildings if nest construction is missed.

The management plan will continue and be regularly updated as long as gulls remain an issue at Fort Wainwright, and depredation permits are required. Proactive activities will insure optimum training opportunities for military personnel as well as compliance to federal law.

SB4.2 Bear Survey

Brown bear (*Ursus arctos*) will be studied to determine numbers, diet, and habitat use and movement patterns across the greater Anchorage-Eagle River area including Fort Richardson and Elmendorf Air Force Base military lands.

Methodology. Beginning in April 2005, upon den emergence in the spring biologists with Alaska Department of Fish and Game, Fort Richardson Natural Resources Department and Elmendorf Air Force Base will capture up to 10 adult female brown bears and deploy radio collars with Global Positioning System remote download capabilities.

Bears will be captured either by helicopter darting, ground trapping, or free-range darting. All captures will be conducted according to the Alaska Department of Fish and Game animal care and use policies. Collared bears will be monitored periodically by aerial radio telemetry utilizing the VHF transmitter of the radio collars. Additional bears may be captured opportunistically during the summer as natural resources managers deal with problem bears.

The Global Positioning System collars will collect bear location data approximately every ninety minutes and all data will be retained in collar memory. Bears will be located by aerial radio telemetry approximately every two weeks, and archived Global Positioning System data stored in the collar will be uploaded to the aircraft. The Global Positioning System collars will be programmed to collect data for two summers. All collars will be removed at the end of the study unless Alaska Department of Fish and Game (ADF&G) priorities require the maintenance of the collars on individual bears.

Habitat use and movement patterns: ADF&G personnel will perform all data entry and statistical analysis related to this project. Bear locations will be entered into an ArcGIS 9 database. Location data will be compared with habitat types using multivariate statistics to identify areas used by bears. Relevant Geographic Information System databases will be collected from ADF&G and Fort Richardson Environmental Geographic Information System Section. Bear movement data will be examined to determine the existence and location of travel corridors on Fort Richardson, Elmendorf Air Force Base and across the greater Anchorage-Eagle river area.

Brown bear numbers: Biological samples (hair, blood, and scat) will be collected from all captured bears and from bears killed by hunters, vehicles or in defense of life or property in the study area. Additional hair and scat samples will be collected by Fort Richardson Natural Resources Department staff during weekly visits to transects established in suitable bear habitat identified by Fort Richardson Natural Resources Department biologists. DNA will be extracted from all blood and hair samples. Microsatellite and mitochondrial laboratory analysis will be conducted by ADF&G personnel in their lab, and species identification, gender, and possibly individual identification to un-collared bears will be assigned.

Brown bear diet: Hair and blood samples will be analyzed for stable isotope concentrations of carbon, nitrogen, and sulfur to provide information on bear diet. Samples will be prepared in the ADF&G lab in Anchorage, and the isotopic analysis will be performed in the U.S. Geological Survey stable isotope lab in Denver, Colorado.

SB4.3 Bison, Caribou, and Moose Monitoring

SB4.3.1 Fort Richardson Aerial Winter Moose Surveys

Aerial surveys of the moose population living in and around Fort Richardson have been conducted for approximately 40 years (comprehensive data available from 80s to present) and are currently conducted jointly by the U.S. Army and ADF&G. These annual comprehensive surveys are usually flown during early winter when obscuring deciduous foliage is at a minimum and when there is sufficient fresh snow depth (approximately 1-2 feet) to cover dark vegetation and soil that would otherwise mask the presence of individual moose. Every attempt is made to complete the surveys prior to the middle of January to minimize sexing errors due to the annual antler shed and to allow antler-class data collection. Data analysis and report generation are conducted by ADF&G. Data from these surveys are used in a variety of management decisions.

The area covered by this survey includes Fort Richardson, Elmendorf Air Force Base and upper Ship Creek Valley for a total coverage area of approximately 90,000 acres. This total area is divided into 14 discrete units of land called Survey Units. Contained within each survey unit is a smaller area of land called an intensive plot. Survey unit and intensive plot boundaries remain the same from year to year and follow recognizable topographic features to the greatest practicable extent. The size of each survey unit varies depending on area topography and range from just over 4,100 (survey unit 13) to just over 9,500 acres (survey unit 5). Intensive plot sizes likewise vary and range from just under 450 acres (intensive plot 8) to just under 900 acres (intensive plot 2).

Surveys typically employ the services of two experienced contract pilots flying small, maneuverable aircraft with low stall speeds (e.g., PA-18, Piper Supercub). Total survey time varies depending on a variety of factors but usually requires 18 hours (1 -2 hours per survey unit) combined flight time flown over the course of two consecutive days.

Data are collected by a single trained observer in each plane (typically one Army and one ADF&G) and are recorded on a standard data form (see "Moose Census Form"). Data recorded per animal observed includes sex, relative antler class (if bull), number of calves (if cow) and if located in the intensive plot (called sightability corrector factor in the data sheet). Also indicated per survey unit are start/stop times, temperature, snow age and cover, light type and intensity, predominant habitat type and conditions potentially affecting the survey results.

Surveys are conducted around 800 feet aboveground level at an approximate airspeed of 60-70 m.p.h. Each survey unit is flown in its entirety using a standard linear search pattern and then each intensive plot is resurveyed using a more intensive circular search pattern. The standard search consists of consecutive parallel transects (modified as required by topography and survey conditions) covering the entire survey unit (including the intensive plot). Transect width varies from approximately .25 -.5 mile. Every moose observed along the focus transect is circled to ensure data integrity.

The standard search portion of the survey provides data on the number of animals actually observed in the survey unit as a whole but must be adjusted for animals not seen by the observer to obtain a more accurate picture of population size. This adjustment is accomplished, in part, by intensively resurveying a portion of the survey unit (i.e., the intensive plot) using an overlapping circular flight pattern. The objective of this intensive search is to obtain an exact count of the number of animals contained within each intensive plot.

These data are then compared to the number of moose observed in the intensive plot during the standard search and are used by ADF&G to generate a Sightability Correction Factor for that survey. This Sightability Correction Factor is a multiplier that is then used to adjust the observed number of moose to account for animals that were missed during that particular survey. For example, suppose that 8 moose were observed within the intensive plot during the standard search of a given survey unit and that 9 were actually sighted during the intensive search of the intensive plot. Assuming that every animal within that intensive plot was counted during the intensive survey and that the intensive plot is representative of the entire survey unit, it is assumed that for every 8 animals observed in the standard search, one animal was missed (.125 animals were missed for every animal sighted or 12.5% of observed total were missed). To adjust the number of observed animals then, the total number of observed moose is multiplied by 1.125 (Sightability Correction Factor).

SB4.3.2 Caribou Surveys

Caribou known to utilize the Donnelly Training Area include the Delta and Macomb herds. The Delta caribou herd primarily occupies an area in the northern foothills of the central Alaska Range between the Delta and Nenana rivers. During the mid- 1980s, calving areas were primarily located between the Delta and Little Delta rivers. However, as the herd size increased during the mid 1980s, calving began to extend into the Dry Creek area, and, by 1993, they were reported as using the upper Wood River, Dick Creek, upper Wells Creek, and upper Nenana and Susitna drainages (Valkenburg et al. 2002; Valkenberg et al. 1988). According to ADF&G, the majority of calving in recent years has been in the upper Susitna and upper Yanert drainages. Some calving has also occurred on the north side of the Alaska Range between the Little Delta and Tatlanika rivers. A few Delta caribou do calve on military lands east of the Little Delta each year (Mark Keech, personal communication). The Delta caribou calving area is delineated in the 2002-2006 Fort Greely and Donnelly Training Area, Alaska Integrated Natural Resources

Management Plan. During the fall and winter of 2000, ADF&G noted a significant portion of Delta caribou herd located on Donnelly Dome and Donnelly Flats area.

The Macomb caribou herd utilizes the mountains of the eastern Alaska Range, from the Delta River to the Mentasta Highway, concentrating activity between the Robertson River and Jarvis Creek. ADF&G reports that the Macomb caribou herd also utilizes the Tanana River valley lowland for forage during the winter season. Primary calving grounds for the Macomb caribou herd are located on the Macomb plateau. The history and management regarding both the Delta and Macomb caribou herds can be found in the ADF&G 2003 management report (ADF&G 2003).

Numerous survey studies concerning the Delta and Macomb caribou herds have been conducted over the years (Young 2001 & 2004; Dubois 2001; Froehle 1982). A 1979 cooperative project led by ADF&G and supported by USAG-AK, surveyed calving caribou in a 90 mile^2 area during a five-day period in May. The area examined lay between Delta Creek and Delta River on the southern boundary of Donnelly Training Area (ADF&G 1980). Alaska Biological Research, Inc. and University of Alaska Fairbanks performed noise sensitivity studies on Delta herd animals subjected to over-flights during Air Force training activities on the west side of the Delta River (Maier et al. 1998). ADF&G routinely tracks and monitors collared animals for both the Delta and Macomb herds.

During the late 1990s and early 2000s, it was noted that caribou had begun to use Donnelly Training Area East (in the vicinity of Donnelly Dome and Donnelly Flats). Proposals for military development in this area spurred natural resource staff interest in possible conflicts with caribou and/or caribou habitat. During the time, resource managers did not know the degree of caribou use of Donnelly Training Area East, when activity occurred, or to which herd animals belonged. Both the Macomb and Delta herds' ranges overlap on Donnelly Training Area East, and both herds have unique management strategies as put forth by ADF&G. Prior to February 2004, no specific survey concentrated on caribou use for the Eddy Drop Zone, Donnelly Drop Zone, and Texas Range areas. The decision was made to establish aerial surveys specifically designed to study caribou presence in and use of Donnelly Training Area as a whole for management assessment and development purposes.

Survey flights were set up once a month, year-round, weather dependant. Each survey was flown in an Aviat Husky A-1 carrying the pilot/biologist and biologist/observer (both in-house staff of the Environmental Office of U.S. Army Garrison Alaska). Applying a survey study design based on input from ADF&G Delta Junction and Fairbanks area biologists, the survey began by flying roughly 8,000 ft. mean sea level along the Donnelly Training Area boundary, detecting and documenting radio collar frequencies. While flying the boundary, detected frequencies would be documented, if possible, as being located on or off Donnelly Training Area. All collars delineated as being within the installation boundary as well as any large concentration of animals near the border were tracked, and located at low-level for the purposes of obtaining collar number verification, herd size estimate, latitude/longitude position, and notes were taken pertaining to herd movement, calving, feeding, habitat use and any other pertinent information with regard to herd activity.

An intense low-level survey for Donnelly Training Area East was initially set up using east/west transects 30" apart starting about (63˚ 54' 00") flying south, and ending roughly at (63˚ 47' 00"). The western boundary extended roughly between the Delta River and Windy Ridge. Altitude varied depending on terrain. If caribou were located, the pilot would break from the transect line and circle, counting the number of adults and calves, if seen, mark the individuals using the onboard Global Positioning System unit and document number of individuals and activity. Once the information was collected, the pilot would resume flying the transect line. The transect surveys were put aside later on for lack of productivity and sightability issues, and, instead, the pilot and observer would spend the majority of time locating

collared animals after the initial high level survey had been conducted. Data was entered into an excel spreadsheet and coordinates were layered onto a map for visual reference.

A total of 13 surveys were flown between February 2004 and March 2005, before the tragic loss of the pilot Tony Payne. Primarily, animals were initially located by tracking collar frequencies, and visually identified, when possible, by collar number. Collar frequencies have been omitted from the report and instead collar numbers are used for identification purposes. Some caribou have identical collar frequencies, or numbers and sometimes both. Non-collared animals were detected by transect work and opportunistically.

SB4.3.3 Bison Surveys

The Delta Bison Herd is located in the Delta Junction/Donnelly Training Area, and has been the subject of interest for the citizens of Delta, the Alaska Department of Fish and Game, the Delta Agricultural Project and the U.S. Army Garrison Alaska (USAG-AK). The bison migrate between private, state and federal lands, which affects special management decisions due to very different needs and goals. In gathering documentation and data for this report, it became apparent that the Delta bison herd has a long and convoluted history and that it was important to provide an account of activities to best understand the topic as a whole when discussing current USAG-AK activities and possible recommendations. The purpose of this document is threefold. The first is to provide a brief but encompassing history of the Delta bison herd. The second, to present USAG-AK qualitative survey data on the movements and distribution of the bison during calving season. Finally, to offer recommendations that may contribute to the cooperative management of the bison herd.

Survey flights were set up once a week, weather dependant. The survey was flown, between 200’ – 500’ above ground level, in an Aviat Husky A-1 starting from Delta Junction and beginning at the mouth of Jarvis Creek. It was considered highly unlikely that there would be any bison north of this point (Steve Dubois, personal communication). From there, an intense survey was begun, flying the Delta River bank to bank, until reaching the Keyhole boundary, where the plane was flown as far east as Windy Ridge, including Texas and Washington ranges. The pilot resumed bank-to-bank flying after reaching the spruce forests located at the southern boundary of Washington Range. During 2005, the survey was flown between the Delta River and the eastern boundary of Donnelly Training Area, checking for bison still migrating to the summer range. The survey was flown using east/west transects 1/2 mile apart to a point south of Buffalo Dome. From Buffalo Dome, the pilot flew south down the west bank of the Delta River, also covering forested areas. The census was continued down to the outlet of Black Rapids Glacier. If a herd was located, the pilot would break from the transect line and circle, counting the number of adults and calves, if seen, and recording Global Positioning System coordinates. Once the information was collected, the pilot would resume flying the transect line. Each survey took approximately 3.5 hours.

Collected data was entered into an excel spreadsheet, and coordinates were layered onto a map for visual reference. % of the bison herd observed was calculated from the total number of animals counted during each survey and the management goal population of 360 as put forth by Alaska Department of Fish and Game.

SB4.4 Small Mammal and Furbearer Surveys

SB4.4.1 Small Mammal Surveys

The primary objective of this survey is to conduct an inventory of small mammal species.

The contractor shall (1) develop a sampling plan that inventories riparian and other critical habitats under-represented in the 1994 survey, as well as habitats thought to harbor rare species, (2) execute the sampling plan and collect the field data, and (3) collect representative voucher specimens for all species encountered.

Task 1. Develop a sampling plan

The contractor shall develop a sampling plan to inventory riparian and other critical habitats under-represented in the 1994 survey, as well as habitats thought to harbor rare species. The sampling plan will be based on the habitats represented on the existing vegetation map. This map lists vegetation types to the level IV of Viereck et al. (1992).

Task 2. Trap small mammals

The contractor shall navigate to the selected sample sites and trap small mammals at each site following standard methods for mammal trapping in Alaska (using Sherman live traps, museum specials, rat traps, and pitfall traps). As much as possible, the methods and trapping effort will be held constant among sampling sites.

Task 3. Collect and maintain voucher specimens

The contractor shall collect and maintain voucher specimens and blood samples of each species for potential genetic analysis, epidemiological studies, and toxin indicators. U.S. Army Alaska will not, however, pay for these analyses.

The contractor shall deliver a draft report in standard scientific format that includes introduction, methods, results, and discussion. The report will describe in detail the actual locations of the sampling sites (field Global Positioning System coordinates and a map of the sites), the effort spent in trapping at each site, the small mammal species identified (by site), a description of small mammal/habitat associations, and management and/or inventory recommendations for small mammals.

Army personnel have conducted small mammal inventories, using a combination of live (Sherman live traps and pitfall) and museum special snap traps, on a small portion of Army land with more inventory work needed during the 2007-2001 time frame.

Areas to be sampled are determined by natural resources personnel in coordination with Range Control, with plot numbers and locations within each area chosen based on a variety of factors.

Each plot is sampled for three nights, with traps checked every 24 hours. Each plot consists of 120 traps set along two 300 meter linear transects that are roughly parallel (depending on topography) and 30 meters apart. Each transect consists of 20 stations set 15 meters apart. Each station consists of a circular array (about one meter apart) of three traps: one museum special snap trap, one Sherman live trap and one conical pitfall trap. Snap traps are baited with a mixture of rolled oats and peanut butter, and Sherman live traps are typically baited with raisins and de-shelled sunflower seeds. Pitfall traps are not baited. Trap placement within the specific circular configuration varies but are usually set along natural runways when possible.

All easily identifiable live specimens captured are placed in a plastic bag to protect both the animal and collector, measured and then released immediately on-site. Live specimens that cannot be positively identified in the field are euthanized quickly using cervical dislocation per Colorado State University animal handling procedures.

Specimens are placed in individual plastic bags along with a waterproof label noting specimen number, date, location, species, condition of specimen and collector (s). The specimens are then placed in an iced cooler within one hour of collection and frozen within 3 hours in order to maintain high quality tissue samples for possible future studies.

All specimens, except for those identified in the field and released, are sent to the museum at the University of Alaska Fairbanks for curation. Specimens are cleaned, processed, identified and preserved in the University of Alaska Museum Mammal Collection. Ecto and internal parasites are collected for future studies. Tissue samples from most specimens are collected and immediately frozen in an ultra-low temperature freezer (-80 C). All data are entered into the Museum database and USAG-AK databases

SB4.4.2 Bat Surveys

Methodology. Acoustic monitoring will be the primary means utilized to sample bat community presence, composition, relative abundance and activity levels. Mist netting surveys will be used to capture bats to verify species identification, for species specific data collection and to record reference calls. Field surveys will be conducted during periods of frequent bat activity (approximately 1 June - 1 October).

Acoustic monitoring. Bat echolocation calls will be monitored and recorded using ultrasonic bat detectors (Anabat II® or Petterson D240x) in conjunction with an electronic Interface Module unit and laptop computer or remotely using ultrasonic bat detectors in conjunction with sound activated cassette tape recorders. Remote detector units will be housed in black PVC boxes and strapped to trees 3-4 meters above the ground with the microphone of the detector directed at a 45-degree angle from the ground. An IBM compatible computer and Anabat6 or Sonobat software will be used to create, display, compare and analyze sonograms (Time vs. Frequency) of recorded bat echolocation calls. For the purpose of data analysis, a call sequence will be defined as a series of bat calls with duration of greater than 0.5 ms consisting of more than two individual echolocation calls. Calls recorded in the field will be compared to calls of known identity or “reference calls,” allowing genus specific features of bat echolocation calls to be discriminated and, in some cases, species specific differentiations will be made.

Mist net surveys. Mist net surveys will be conducted by qualified USAG-AK natural resources staff in accordance with Alaska Department of Fish and Game permit requirements. Because mist net surveys for bats are more successful over water sources such as ponds and streams where bats forage and drink, mist netting surveys will focus on the water sources within the survey area that appear most conducive for capturing bats. Avinet® 9m and 12m length nets and Avinet® 3 piece net pole sets or equivalents will be used. Three nets, with spacing of approximately 30 meters as determined by site logistics, will be opened at sunset and kept open for three hours or until at least one hour passes without a bat capture. Nets will be arranged to maximize capture success and will be centered on the best available foraging habitats in the survey site area. Mist nets will not be deployed on nights with inclement weather such as low temperature or precipitation. Captured bats will be removed from mist nets, placed in 100% cotton drawstring bags and transported to a central area located 20-40 meters from the nets for processing. Species-specific identification will be determined using published dichotomous keys. For each captured bat the species, sex, reproductive status, mass, forearm length, age class, capture time, net number, direction of flight and air temperature at time of capture and will recorded. Juveniles will be distinguished from adults by a lack of ossification of the third metacarpal-phalangeal joint. To further discriminate between *Myotis* species, additional data will be taken such as tragus length, thumb length, right rear foot measurements, as well as calcar keel and fringe presence. Every effort was made to ensure the welfare of captured bats and to prevent individuals from escaping the nets. To monitor the presence of insects available as potential prey for bats during the mist net survey periods, insect traps constructed of four inch (10.16 centimeter) diameter black ABS tubing smeared with axle grease will be deployed at acoustic survey sites. Traps will

be suspended 1-2 meters above ground level. All captured insects will be removed from traps, stored in alcohol and later identified to Family level using published dichotomous keys.

Additional Data Collection. The following information will be obtained and annotated on a bat survey data form:

a. Date: dd/mmm/yyyy format, e.g., 10 Jul 2005.
b. Observer: names and initials of all survey personnel present.
c. Station: Survey site location.
d. Global Positioning System data: Global Positioning System coordinates of survey site locations.
e. Time: 24 hour time. Start and end times of survey periods.

SB4.5 Fisheries Surveys

SB4.5.1 Pike Surveys

Northern pike have been confirmed in two lakes, Otter and Gwen, on Fort Richardson although Gwen Lake experiences heavy winter die-off and is currently not thought to harbor pike. Pike are not indigenous to south-central Alaska and can have devastating effects on ecosystems that have not adapted to their presence. Indigenous forage fish and visiting wildlife (waterfowl, small mammals, etc) are likely to suffer from the highly predatory pike. Additionally, stocked rainbow trout in these lakes are likely to be highly impacted. The primary objectives for this project are to monitor for the presence/absence of pike in post lakes and to remove as many pike as possible from water bodies harboring pike. The secondary objective is to delineate potential prime pike spawning and rearing locations in all post water bodies.

Monitoring for the presence of pike in Fort Richardson waters consists of review of annual Alaska Department of Fish and Game fish harvest reports, angler interviews and visual surveys of the water bodies themselves. Fish harvest reports are reviewed annually for records of pike harvest in Otter, Clunie and Gwen lakes (records from 1979-2004 indicate no reported pike harvests). Anglers are interviewed in the field as often as possible throughout the year and are queried for pike observations or harvest.

Visual surveys for the presence of pike in Fort Richardson lakes (Otter, Gwen, Thompson, Walden, Clunie) is conducted by Army personnel on an annual basis. Personnel circumnavigate each post lake by non-motorized boat or canoe at least once during the summer, searching for observable pike. Observers are equipped with polarized sunglasses for enhanced subsurface visual acuity and gps units to record exact locations of observations. Survey areas and patterns vary depending on the water body but in general are concentrated along the shoreline and around offshore patches of aquatic vegetation. In areas where shoreline vegetation makes visual detection of hiding pike difficult, personnel may employ electrofishing techniques if doing so can be accomplished safely and with a reasonable degree of certainty that non-target species will remain unaffected by the electrical pulses. Areas of likely spawning and rearing habitat are also noted during the water body surveys and are mapped to aid future monitoring and removal efforts.

SB4.5.2 Fisheries Harvest Surveys

Army personnel monitor fish harvest in installation waters primarily through review of annual Alaska Department of Fish and Game fish harvest reports and secondarily through on-site angler interviews. Data available from Alaska Department of Fish and Game fish harvest reports includes (for select water bodies) number of anglers, trips, days fished and number of harvested fish per species.

Additionally, anglers are interviewed in the field as often as possible throughout the year and are queried regarding harvest success.

SB4.5.3 Spawning Salmon Surveys

Chester Creek Adult Coho Survey
Army personnel conduct annual streamside surveys of adult coho salmon in South Fork Chester Creek on Fort Richardson to determine timing and abundance of spawning coho in addition to delineation of important spawning areas along the stream. Streamside salmon surveys are often conducted in tandem with the collection of brown bear hair for the brown bear population estimation component of the brown bear telemetry project. Data generated from this survey is used for a variety of management decisions and may serve as baseline data in support of salmon reintroduction efforts on Chester Creek.

Surveys are typically conducted weekly in August and September. The surveys employ a minimum of two observers, both equipped with wading equipment, polarized sunglasses and gps units. Surveys start at the bridge on Bulldog Trail and proceed both upstream and downstream for a distance of approximately 100 yards past the last observed adult salmon. Both upstream and downstream stretches of the creek are surveyed during the course of a single day when possible to minimize duplicate counts resulting from fish movement.

Observers proceed carefully along one bank of the creek with the lead observer scanning primarily for salmon and the trailing observer recording data and scanning primarily for bears. Data recorded include date, survey conditions, species, numbers and location of all fish observed. Also recorded are observations of bear activity. Every attempt is made to minimize disturbance to fish.

Campbell Creek Adult Salmon Survey
Army personnel conduct annual streamside surveys along North Fork Campbell Creek on Fort Richardson to determine timing and abundance of spawning sockeye, coho and chinook salmon in addition to delineation of important spawning areas along the stream. Surveys start at the footbridge on Bulldog Trail and proceed upstream for approximately 100 yards past the last observed salmon and downstream to the installation boundary.

Survey methodology follows that given above except that they are conducted weekly from June until October.

SB4.6 Beluga Whale Monitoring

Schedule for Observations:
Observations will be conducted on as many days as possible during the months of May-November. Technicians assigned to the beluga project will be prepared to conduct observations every work day and some weekends. Before the observation season at the mouth of Eagle River can begin, a trail must be cleared by Explosives Ordnance Demolition (EOD) personnel. Alternate trails will also be established leading from the main trail around the ends of tidal channels, to allow for egress during average high tide events (28-30 feet). Anyone accessing the mouth across the flats must have the appropriate training (see below), coordinate with Range Control, retain positive radio communication with Range throughout the entirety of the stay on the ERF and must walk only on the trail cleared and marked by EOD.

Observation start times will be as close to 0800 as possible with end times around 1600. These are loose guidelines however, as ambient light (especially in the fall) and tidal state conditions (high tides often cover the routes cleared by EOD and thus preclude entrance into the impact area) will often dictate the

true start time. Also, there may be times when tidal conditions will preclude leaving the flats until well after 1600.

Observations will be coordinated as far in advance as possible with Range Control, noting, however, that the Range schedule usually does not extend beyond a couple of days to a week at the maximum. The number of days in which sampling can occur in ERF is directly related to military training activities. Any military training involving "live fire" exercises may block use of access roads used to enter ERF if they are within the firing fan of the training at hand. The firing fan is that area in which there is a one in a million chance of a live round of ammunition landing outside of the surface danger zone. The amount of data that can be collected over the course of the field season is therefore directly related to these activities. Currently, no firing is taking place during the field season.

Training:
All field observers will attend the following safety courses: First aid/CPR (unless possessing current certification), Unexploded Ordnance training, Eagle River Flats safety briefing and bear safety. All field observers will read, at a minimum, section I of the National Marine Fisheries Service document, "Conservation Plan for the Cook Inlet Beluga Whale *(Delphinapterus leucas*), 2008" http://www.fakr.noaa.gov/protectedresources/whales/beluga/mmpa/final/cp2008.pdf .

Field observers will also undergo supervised training by experienced (minimum of two years of directed beluga observations) permanent staff regarding data collection procedures and identifying defined whale behaviors. Observers will be exposed to the full variety of typical behaviors exhibited by beluga whales in Eagle River and Eagle Bay. A minimum of 40 hours of supervised training will take place before observers will be allowed to collect data on their own. Most of the time, at least one experienced member of the permanent staff will be present throughout the field season. A minimum of two observers will always be present during whale observations.

Observations and Data Collection:

Follow protocol: Group follow
Sampling Method: Focal group sampling.
Length of Sampling Round: 20 minutes
Parameter of Interest: Beluga abundance (# of individuals or # of whale groups).
Estimator: mean number of belugas, mean number of whale groups

Once at the observation point, one observer will scan for belugas in Eagle Bay using high quality binoculars (Zeiss and Swarovski 12x45) and spotting scope (Swarovski 20-60X)[1] while the other observer scans the river using the naked eye. Scans will be broken down into 20 minute sampling rounds. Once whales are spotted, observers will follow a single group of whales for 20 minutes or until the group can no longer be seen due to distance or environmental conditions.

All observations will be noted on a standardized data sheet. The observer will define group activity based on their assessment of what most (>50%) of the whale group is engaged in during the course of the sampling round. Up to two behaviors can be recorded during the sampling round, with one being designated as the primary (1°) activity and the other designated as the secondary (2°) activity. Any unusual behaviors during sampling rounds will be noted in the comments section on the back of the datasheet.

[1] Inclusion of specific company names or products in this document does not indicate endorsement by the U.S. Army or any other entity named herein.

Behavioral budgets of belugas (a proportion, calculated as time spent in a behavioral state/total time focal group follow) will be calculated. Budgets can also be determined on a daily scale, at 1-hour intervals over the course of the day (average proportion of time spent per behavioral state per 1-hour interval). Beluga behavioral budgets will allow us to examine the range of activities whales engage in over the course of the day in a systematic fashion and whether or not these behaviors change over the course of the field season. Focal group sampling is subject to several biases such as attention being drawn to more obvious behaviors and differential visibility of group members due to their activity (Mann 2000), but there are a few reasons why this sampling methodology is being used in ERF. First, focal animal sampling for belugas is not possible as individuals are very hard to identify and following them at any distance in the turbid conditions of Eagle Bay and Eagle River is not practical. Second, two years of whale observation from ERF has shown that belugas tend to move as one cohesive group into and out of the observation area over the course of the day, with relatively small inter-individual distances, which lends itself very well to group sampling. In addition, because of this cohesive behavior, rare behavioral events can be recorded without losing track of the primary behavior of the group itself.

Over the course of each sampling round counts of whales will be made, distinguishing between white, gray, and calves. *Only whales actually seen will be counted. There will be no attempt to account for whales that might be under water***.** These estimates will be averaged to come up with an estimate of the total number of whales observed over the course of the day. Since most observations over the course of a day are of the same group of whales, the number of animals observed will usually increase as the whales move closer to the observation point, allowing for more accurate counts. Summary statistics will be calculated for the mean number of whales observed for each day, week and month. Single factor analysis of variance will be used to determine if there are significant differences in the mean number of belugas observed in and around ERF from month to month (May-October) and over the course of the day. Sample size requirements needed to obtain a 95% confidence interval for multisample means analysis will follow Zar (1984).

Environmental conditions can mask the true color of an individual. Under some lighting conditions for instance, some gray animals appear much lighter than they actually are. For this reason, observers should, to the greatest extent possible, compare the size of gray animals to that of associated white animals. Additionally, while beluga calves are primarily dark in color, calves ranging from pinkish-brown to almost pure white have been observed in Knik Arm. Since observed whale groups tend to move closer to the observation point throughout the day as they move up Eagle Bay, more accurate enumeration of age class composition will be possible, helping to minimize observation biases associated with distance. Furthermore, based on past observations, the ability to count and classify whales decreases dramatically on the west (far) side of Eagle Bay sandbar. Because of this, enumeration and classification of whales will only be recorded for animals sighted on the east (near) side of the sand bar, which should further help to minimize distance bias. Environmental conditions will be recorded at the start of every sampling round. Any sampling round in which conditions are rated as poor will be truncated from the data set and excluded from analysis.

An alpha-numeric grid superimposed over a map of the area will be used to record the location of a whale group at the start and end of the sampling round. A compass bearing to the whale(s) position relative to the observation site should also be noted to help refine the location. Depending upon funding, a theodolite may be purchased in order to more accurately denote whale locations.

The time covered by each sampling round will be noted (in 24 hr. mode). This will allow for further analysis of whale numbers over the course of the day. Unusual behaviors or other species of wildlife observed will be recorded in the notes section. Any signs of a beluga in distress (signs of entanglement, strandings, etc) will be reported immediately to the NMFS [(907)360-3481)]. Any harassment of belugas by boats must be reported to NMFS enforcement division [(907) 250-5188]. Pictures (especially video)

of such incidents and recording of boat numbers and detailed descriptions will be taken to aid in carcass recovery, rescue, or law enforcement efforts. Responses (if any) of belugas to boats or aircraft flying over the study area should also be noted. The presence of other marine mammals (such as harbor seals) should always be recorded in the notes section as well.

Observers will only follow one group at a time per sampling round. If a group can no longer be observed, then it is permissible for the observer to move on to another group, making sure to note the sampling round and whale count in the next row on the data sheet. Each whale group will be given its own unique sampling round number to distinguish between separate samples. Separate data sheets will be used for each distinct whale group. If more than one group is present at the same time, more than one observer will be needed. If groups converge, they will be treated as one group for the duration of the sampling round. Observers should make a note of converging groups in the comments section on the back of the datasheets. If a target whale group goes out of sight during any point of a sampling round and whales are seen again before the end of the same round, then this observed group will be considered the same group if seen in same general grid area of the previous sighting. If a whale group goes out of sight and stays out of sight for more than 20 minutes, it will be treated as a separate sample group if spotted after that time period and given its own unique sampling round number.

Statistical Note: In this study, the sample is each distinct group of belugas. If one group of whales is followed for one or several sampling rounds, then our sample size is still only N = 1. This is an important distinction for purposes of analysis and to avoid pseudoreplicaton.

Remote Camera Operation:
In addition to direct observations of whales, remote color motion-sensitive cameras with infrared illumination at low light (Reconyx PC 85)[2] are used to collect presence/absence data on belugas during times when observers cannot be present. A minimum of two cameras will be deployed on the north bank of Eagle River- one at the mouth facing SSW (perpendicular to water flow) and one approximately 200 M upstream from the mouth facing W). Cameras will be set on time-lapse mode with a one minute time increment between shots and with the motion-detection feature enabled. Camera times will be synched with each other and all other devices used to record time during the observational period (watches, video cameras, etc). Each camera will be serviced (change card and batteries) every two weeks and checked for obvious external problems (alignment change, lens fouling, etc) every day when feasible.

Camera cards will be stored in a waterproof container while in the field. The data from cards will be downloaded onto an external hard drive dedicated solely to this project and backed up on a redundant drive. Analysis of the images from each card will be completed as soon as possible after removal from the field with a general time limit of two weeks from removal to analysis. Data will be entered into a Microsoft Access database.

Analysis will be performed by one experienced team member (having analyzed at least one full seasons worth of camera data (or at least 30,000 images) or two team members that have analyzed less than 30,000 images each. Analysis of the images will include searching photos[3] for presence of beluga whales

[2] Inclusion of specific company names or products in this document does not indicate endorsement by the U.S. Army or any other entity named herein.
[3] Images are named using an alpha-numeric scheme, are numbered sequentially, and ordered sequentially in the folder created by the camera. Images taken under the motion-detection mode are named with a number proceeded by an "M" (e.g. M000101.jpg). These images are placed at the beginning of the sequence of images in a particular folder, even if they were the last images taken. Images taken under the time-lapse mode are named with a number proceeded by a "T" (e.g. T000101.jpg) and are placed after the images taken by the motion-detection images.

and harbor seals in the river. Analysts will indicate camera number, folder name,[4] starting time and date of the folder, presence of beluga(s) or other marine mammals, any other unusual event (e.g. boat passage, other mammalian presence, etc), and the date and end time of each folder. When an entry is made about the presence of a beluga, the analyst must note the following information: date, time, image number, number of whales, color of whales, and tidal state[5].

At the end of the folder, the analyst will then subtract the number of unusable images (night images, images taken while servicing camera, etc) from the gross number of images and record the resulting figure as the total number of usable images. The analyst will also note if observers were present on the flats during the dates covered in a folder and if so during which times. The presence/absence data from both the camera and the observational studies will then be compared. This comparison will allow a measure of how effective the cameras are at recording the actual presence/absence of whales.

SB5. Recreation Monitoring

SA5.1 Recreational Facility Survey

Purpose. Establish a protocol for recreational facilities surveys.

Stocked Lakes Surveys. Conduct survey on at least an annual basis, preferably twice a year (once prior to the start of the summer season in April/May, and once at the close of the season in September/October). Visit each road-accessible stocked lake and gather data on the following:

1. Alaska Department of Fish and Game SIGNS. Location, condition, number.
2. ACCESS. Type of access such as hiking trail, ATV trail, road, boat ramp. Condition (is erosion occurring). Surface material (gravel, dirt, emergent wetland, etc). Original forms should already contain information about how to access the site (distance from highway, distance from main road, etc.).
3. RECREATION. Type of recreation available (fishing, camping, picnicking).
4. FISH STOCKING. Current stocking information from Alaska Department of Fish and Game – available from local F&G office or on the web.
5. IMPACTS. Written description of visible disturbance, trash, wheel ruts, foot paths, etc.
6. WETLANDS. Specific written description of wetlands at the lake and disturbance to them.
7. PHOTOS. Take photos of the lake, access, signs, impacts, wetlands and other items for documentation.
8. MONITORING HISTORY. Record the date of your visit.

Compile a report with the above information listed on one sheet per lake. Compare with previous years to document any changes in conditions and to list all previous dates under the Monitoring History section. Include a representative photo and stocking history table.

Other Recreational Areas. Compile a list of other established recreational sites that should be monitored on an annual basis, if any. Conduct the survey annually, and gather the following data:

1. SIGNAGE. Location, condition, number.

[4] Folders will be named using the following convention: ERFCamera#_start date-end date. Thus a group of images taken with Camera number 3 during from 1 July to 1 August, 2009 would be archived in a folder called "ERFCam3_1July-1Aug09"

[5] i.e. low tide, ¼ flood/ebb, ½ flood/ebb, ¾ flood/ebb, full tide—these are based on comparison to a series of photos indicating physical landmarks associated with each tidal stage.

2. ACCESS. Type of access such as hiking trail, ATV trail, road, boat ramp. Condition (is erosion occurring). Surface material (gravel, dirt, emergent wetland, etc). During the initial survey, record information about how to access the site (distance from highway, distance from main road, etc.).
3. RECREATION. Type of recreation available.
4. IMPACTS. Written description of visible disturbance, trash, wheel ruts, foot paths, etc.
5. WETLANDS. Specific written description of any wetlands at the site and disturbance to them.
6. PHOTOS. Take photos of the site, access, signs, impacts, wetlands and other items for documentation.
7. MONITORING HISTORY. Record the date of your visit.

Compile a report with the above information listed on one sheet per site. Compare with previous years to document any changes in conditions and to list all previous dates under the Monitoring History section. Include a representative photo.

SA5.2 Trespass Structure Monitoring

1. Purpose: Establish a monitoring protocol for locating trespass structures and documenting trail establishment and expansion.

2. Background: For over 25 years, trespass structures have been erected on Fort Wainwright, primarily in the Tanana Flats Training Area. Structures ranged from simple tent stands to elaborate homes. The number of structures grew rapidly during the 1990s, with nearly 55 structures identified in the late 1990s before abatement measures were adopted. A continuing effort is required to identify new or previously overlooked structures. In addition to trespass structure monitoring, new trails can be documented at the same time.

3. Protocol:

3.1. Tanana Flats Training Area and Donnelly Training Area West.

3.1.1. Flights will be arranged with helicopters or fixed-wing aircraft. Personnel from G-3 Range Control and Directorate of Public Works Environmental will act as observers. Post Safety, Provost Marshal's Office and others may also be involved. A systematic approach that follows known airboat and riverboat access routes is best. In addition, air strips and the lands around them will be checked. Off-road recreational vehicle trails from these air strips will be flown. Any new trails will be mapped with the Global Positioning System.

3.1.2. When structures are identified, potential helicopter landing zones will also be identified. Alternate methods of access will be noted if landing zones are not available.

3.1.3. Areas may also be accessed by airboat or riverboat, although generally trespass monitoring by boat will be conducted concurrently with other field projects.

3.1.4. During the winter, many of these areas are also accessible by snowmachine, which will allow for additional monitoring from the existing trail network.

3.2. Road-accessible areas (Yukon Training Area, Donnelly Training Area East, Fort Richardson).

3.2.1. Monitoring will be conducted on an opportunistic basis when conservation personnel are in the field for other projects.

3.3. Data to be collected.

3.3.1. Global Positioning System points and photographs will be taken.

3.3.2. A brief inventory of contents may also be conducted.

3.3.3. When possible, at the time a structure is located it should be posted with a notice to vacate the property. This is a standard notice and contains POC phone numbers.

3.3.4. An effort should be made to locate information about the owners, which can sometimes be found at the cabin. (This information is used during the removal and clean-up phase.)

3.4. At a minimum, surveys will be conducted annually over all areas and may be combined with other aerial surveys.
3.5. All data on new or newly discovered cabins will be kept on the 'TAC matrix.xls' file at Fort Wainwright.
3.6. A more comprehensive method of trail creation/expansion monitoring involves Geographic Information System analysis comparing new aerial photography with previous photographs. This can only be accomplished when new aerial photos are flown.

SC. MANAGEMENT

SC1. Introduction

The following section details the procedures and standard practices used by USAG-AK for survey and monitoring of its natural resources. These procedures and standard practices are grouped by program area.

SC2. Watershed Management

Watershed management includes procedures to manage soils, water, vegetation, and landforms across all USAG-AK lands. Watershed management constitutes standard procedures and practices for soils management and wetlands management. Any work in navigable water or wetlands will most likely need a permit from the U.S. Army Corps of Engineer Regulatory Branch and from the State of Alaska Department of Natural Resources Office of Habitat Management and Permitting. Where practicable, "softer" bioengineered techniques will be employed, such as those discussed in McCullah and Gray (2005) and Walter et al. (2005), rather than traditional hardened techniques such as riprap.

SC2.1 Soils Management

The following section describes standard procedures for erosion and sediment control structures, gravel pit development and reclamation, guard rail, gate, fencing and post installation, sign and Seibert stake installation, and permanent and temporary soil stabilization practices.

SC2.1.1 Erosion and Sediment Control Structures

The structures in this section that can be used in-stream or on a streambank below the ordinary high water of the water body (e.g., rock barbs, gabions, grid pavers, outlet protection, riprap) would require permits from state (Alaska Department of Natural Resources Office of Habitat Management and Permitting, Alaska Department of Environmental Conservation) and federal agencies (U.S. Army Corps of Engineers). Any streambank stabilization project would also require a permit from the same state and federal agencies.

SC2.1.1.1 Rock Barbs

Rock barb in-stream structures should be the last resort at solving streambank erosion problems, especially in streams that have been designated as anadromous. In addition, these structures must be designed by an experienced engineer/hydrologist. If these structures are not designed and constructed properly, they can be destructive. Rock barbs consist of constructed rock piles set in the streambed installed to deflect erosive water forces away from vulnerable streambanks. Rock barbs are keyed into the existing bank slope and streambed, extend into the stream and are pointed upstream. Barb length, barb spacing, rock size and gradation and depth of bed and bank keying are dependant on stream size and hydrology, soils and protection requirements. Rock barbs can include wire basket enclosures for rock placement.

SC2.1.1.2 Brush Barrier

Brush barriers are perimeter sediment control structures used to prevent soil in storm water runoff from leaving a construction site. Brush barriers are constructed of material such as small tree branches, root mats, stone, or other debris left over from site clearing and grubbing. In some configurations, brush barriers are covered with a filter cloth to stabilize the structure and improve barrier efficiency.
Brush barriers are applicable to sites where there is enough material from clearing and grubbing to form a sufficient mound of debris along the perimeter of an area. The drainage area for brush barriers must be no greater than 0.25 acre per 100 feet of barrier length. In addition, the drainage slope leading down to a brush barrier must be no greater than 2:1 and no longer than 100 feet. Brush barriers have limited usefulness because they are constructed of materials that decompose.

A brush barrier can be constructed using only cleared material from a site, but it is recommended that the mound be covered with a filter fabric barrier to hold the material in place and increase sediment barrier efficiency. Whether a filter fabric cover is used or not, the barrier mound should be at least 3 feet high and 5 feet wide at its base. Material with a diameter larger than 6 inches should not be used, as this material may be too bulky and create void spaces where sediment and runoff will flow through the barrier. The edge of the filter fabric cover should be buried in a trench 4 inches deep and 6 inches wide on the drainage side of the barrier. This is done to secure the fabric and create a barrier to sediment while allowing storm water to pass through the water-permeable filter fabric. The filter fabric should be extended just over the peak of the brush mound and secured on the down-slope edge of the fabric by fastening it to twine or small-diameter rope that is staked securely.

Brush barriers are an effective storm water runoff control only when the contributing flow has a slow velocity. Brush barriers are therefore not appropriate for high-velocity flow areas. A large amount of material is needed to construct a useful brush barrier. For sites with little material from clearing, alternative perimeter controls such as a fabric silt fence may be more appropriate. Although brush barriers provide temporary storage for large amounts of cleared material from a site, this material will ultimately have to be removed from the site after construction activities have ceased and the area reaches final stabilization.

Brush barriers should be inspected after each significant rainfall event to ensure continued effectiveness. If channels form through void spaces in the barrier, the barrier should be reconstructed to eliminate the channels. Accumulated sediment should be removed from the uphill side of the barrier when sediment height reaches between 1/3 and 1/2 the height of the barrier. When the entire site has reached final stabilization, the brush barrier should be removed and disposed of properly.

Brush barriers can be effective at reducing off-site sediment transport, and their effectiveness is greatly increased with the use of a fabric cover on the up-slope side of the brush barrier.

SC2.1.1.3 Check Dams

Check dams are small, temporary dams constructed across a swale or channel. Check dams can be constructed using gravel, rock, sandbags, logs, or straw bales and are used to slow the velocity of concentrated flow in a channel. By reducing the velocity of the water flowing through a swale or channel, check dams reduce the erosion in the swale or channel. As a secondary function, check dams can also be used to catch sediment from the channel itself or from the contributing drainage area as storm water runoff flows through the structure. However, the use of check dams in a channel should not be a substitute for the use of other sediment-trapping and erosion control measures. As with most other temporary structures, check dams are most effective when used in combination with other storm water and erosion and sediment control measures.

Check dams should be used in swales or channels that will be used for a short period of time where it is not practical to line the channel or implement other flow control practices. In addition, check dams are appropriate where temporary seeding has been recently implemented but has not had time to take root and fully develop.

Check dams are usually used in small open channels with a contributing drainage area of 2 to 10 acres. For a given swale or channel, multiple check dams, spaced at appropriate intervals, can increase overall effectiveness. If dams are used in a series, they should be spaced such that the base of the upstream dam is at the same elevation as the top of the next downstream dam.

Check dams can be constructed from a number of different materials. Most commonly, they are made of rock, logs, sandbags, or straw bales. When using rock or stone, the material diameter should be 2 to 15 inches. Logs should have a diameter of 6 to 8 inches. Regardless of the material used, careful construction of a check dam is necessary to ensure its effectiveness. Dams should be installed with careful placement of the construction material. Mere dumping of the dam material into a channel is not appropriate and will reduce overall effectiveness.

All check dams should have a maximum height of 3 feet. The center of the dam should be at least 6 inches lower than the edges. This design creates a weir effect that helps to channel flows away from the banks and prevent further erosion. Additional stability can be achieved by implanting the dam material approximately 6 inches into the sides and bottom of the channel. When installing more than one check dam in a channel, outlet stabilization measures should be installed below the final dam in the series. Because this area is likely to be vulnerable to further erosion, riprap, geotextile lining, or some other stabilization measure is highly recommended.

Check dams should not be used in live, flowing streams unless approved by an appropriate regulatory agency. Because the primary function of check dams is to slow runoff in a channel, they should not be used as a stand-alone substitute for other sediment-trapping devices. Also, leaves have been shown to be a significant problem by clogging check dams in the fall. Therefore, they might necessitate increased inspection and maintenance.

Check dams should be inspected after each storm event to ensure continued effectiveness. During inspection, large debris, trash, and leaves should be removed. The center of a check dam should always be lower than its edges. If erosion or heavy flows cause the edges of a dam to fall to a height equal to or below the height of the center, repairs should be made immediately. Accumulated sediment should be removed from the upstream side of a check dam when the sediment has reached a height of approximately one-half the original height of the dam (measured at the center). In addition, all accumulated sediment should also be removed prior to removing a check dam. Removal of a check dam should be completed only after the contributing drainage area has been completely stabilized. Permanent vegetation should replace areas from which gravel, stone, logs, or other material have been removed. If the check dam is constructed of rock or gravel, maintenance crews should be sure to clear all small rock and gravel pieces from vegetated areas before attempting to mow the grass between check dams. Failure to remove stones and gravel can result in serious injury from flying debris.

Field experience has shown that rock check dams are more effective than silt fences or straw bales to stabilize wet weather ditches. For long channels, check dams are most effective when used in a series, creating multiple barriers to sediment-laden runoff.

SC2.1.1.4 Construction Entrances

The purpose of stabilizing entrances to a construction site is to minimize the amount of sediment leaving the area as mud and sediment attached to motorized vehicles. Installing a pad of gravel over filter cloth

where construction traffic leaves a site can help stabilize a construction entrance. As a vehicle drives over the gravel pad, mud and sediment are removed from the vehicle's wheels and off-site transport of soil is reduced. The gravel pad also reduces erosion and rutting on the soil beneath the stabilization structure. The filter fabric separates the gravel from the soil below, preventing the gravel from being ground into the soil. The fabric also reduces the amount of rutting caused by vehicle tires by spreading the vehicle's weight over a larger soil area than just the tire width.

In addition to removal of sediment by simple friction of vehicle tires on the gravel pad, a vehicle washing station can be established at the site entrance. Wash stations, if used on a routine basis, remove a substantial amount of sediment from vehicles before they leave the site. Diverting runoff from vehicle washing stations into a sediment trap helps ensure that sediment removed from vehicles is kept on-site and disposed of properly.

Typically, stabilized construction entrances are installed at locations where construction traffic leaves or enters an existing paved road. However, the applicability of site entrance stabilization should be extended to any roadway or entrance where vehicles will access or leave the site. From a public relations point of view, stabilizing construction site entrances can be a worthwhile exercise. If the site entrance is the most publicly noticeable part of a construction site, stabilized entrances can improve the appearance to passersby and improve public perception of the construction project.

All entrances to a site should be stabilized before construction and further disturbance of the site area begins. The stabilized site entrances should be long and wide enough so that the largest construction vehicle that will enter the site will fit in the entrance with room to spare. If many vehicles are expected to use an entrance in any one day, the site entrance should be wide enough for the passage of two vehicles at the same time with room on either side of each vehicle. If a site entrance leads to a paved road, the end of the entrance should be "flared" (made wider as in the shape of a funnel) so that long vehicles do not leave the stabilized area when turning onto or off of the paved roadway. If a construction site entrance crosses a stream, swale, or other depression, a bridge or culvert should be provided to prevent erosion from unprotected banks. Stone and gravel used to stabilize the construction site entrance should be large enough so that they are not carried off-site with vehicle traffic. In addition, sharp-edged stone should be avoided to reduce the possibility of puncturing vehicle tires. Stone or gravel should be installed at a depth of at least 6 inches for the entire length and width of the stabilized construction entrance.

Although stabilizing a construction entrance is a good way to help reduce the amount of sediment leaving a site, some soil may still be deposited from vehicle tires onto paved surfaces. To further reduce the chance of these sediments polluting storm water runoff, sweeping of the paved area adjacent to the stabilized site entrance is recommended. For sites using wash stations, a reliable water source to wash vehicles before leaving the site might not be initially available. In this case, water may have to be trucked to the site at additional cost.

Stabilization of site entrances should be maintained until the remainder of the construction site has been fully stabilized. Stone and gravel might need to be periodically added to each stabilized construction site entrance to keep the entrance effective. Soil that is tracked off-site should be swept up immediately for proper disposal. For sites with wash racks at each site entrance, sediment traps will have to be constructed and maintained for the life of the project. Maintenance will entail the periodic removal of sediment from the traps to ensure their continued effectiveness.

Stabilizing construction entrances to prevent sediment transport off-site is effective only if all entrances to the site are stabilized and maintained. Also, stabilization of construction site entrances may not be very effective unless a wash rack is installed and routinely used. This can be problematic for sites with multiple entrances and high vehicle traffic.

SC2.1.1.5 Drainage Swale

A drainage swale is a channel with a lining of vegetation, riprap, asphalt, concrete, or other material and is used to intercept and divert flow to a suitable outlet. It is constructed by excavating a channel and applying the appropriate stabilization. They can be used to convey runoff from the bottom or top of a slope. For swales draining a disturbed area, the outlet can lead to a sediment trapping device prior to its release.

SC2.1.1.6 Earth Dike

Earthen perimeter controls usually consist of a dike or a combination dike and channel constructed along the perimeter of a disturbed site. Simply defined, an earthen perimeter control is a ridge of compacted soil, often accompanied by a ditch or swale with a vegetated lining, located at the top or base of a sloping disturbed area. Depending on their location and the topography of the landscape, earthen perimeter controls can achieve one of two main goals. Located on the upslope side of a site, earthen perimeter controls help to prevent surface runoff from entering a disturbed construction site. An earthen structure located upslope can improve working conditions on a construction site by preventing an increase in the total amount of sheet flow runoff traveling across the disturbed area and thereby lessen erosion on the site. Alternatively, earthen perimeter control structures can be located on the downslope side of a site to divert sediment-laden runoff created on-site to on-site sediment trapping devices, preventing soil loss from the disturbed area.

These control practices can be referred to by a number of terms, including temporary diversion dikes, earth dikes, or interceptor dikes. Generally speaking, however, all earthen perimeter controls are constructed in a similar fashion with a similar objective to control the velocity and/or route of sediment-laden storm water runoff.

Temporary diversion dikes are applicable where it is desirable to divert flows away from disturbed areas such as cut or fill slopes and to divert runoff to a stabilized outlet. The dikes can be erected at the top of a sloping area or in the middle of a slope to divert storm water runoff around a disturbed construction site. In this way, earth dikes can be used to reduce the length of the slope across which runoff will travel, thereby reducing the erosion potential of the flow. If placed at the bottom of a sloping disturbed area, diversion dikes can divert flow to a sediment trapping device. Temporary diversion dikes are usually appropriate for drainage basins smaller than 5 acres, but with modifications they can be capable of servicing areas as large as 10 acres. With regular maintenance, earthen diversion dikes have a useful life span of approximately 18 months.

To prevent storm water runoff from entering a site, earthen perimeter controls can be used to divert runoff from areas upslope around the disturbed construction site. This is accomplished by constructing a continuous, compacted earthen mound along the upslope perimeter of the site. As an additional control measure, a shallow ditch can accompany the earthen mound.

The siting of earthen perimeter controls depends on the topography of the area surrounding a specific construction site and on whether the goal is to prevent sediment-laden runoff from entering the site or to keep storm water runoff from leaving the site. When determining the appropriate size and design of earthen perimeter controls, the shape of the surrounding landscape and drainage patterns should be considered. Also, the amount of runoff to be diverted, the velocity of runoff in the diversion, the erodibility of soils on the slope and within the diversion channel or swale are essential design considerations.

Diversion dikes should be constructed and fully stabilized prior to commencement of major land disturbance. This will maximize the effectiveness of the diversion measure as an erosion and sediment control device.

The top of earthen perimeter controls designed as temporary flow diversion measures should be at least 2 feet wide. Bottom width at ground level is typically 6 feet. The minimum height for earthen dikes should be 18 inches, with side slopes no steeper than 2:1. For points where vehicles will cross the dike, the slope should be no steeper than 3:1 and the mound should be constructed of gravel rather than soil. This will prolong the life of the dike and increase effectiveness at the point of vehicle crossing.

If a channel is excavated along the dike, its shape can be parabolic, trapezoidal, or V-shaped. Prior to excavation or mound building, all trees, brush, stumps and other objects in the path of the diversion structure should be removed and the base of the dike should be tilled before laying the fill. The maximum design flow velocity should range from 1.5 to 5.0 feet per second, depending on the vegetative cover and soil texture.

Most earthen perimeter structures are designed for short-term, temporary use. If the expected life span of the diversion structure is greater than 15 days, it is strongly recommended that both the earthen dike and the accompanying ditch be seeded with vegetation immediately after construction. This will increase the stability of the perimeter control and can decrease the need for frequent repairs and maintenance.
Earth dikes are an effective means of diverting sediment-laden storm water runoff around a disturbed area. However, the concentrated runoff in the channel or ditch has increased erosion potential. To alleviate this erosion capability, diversion dikes must be directed to sediment trapping devices, where erosion sediment can settle out of the runoff before being discharged to surface waters. Examples of appropriate sediment trapping devices that might be used in conjunction with temporary diversion structures include a sediment basin, a sediment chamber/filter, or any other structure designed to allow sediment to be collected for proper disposal.

If a diversion dike crosses a vehicle roadway or entrance, its effectiveness can be reduced. Wherever possible, diversion dikes should be designed to avoid crossing vehicle pathways. Earthen diversion dikes should be inspected after each rainfall to ensure continued effectiveness. The dike should be maintained at the original height, and any decrease in height due to settling or erosion should be repaired immediately. To remain effective, earth dikes must be compacted at all times. Regardless of rainfall frequency, dikes should be inspected at least once every two weeks for evidence of erosion or deterioration.

When properly placed and maintained, earth dikes used as temporary diversions are effective for controlling the velocity and direction of storm water runoff. Used by themselves, they do not have any pollutant removal capability. Diversion dikes must be used in combination with an appropriate sediment trapping device at the outfall of the diversion channel.

SC2.12.1.7 Filter Berms

A gravel or stone filter berm is a temporary ridge made up of loose gravel, stone, or crushed rock that slows, filters, and diverts flow from an open traffic area and acts as an efficient form of sediment control. A specific type of filter berm is the continuous berm, a geosynthetic fabric that encapsulates sand, rock, or soil.

SC2.1.1.8 Gabions

Gabions are free-draining walls constructed by filling large baskets with broken stone. The baskets are made from galvanized steel mesh, woven strips, or plastic mesh. They can also be made from wickerwork, bamboo slats, nylon or polypropylene. A typical basket is rectangular with dimensions of about 50 cm by 15 cm.

Retention is achieved from a combination of the stones weight and its interlocking and frictional strength. The wall face is battered at approximately 6 degrees from the vertical. The maximum height is approximately 10 m. They are constructed with either a stepped face or a stepped back.

The permeability and flexibility of gabions make them suitable when the retained material is likely to be saturated and when the bearing quality of the soil is poor. Wire mesh gabions have two forms, baskets, which are used for walls, and mattresses, which are used for revetments and river linings.

The actual shape of gabion retaining walls is trapezoidal. However, the outer and inner faces may be straight or steeped. The width of the horizontal tread of the steps should not exceed the depth of the gabion. Walls can have a plain outer face, preferably built to a batter for appearance and to increase resistance to overturning. Similarly walls with stepped faces should be tilted toward the backfill. Counter forts or buttresses may be incorporated in the construction.

For large walls where the cross section is greater than 4m wide, an economy can be made by using a cellular form of construction. The outer and inner gabion faces are tied by bulkheads of gabions and the cells between them filled with stone. The size and shape of the cells should be proportioned to achieve internal stability.

For rivers, the permeability of the gabions allows water in the backfill to drain freely during the falling water levels. However, the use of filters should be considered to prevent leaching of minerals.

SC2.1.1.9 Gradient Terraces

Gradient terraces are made of either earthen embankments or ridge and channel systems that are properly spaced and are constructed with an adequate grade. They reduce damage from erosion by collecting and redistributing surface runoff to stable outlets at slower speeds and by increasing the distance of overland runoff flow. They also surpass smooth slopes in holding moisture and help to minimize sediment loading of surface runoff.

Gradient terraces are most suitable for use in areas with an existing or expected water erosion problem and no vegetation, and they are only effective when there are suitable runoff outlets provided. They are usually limited for use on long, steep slopes with a water erosion problem, or where it is anticipated that water erosion will be a problem. They should not be constructed on slopes containing rocky or sandy soil. Gradient terraces should be designed with adequate and appropriate outlets and should be installed according to a well-developed plan after conduction of an engineering survey and layout. Acceptable outlets include grassed waterways, vegetated areas, or tile outlets. Any outlet that is used should be able to redirect surface runoff away from the terraces and toward an area that is not susceptible to erosion or other damage.

General specifications require that:

- Whenever possible, vegetative cover should be used in the outlet.
- At the junction of the terrace and the outlet, the terrace's water surface design elevation should be no lower than the outlet's water surface design elevation when both are performing at design flow.
- During construction of the terrace system, dust control procedures should be followed.
- Proper vegetation/stabilization practices should be followed while constructing these features.
- Gradient terraces are not appropriate for use on sandy, steep, or shallow soils. If too much water permeates the soil in a terrace system, sloughing could occur, and cut and fill costs could increase substantially.

Regular inspections of the terraces should occur after any major storms and at least once a year to ensure that the terraces are structurally sound and have not been subject to erosion.

SC2.1.1.10 Cobble Drains

Cobble drains are typically installed underneath roads crossing sub-surface water flows to prevent fill material saturation and impairment. Cobble drains consist of aggregate 3” to 7” with no fines set into excavated trench approximately 3’ below the road sub-base. Trench width and location are determined by surface scours prior to installation. Cobble drains typically run to a downhill slope and are installed perpendicular to the road base. The outlet is left open.

Once the aggregate is installed, a layer of geotextile extending a minimum of 2’ over the trench sides is installed and the area is backfilled with material in 6” compacted lifts to desired height.

A backhoe (Case 235) or an excavator (CAT 320) is used for cobble drain excavation.

SC2.1.1.11 Stand Pipes

Stand pipes, also known as drop inlets, are used in areas where ponding water levels must be maintained without being allowed to overtop a road or pad. Stand pipes are constructed out of corrugated metal pipe and their installation is similar to regular corrugated metal pipe culvert installation, but include a vertical section of pipe attached to a 90 degree elbow. The height of the vertical pipe inlet is set at an elevation that maintains desired water levels. Stand pipes typically include a trash rack grate assembly installed on the top of the vertical pipe to prevent coarse debris from entering the pipe.

A backhoe (Case 235) or an excavator (CAT 320) is used for stand pipes excavation. Stand pipes are installed on top of a 6” layer of D1 bedding and covered with 6” layers of compacted fill material until desired coverage is met.

SC2.1.1.12 Gravel or Stone Filter Berm

A gravel or stone filter berm is a temporary ridge made up of loose gravel, stone, or crushed rock that slows, filters, and diverts flow from an open traffic area and acts as an efficient form of sediment control. A specific type of filter berm is the continuous berm, a geosynthetic fabric that encapsulates sand, rock, or soil. Gravel or stone filter berms are most suitable in areas where vehicular traffic needs to be rerouted because roads are under construction, or in traffic areas within a construction site.
The following construction guidelines should be considered when building the berm:

- Well-graded gravel or crushed rock should be used to build the berm.
- Berms should be spaced according to the steepness of the slope, with berms spaced closer together as the slope increases.
- Sediment that builds up should be removed and disposed of and the filter material should be replaced. Regular inspection should indicate the frequency of sediment removal needed.
- Berms are intended to be used only in gently sloping areas. They do not last very long, and they require maintenance due to clogging from mud and soil on vehicle tires.
- The berm should be inspected after every rainfall to ensure that sediment has not built up and that no damage has been done by vehicles. It is important that repairs be performed at the first sign of deterioration to ensure that the berm is functioning properly.
- The effectiveness of a rock filter berm depends upon rock size, slope, soil, and rainfall amount. The continuous berm is not staked into the ground and no trenching is required. Effectiveness has been rated at up to 95% for sediment removal, but is highly dependent on local conditions including hydrologic, hydraulic, topographic, and sediment characteristics.

SC2.1.1.13 Grid Pavers

Cement or plastic grid pavers can be used to line ditches or stream bottoms where vehicles cross in order to control erosion, stabilize stream bottoms, and minimize rutting or shifting of material. Grid pavers also reduce storm water runoff, help prevent flooding, reduce non-point source pollution, reduce imperviousness of the area, and minimize site disturbance.

SC2.1.1.14 Outlet Protection

This involves placing structurally lined aprons or other appropriate energy-dissipating devices at the outlets of pipes to reduce the velocity of storm water flows and thereby prevent scouring at storm water outlets, protecting the outlet structure and minimizing potential for erosion downstream. If outlets are draining directly into streams that support fish, then design and construction methods need to be carefully taken into consideration.

SC2.1.1.15 Permanent Diversions

Diversions can be constructed by creating channels across slopes with supporting earthen ridges on the bottom sides of the slopes. The ridges reduce slope length, collect storm water runoff, and deflect the runoff to acceptable outlets that convey it without erosion.

Diversions are used in areas where runoff from higher elevations poses a threat of property damage or erosion. Diversions can also be used to promote the growth of vegetation in areas of lower elevations. Finally, diversions protect upland slopes that are being damaged by surface and/or shallow subsurface flow by reducing slope length, which minimizes soil loss.

Ridge. A cross section of the earthen ridge must have side slopes no steeper than 2:1, a width at the design water elevation of at least 4 feet, a minimum freeboard of 0.3 feet, and a 10% settlement factor included in the design.

Outlet. Four acceptable outlets for the conveyance of runoff and their construction specifications include:

I. Storm water conveyance channel

A permanently designed waterway, containing appropriate vegetation, that is appropriately shaped and sized to carry storm water runoff away from developing areas without any damage from erosion. The following are general specifications that are required for channel construction:

- All obstructions and unsuitable material, such as trees, roots, brush, and stumps, and any excess soil, should be removed from the channel area and disposed of properly.
- The channel must meet grade and cross-section specifications, and any fill that is used must be compacted to ensure equal settlement.
- Parabolic and triangular-shaped, grass-lined channels should not have a top width of more than 30 feet.
- Trapezoidal, grass-lined channels may not have a bottom width of more than 15 feet unless there are multiple or divided waterways, they have a riprap center, or other methods of controlling the meandering of low flows are provided.
- If grass-lined channels have a base flow, a stone center or subsurface drain or another method for managing the base flow must be provided.
- All channels must have outlets that are protected from erosion.

II. Level spreader

A level spreader is a device used to prevent erosion and to improve infiltration by spreading storm water runoff evenly over the ground as shallow flow instead of through channels. It usually involves a depression in the soil surface that disperses flow onto a flatter area across a slight slope and then releases the flow onto level vegetated areas. This reduces flow speed and increases infiltration. Construction specifications for level spreaders include:

- Level spreaders should be constructed on natural soils and not on fill material or easily erodible soils.
- There should be a level entrance to the spreader to ensure the flow can be evenly distributed.
- Heavy equipment and traffic should not be allowed on the level spreader, as they can cause compaction of soil and disturbance of the slope grade.
- The spreader should be regraded if ponding or erosion channels develop.
- Dense vegetation should be sustained and damaged areas reseeded when necessary.

III. Outlet protection

This involves placing structurally lined aprons or other appropriate energy-dissipating devices at the outlets of pipes to reduce the velocity of storm water flows and thereby prevent scouring at storm water outlets, protect the outlet structure, and minimize potential for erosion downstream. Construction specifications for outlet protection practices require the following:

- No bends occur in the horizontal alignment.
- There is no slope along the length of the apron, and the invert elevations must be equal at the receiving channel and the apron's downstream end.
- No overfall at the end of the apron is allowed.
- If a pipe discharges into a well-defined channel, the channel's side slopes may not be steeper than 2:1.
- The apron is lined with riprap, grouted riprap, concrete, or gabion baskets, with all riprap conforming to standards and specifications, and the median-sized stone for riprap is specified in the plan.
- Filter cloth, conforming to standards and specifications, must be placed between riprap and the underlying soil to prevent any soil movement through the riprap.
- All grout for grouted riprap must be one part Portland cement for every 3 parts sand, mixed thoroughly with water. Once stones are in place, the spaces between them are to be filled with grout to a minimum depth of 6 inches, with the deeper portions choked with fine material.
- All concrete aprons must be installed as specified in the plan.
- The end of the paved channel in a paved channel outlet must be smoothly joined with the receiving channel section, with no overfall at the end of the paved section.

IV. Paved flume

A paved flume is a permanent, paved channel that is constructed on a slope through which storm water runoff can be diverted down the face of the slope without causing erosion problems on or below the slope. Paved flumes are not recommended unless very high flows with excessive erosive power are expected, because increased runoff velocity might magnify erosion at the flume's outfall. Outfall protection must be provided to prevent damage from high velocity flows. The paved flume also prevents infiltration of surface runoff, exacerbating off-site runoff problems. Where possible, vegetated channels should be used –additional stabilization can be provided with riprap, gabions, or turf reinforcement mats.

Construction specifications for paved flumes require that:

- The subgrade must be constructed to required elevations, with all soft portions and unsuitable material removed and replaced with suitable material, it must be thoroughly compacted and smoothed to a uniform surface, and must be moist when the concrete is poured.
- The slope of the structure may be no more than 1.5:1.
- Curtain walls must be attached to the beginning and end of any paved flumes that are not adjoined to another structure, and the curtain walls should be the same width as the flume channel, at least 6 inches thick, and extend at least 18 inches into the soil under the channel.
- Anchor lugs must be spaced no more than 10 feet apart on center, continuous with the channel lining for the length of the flume; they must be the same width as the bottom of the flume channel, at least 6 inches thick, and extend at least 1 foot into the soil under the channel.
- There should be at least a 4-inch thickness of class A-3 concrete with welded wire fabric in the center of the flume channel for reinforcement.
- Traverse joints should be provided at approximately 20-foot intervals or when there are more than 45 minutes between consecutive concrete placements in order to control cracks.
- Expansion joints should be provided approximately every 90 feet.
- Outlets of the paved flumes should be protected from erosion through the use of an energy-dissipating device with outlet protection, as described previously.

Stabilization. Immediately after the ridge and channel are constructed, they must be seeded and mulched along with any disturbed areas that drain into the diversion. Sediment-trapping measures must remain in place in case the upslope area is not stabilized to prevent soil from moving into the diversion. All obstructions and unsuitable material, such as trees, brush, and stumps, must be removed from the channel area and disposed of so the diversion may function properly. The channel must meet grade and cross-section specifications, and any fill that is used must be free from excessive organic debris, rocks, or other unsuitable material and must be compacted to ensure equal settlement. Disturbed areas should be permanently stabilized according to applicable local standards and specifications.
The area around the channel that is disturbed by its construction must be stabilized so that it is not subject to similar erosion as the steep slope the channel is built to protect.

Diversions should be inspected after every rainfall and a minimum of once every two weeks before final stabilization. Channels should be cleared of sediment, repairs made when necessary, and seeded areas reseeded if a vegetative cover is not established.

SC2.1.1.16 Riprap

Riprap is a permanent, erosion-resistant layer made of stones. It is intended to protect soil from erosion in areas of concentrated runoff. Riprap may also be used to stabilize slopes that are unstable because of seepage problems.

Riprap can be used to stabilize cut-and-fill slopes; channel side slopes and bottoms; inlets and outlets for culverts, bridges, slope drains, grade stabilization structures, and storm drains; and streambanks and grades.

Riprap may be unstable on very steep slopes, especially when rounded rock is used. For slopes steeper than 2:1, consider using other materials such as geotextiles and rootwads for erosion protection. If riprap is being planned for the bottom of a permanently flowing channel, the bottom can be modified to enhance fish habitat. This can be done by constructing riffles and pools which simulate natural conditions. These riffles promote aeration and the pools provide deep waters for habitats. If riprap structures are placed on the bottom of a stream to create riffles and pools, they should be designed by an engineer/hydrologist who has experience with these types of projects. If installed and/or designed improperly, these structures can be very destructive to a stream and the existing fish habitat.

The following are some design recommendations for riprap installation:

- Gradation. A well-graded mixture of rock sizes should be used instead of one uniform size.
- Quality of stone. Riprap must be durable so that freeze/thaw cycles do not decompose it in a short time; most igneous stones such as granite have suitable durability.
- Riprap depth. The thickness of riprap layers should be at least two times the maximum stone diameter.
- Filter material. Filter material is usually required between riprap and the underlying soil surface to prevent soil from moving through the riprap; a filter cloth material or a layer of gravel is usually used for the filter.
- Leaching protection. Leaching can be controlled by installing a riprap gradation small enough to act as a filter against the channel base material, or a protective filter can be installed between the riprap and the base material.
- Riprap limits. The riprap should extend from the ordinary high water elevation or to a point where vegetation will be satisfactory to control erosion.
- Curves. Riprap should extend to five times the bottom width upstream and downstream of the beginning and ending of the curve as well as the entire curved section.
- Riprap size. The size of riprap to be installed depends on site-specific conditions (e.g., hydrology, bank steepness, cause of erosion, etc.).

Riprap is limited by steepness of slope, because slopes greater than 2:1 have potential riprap loss due to erosion and sliding. When working within flowing streams, measures should be taken to prevent excessive turbidity and erosion during construction. Construction should occur when water levels are at their lowest. The Office of Habitat Management and Permitting prefers that this type of work be conducted when water levels are low and the introduction of sediment can be minimized. Installing temporary in-stream structures and/or blocking streams should be a last option for this type of work. Riprap should be inspected annually and after major storms. If riprap has been damaged, repairs should be made promptly to prevent a progressive failure. If repairs are needed repeatedly at one location, the site should be evaluated to determine if the original design conditions have changed. Channel obstructions such as trees and sediment bars can change flow patterns and cause erosive forces that may damage riprap.

SC2.1.1.17 Silt Fence

Silt fences are used as temporary perimeter controls around sites where there will be soil disturbance due to construction activities. They consist of a length of filter fabric stretched between anchoring posts spaced at regular intervals along the site perimeter. The filter fabric should be entrenched in the ground between the support posts. When installed correctly and inspected frequently, silt fences can be an effective barrier to sediment leaving the site in storm water runoff.

Silt fences are generally applicable to construction sites with relatively small drainage areas. They are appropriate in areas where runoff will be occurring as low-level shallow flow, not exceeding 0.5 cfs. The drainage area for silt fences generally should not exceed 0.25 acre per 100-foot fence length. Slope length above the fence should not exceed 100 feet.

Material for silt fences should be a pervious sheet of synthetic fabric such as polypropylene, nylon, polyester, or polyethylene yarn, chosen based on minimum synthetic fabric requirements, as shown in Table 1.

Table SC2.1. Minimum requirements for silt fence construction.

Physical Property	Requirements
Filtering Efficiency	75 - 85% (minimum): highly dependent on local conditions
Tensile Strength at 20% (maximum) Elongation	Standard Strength: 30 lbs/linear inch (minimum) Extra Strength: 50 lbs/linear inch (minimum)
Ultraviolet Radiation	90% (minimum)
Slurry Flow Rate	0.3 gal/ft2/min (minimum)

If a standard strength fabric is used, it can be reinforced with wire mesh behind the filter fabric. This can increase the effective life of the fence. In any case, the maximum life expectancy for synthetic fabric silt fences is approximately 6 months, depending on the amount of rainfall and runoff for a given area. Burlap fences have a much shorter useful life span, usually only up to two months.

Stakes used to anchor the filter fabric should be either wooden or metal. Wooden stakes should be at least 5 feet long and have a minimum diameter of 2 inches if a hardwood such as oak is used. Softer woods such as pine should be at least 4 inches in diameter. When using metal posts in place of wooden stakes, they should have a minimum weight of 1.00 to 1.33 lb/linear foot. If metal posts are used, attachment points are needed for fastening the filter fabric, using wire ties.

A silt fence should be erected in a continuous fashion from a single roll of fabric to eliminate unwanted gaps in the fence. If a continuous roll of fabric is not available, the fabric should overlap from both directions only at stakes or posts, with a minimum overlap of 6 inches. A trench should be excavated to bury the bottom of the fabric fence at least 6 inches below the ground surface. This will help prevent gaps from forming near the ground surface that would render the fencing useless as a sediment barrier.

The height of the fence posts should be between 16 and 34 inches above the original ground surface. If standard strength fabric is used in combination with wire mesh, the posts should be spaced no more than 10 feet apart. If extra-strength fabric is used without wire mesh reinforcement, the support posts should be spaced no more than 6 feet apart.

The fence should be designed to withstand the runoff from a 10-year peak storm event and, once installed, should remain in place until all areas up-slope have been permanently stabilized by vegetation or other means.

Silt fences should not be installed along areas where rocks or other hard surfaces will prevent uniform anchoring of fence posts and entrenching of the filter fabric. This will greatly reduce the effectiveness of silt fencing and can create runoff channels leading off-site. Silt fences are not suitable for areas where large amounts of concentrated runoff are likely. In addition, open areas where wind velocity is high may present a maintenance challenge, as high winds may accelerate deterioration of the filter fabric. Silt fences should not be installed across streams, ditches, or waterways.

When the pores of the fence fabric become clogged with sediment, pools of water are likely to form on the uphill side of fence. Siting and design of the silt fence should account for this and care should be taken to avoid unnecessary diversion of storm water from these pools that might cause further erosion damage.

Silt fences should be inspected regularly and frequently as well as after each rainfall event to ensure that they are intact and that there are no gaps at the fence/ground interface or tears along the length of the fence. If gaps or tears are found, they should be repaired or the fabric should be replaced immediately. Accumulated sediments should be removed from the fence base when the sediment reaches one-third to one-half the height of the fence. Sediment removal should occur more frequently if accumulated sediment is creating noticeable strain on the fabric and there is the possibility of the fence failing from a sudden storm event. When the silt fence is removed, the accumulated sediment also should be removed.

The following effectiveness ranges for silt fence constructed of filter fabric that are properly installed and well maintained: average total suspended solids removal of 70%, sand removal of 80 to 90%, silt-loam removal of 50 to 80%, and silt-clay-loam removal of 0 to 20%. Removal rates are highly dependent on local conditions and installation.

SC2.1.1.18 Storm Drain Inlet Protection

Storm drain inlet protection measures are controls that help prevent soil and debris from site erosion from entering storm drain drop inlets. Typically, these measures are temporary controls that are implemented prior to large-scale disturbance of the surrounding site. These controls are advantageous because their implementation allows storm drains to be used during even the early stages of construction activities. The early use of storm drains during project development significantly reduces the occurrence of future erosion problems.

Three temporary control measures to protect storm drain drop inlets are:

- Excavation around the perimeter of the drop inlet
- Fabric barriers around inlet entrances
- Block and gravel protection

Excavation around a storm drain inlet creates a settling pool to remove sediments. Weep holes protected by gravel are used to drain the shallow pool of water that accumulates around the inlet. A fabric barrier made of porous material erected around an inlet can create an effective shield to erosion sediment while allowing water flow into the storm drain. This type of barrier can slow runoff velocity while catching soil and other debris at the drain inlet. Block and gravel inlet protection uses standard concrete blocks and gravel to form a barrier to sediments while permitting water runoff through select blocks laid sideways. In addition to the materials listed above, limited temporary storm water drop inlet protection can also be achieved with the use of straw bales or sandbags to create barriers to sediment. For permanent storm drain drop inlet protection after the surrounding area has been stabilized, sod can be installed as a barrier to slow storm water entry to storm drain inlets and capture erosion sediments. This final inlet protection measure can be used as an aesthetically pleasing way to slow storm water velocity near drop inlet entrances and to remove sediments and other pollutants from runoff.

All temporary controls should have a drainage area no greater than 1 acre per inlet. It is also important for temporary controls to be constructed prior to disturbance of the surrounding landscape. Excavated drop inlet protection and block and gravel inlet protection are applicable to areas of high flow where overflow is anticipated into the storm drain. Fabric barriers are recommended for smaller, relatively flat drainage areas (slopes less than 5% leading to the storm drain). Temporary drop inlet control measures are often used in combination with each other and other storm water control techniques.

With the exception of sod drop inlet protection, these controls should be installed before any soil disturbance in the drainage area. Excavation around drop inlets should be dug a minimum of 1 foot deep (2 feet maximum) with a minimum excavated volume of 35 yd^3 per acre disturbed. Side slopes leading to the inlet should be no steeper than 2:1. The shape of the excavated area should be designed such that the

dimensions fit the area from which storm water is anticipated to drain. For example, the longest side of an excavated area should be along the side of the inlet expected to drain the largest area.

Fabric inlet protection should be staked close to the inlet to prevent overflow on unprotected soils. Stakes should be used with a minimum length of 3 feet, spaced no more than 3 feet apart. A frame should be constructed for fabric support during overflow periods and should be buried at least 1 foot below the soil surface and rise to a height no greater than 1.5 feet above ground. The top of the frame and fabric should be below the downslope ground elevation to prevent runoff bypassing the inlet.

Block and gravel inlet barrier height should be 1 foot minimum (2 feet maximum), and mortar should not be used. The bottom row of blocks should be laid at least 2 inches below the soil surface flush against the drain for stability. One block in the bottom row should be placed on each side of the inlet on its side to allow drainage. Wire mesh (1/2 inch) should be placed over all block openings to prevent gravel from entering the inlet, and gravel (3/4 to 1/2 inch in diameter) should be placed outside the block structure at a slope no greater than 2:1.

Sod inlet protection should not be considered until the entire surrounding drainage area is stabilized. The sod should be laid so that it extends at least 4 feet from the inlet in each direction to form a continuous mat around the inlet, laying sod strips perpendicular to the direction of flows. The sod strips should be staggered such that strip ends are not aligned, and the slope of the sodded area should not be steeper than 4:1 approaching the drop inlet.

Storm water drop inlet protection measures should not be used as stand-alone sediment control measures. To increase inlet protection effectiveness, these practices should be used in combination with other measures, such as small impoundments or sediment traps. Temporary storm drain inlet protection is not intended for use in drainage areas larger than 1 acre. Generally, storm water inlet protection measures are practical for relatively low-sediment, low-volume flows. Frequent maintenance of storm drain control structures is necessary to prevent clogging. If sediment and other debris clog the water intake, drop intake control measures can actually cause erosion in unprotected areas.

All temporary control measures must be checked after each storm event. To maintain the sediment capacity of the shallow settling pools created from these techniques, accumulated sediment should be removed from the area around the drop inlet (excavated area, around fabric barrier, or around block structure) when the sediment capacity is reduced by approximately 50%. Additional debris should be removed from the shallow pools on a periodic basis. Weep holes in excavated areas around inlets can become clogged and prevent water from draining out of shallow pools that form. Should this happen, unclogging the water intake may be difficult and costly.

Excavated drop inlet protection may be used to improve the effectiveness and reliability of other sediment traps and barriers, such as fabric or block and gravel inlet protection. However, as a whole, the effectiveness of inlet protection is low for erosion and sediment control, long-term pollutant removal, and low for habitat and stream protection.

SC2.1.1.19 Subsurface Drains

These are perforated pipes or conduit placed beneath the surface of the ground at a designated depth and grade. They are used to drain an area by lowering the water table. A high water table can saturate soils and prevent the growth of certain vegetation. Drains can help prevent soil from “slipping” down the hill.

SC2.1.1.20 Wind Fences and Sand Fences

Sand fences are barriers of small, evenly spaced wooden slats or fabric erected to reduce wind velocity and to trap blowing sand. They can be used effectively as perimeter controls around open construction sites to reduce the off-site movement of fine sediments transported by wind. They also prevent off-site damage to roads, streams, and adjacent properties. The spaces between fence slats allow wind and sediment to pass through but reduce the wind velocity, which causes sediment deposition along the fence.

Wind fences are applicable to areas with a preponderance of loose, fine-textured soils that can be transported off-site by high winds. They are especially advantageous for construction sites with large areas of cleared land or in arid regions where blowing sand and dust are especially problematic. Shorefront development sites also benefit from using wind fences because they promote the formation of frontal dunes.

Effective trapping of sediment and reduction of wind velocity occurs only when the fence is erected perpendicular to the prevailing wind. Although wind fences have been shown effective up to 22.5 degrees from perpendicular, they should be erected as close to perpendicular to the movement of wind as possible. Multiple fences can be erected to increase sediment-trapping efficiency, depending on the degree of protection desired. Linear rows of fence 2 to 4 feet high and spaced 20 to 40 feet apart can be installed. When used on shoreline beaches, wind fences should be installed well away from the incoming tide. A wind fence does not control sediment carried in storm water runoff. Wind fences should be installed in conjunction with other sediment and erosion control measures that capture sediment from runoff. Wind fences require periodic inspection to ensure that there are no breaks or gaps. Repairs should be made immediately. Sand and sediment should be cleaned from the fence area periodically to prevent their mobilization by storm water runoff.

Wind fences are very effective for promoting dune formation along shoreline areas, but are not adequate as a primary dust control or sediment-trapping measure for perimeters of construction sites. They should be used only in conjunction with other erosion and sediment control practices. Wind and sand fences are relatively inexpensive to purchase, install, and maintain because they are small, easy to transport, lightweight, and constructed of low-cost materials.

SC2.1.1.21 Sediment Filters and Sediment Chambers

Sediment filters are a class of sediment-trapping devices typically used to remove pollutants, primarily particulates, from storm water runoff. Generally speaking, sediment filters have four basic components: (1) inflow regulation, (2) pretreatment, (3) filter bed, and (4) outflow mechanism. Sediment chambers are merely one component of a sediment filter system.

Inflow regulation refers to the diversion of storm water runoff into the sediment-trapping device. After runoff enters the filter system, it enters a pretreatment sedimentation chamber. This chamber, used as a preliminary settling area for large debris and sediments, usually consists of nothing more than a wet detention basin. As water reaches a predetermined level, it flows over a weir into a filter bed of some filter medium. The filter medium is typically sand, but it can consist of sand, soil, gravel, peat, compost, or a combination of these materials. The purpose of the filter bed is to remove smaller sediments and other pollutants from the storm water as it percolates through the filter medium. Finally, treated flow exits the sediment filter system via an outflow mechanism to return to the storm water conveyance system. Sediment filter systems can be confined or unconfined, on-line or off-line, and aboveground or belowground. Confined sediment filters are constructed with the filter medium contained in a structure, often a concrete vault. Unconfined sediment filters are constructed without encasing the filter medium in a confining structure. As one example, sand might be placed on the banks of a permanent wet pond detention system to create an unconfined filter. On-line systems are designed to retain storm water in its original stream channel or storm drain system. Off-line systems are designed to divert storm water.

Sediment filters may be a good alternative for smaller construction sites where the use of a wet pond is being considered as a sediment-trapping device. Their applicability is wide ranging, and they can be used in urban areas with large amounts of highly impervious area. Because confined sand filters are man-made soil systems, they can be applied to most development sites and have few constraining factors. However, for all sediment filter systems, the drainage area to be serviced should be no more than 10 acres.

The type of filter system chosen depends on the amount of land available and the desired location within the site. Examples of sediment filter systems include the "Delaware" sand filter and the "Austin" sand filter. The Austin sand filter, so named because it first came into widespread use in Austin, Texas, is a surface filter system that can be used in areas with space restrictions. If space is at a premium, an underground filter may be the most appropriate choice. For effective storm water sediment control at the perimeter of a site, the Delaware sand filter might be a good choice. This configuration consists of two parallel, trench-like chambers installed at a site's perimeter. The first trench (sediment chamber) provides pretreatment sediment settling before the runoff spills into the second trench (filter medium).

Available space is likely to be the most important siting and design consideration when choosing an appropriate sediment-filtering system. As mentioned previously, the decision as to which configuration is implemented on a particular site is dependent on the amount of space on a site. Another important consideration when deciding to install sediment-filtering systems is the amount of available head. Head refers to the vertical distance available between the inflow of the filter system and the outflow point. Because most filtering systems depend on gravity as the driving force to move water through the system, if a certain amount of head is not available, the system will not be effective and might cause more harm than good. For surface and underground sand filters, a minimum head of 5 feet is suggested. Perimeter sand filters such as the two-chambered Delaware sand filter should have a minimum available head of 2 to 3 feet. The depth of filter media will vary depending on media type, but for sand filters it is recommended that the sand (0.04-inch diameter or smaller) be at least 18 inches deep, with a minimum of 4 to 6 inches of gravel for the bed of the filter. Throughout the life of a sediment filter system, there will be a need for frequent access to assess continued effectiveness and perform routine maintenance and emergency repairs. Because most maintenance of sediment filters requires manual rather than mechanical removal of sediments and debris, filter systems should be located to allow easy access.

Sediment filters are usually limited to the removal of pollutants from storm water runoff. They must be used in combination with other storm water management practices to provide flood protection. Sediment filters should not be used on fill sites or near steep slopes. In addition, sediment filters are likely to lose effectiveness in cold regions because of freezing conditions.

Maintenance of storm water sediment filters can be relatively high compared to other sediment-trapping devices. Routine maintenance includes raking the filter medium and removal of surface sediment and trash. These maintenance chores will likely need to be accomplished by manual labor rather than mechanical means. Depending on the medium used in the structure, the filter material may have to be changed or replaced up to several times a year. This will depend, among other things, on rainfall intensity and the expected sediment load.

Sediment filters of all media types should be inspected monthly and after each significant rainfall event to ensure proper filtration. Trash and debris removal should be removed during inspections. Sediment should be removed from filter inlets and sediment chambers when 75 % of the storage volume has been filled. Because filter media have the potential for high loadings of metals and petroleum hydrocarbons, the filter medium should be periodically analyzed to prevent it from reaching levels that would classify it as a hazardous waste. This is especially true on sites where solvents or other potentially hazardous chemicals will be used. Spill prevention measures should be implemented as necessary. The top 3 to 4

inches of the filter medium should be replaced on an annual basis, or more frequently if drawdown does not occur within 36 hours of a storm event.

Treatment effectiveness will depend on a number of factors, including treatment volume; whether the filter is on-line or off-line, confined or unconfined; and the type of land use in the contributing drainage area. Sand filter removal rates are "high" for sediment and trace metals and "moderate" for nutrients, BOD (biological oxygen demand), and fecal coliform. Removal rates can be increased slightly by using a peat/sand mixture as the filter medium due to the adsorptive properties of peat. Estimated pollutant removal capabilities for various storm water sediment filter systems is shown in Table SC2.2.

Table SC2.2. Pollutant removal efficiencies for sand filters.

Source	**Filter System**	**TSS[a] (%)**	**TP[a] (%)**	**TN[a] (%)**	**Other Pollutants**
Claytor and Schueler 1996	Surface Sand Filter	85	55	35	Bacteria: 40-80% Metals: 35-90%
	Perimeter Sand Filter	80	65	45	Hydrocarbons: 80%
Livingston 1997	Sand Filter (general)	60–85	30–75	30–60	Metals: 30–80%

[a]TSS=total suspended solids; TP=total phosphorus; TN=total nitrogen

SC2.1.1.22 Temporary Sediment Basin and Rock Dams

Sediment basins and rock dams are two ways to capture sediment from storm water runoff before it leaves a construction site. Both structures allow a shallow pool to form in an excavated or natural depression where sediment from storm water runoff can settle. Basin dewatering is achieved either through a single riser and drainage hole leading to a suitable outlet on the downstream side of the embankment or through the gravel of the rock dam. In both cases, water is released at a substantially slower rate than would be possible without the control structure.

A sediment basin can be constructed by excavation or by erecting an earthen embankment across a low area or drainage swale. The basin can be either a temporary (up to 3 years) structure or a permanent storm water control measure. Sediment basins can be designed to drain completely during dry periods, or they can be constructed so that a shallow, permanent pool of water remains between storm events. However, depending on the size of the basin constructed, the basin may be considered a wet pond and subject to additional regulation.

Rock dams are similar in design to sediment basins with earthen embankments. These damming structures are constructed of rock and gravel and release water from the settling pool gradually through the spaces between the rock aggregate.

Sediment basins are normally used for drainage areas of 5 to 100 acres. They can be temporary or permanent structures. Generally, sediment basins designed to be used for up to 3 years are described as temporary, while those designed for longer service are said to be permanent. Temporary sediment basins can be converted into permanent storm water runoff management ponds, but they must meet all regulatory requirements for wet ponds.

Sediment basins are applicable in drainage areas where it is anticipated that other erosion controls, such as sediment traps, will not be sufficient to prevent off-site transport of sediment. Choosing to construct a

sediment basin with either an earthen embankment or a stone/rock dam will depend on the materials available, location of the basin, and desired capacity for storm water runoff and settling of sediments. Rock dams are suitable where earthen embankments would be difficult to construct or where riprap is readily available. Rock structures are also desirable where the top of the dam structure is to be used as an overflow outlet. These riprap dams are best for drainage areas of less than 50 acres. Earthen damming structures are appropriate where failure of the dam will not result in substantial damage or loss of property or life. If properly constructed, sediment basins with earthen dams can handle storm water runoff from drainage basins as large as 100 acres.

The potential sites for sediment basins should be investigated during the initial site evaluation. Basins should be constructed before any grading takes place within the drainage area. For structures that will be permanent, the design of the basin should be completed by a qualified professional engineer experienced in the design of dams.

Sediment basins with rock dams should be limited to a drainage area of 50 acres. Rock dam height should be limited to 8 feet with a minimum top width of 5 feet. Side slopes for rock dams should be no steeper than 2:1 on the basin side of the structure and 3:1 on the outlet side. The basin side of the rock dam should be covered with fine gravel from top to bottom for a minimum of 1 foot. This will slow the drainage rate from the pool that forms and allow time for sediments to settle. The detention time should be at least 8 hours.

Sediment basins with earthen embankments should be outfitted with a dewatering pipe and riser set just above the sediment removal cutoff level. The riser pipe should be located at the deepest point of the basin and extend no farther than 1 foot below the level of the earthen dam. A water permeable cover should be placed over the primary dewatering riser pipe to prevent trash and debris from entering and clogging the spillway. To provide an additional path for water to enter the primary spillway, secondary dewatering holes can be drilled near the base of the riser pipe, provided the holes are protected with gravel to prevent sediment from entering the spillway piping.

To ensure adequate drainage, the following equation can be used to approximate the total area of dewatering holes for a particular basin:

$A_o = (A_s \text{ x } (2h) / (T \text{ x } C_d \text{ x } 20{,}428)$
where
A_o = total surface area of dewatering holes, ft^2;
A_s = surface area of the basin, ft^2;
h = head of water above the hole, ft;
C_d = coefficient of contraction for an orifice, approximately 0.6; and
T = detention time or time needed to dewater the basin, hours.

In all cases, such structures should be designed by an appropriate professional based on local hydrologic, hydraulic, topographic, and sediment conditions.

Neither a sediment basin with an earthen embankment nor a rock dam should be used in areas of continuously running water (live streams). The use of sediment basins is not intended for areas where failure of the earthen or rock dam will result in loss of life, or damage to homes or other buildings. In addition, sediment basins should not be used in areas where failure will prevent the use of public roads or utilities.

Routine inspection and maintenance of sediment basins is essential to their continued effectiveness. Basins should be inspected after each storm event to ensure proper drainage from the collection pool and

to determine the need for structural repairs. Erosion from the earthen embankment or stones moved from rock dams should be replaced immediately. Sediment basins must be located in an area that is easily accessible to maintenance crews for removal of accumulated sediment. Sediment should be removed from the basin when its storage capacity has reached approximately 50%. Trash and debris from around dewatering devices should be removed promptly after rainfall events.

The effectiveness of a sediment basin depends primarily on the sediment particle size and the ratio of basin surface area to inflow rate. Basins with a large surface area-to-volume ratio will be most effective. Studies have shown that the following equation relating surface area and peak inflow rate gives a trapping efficiency greater than 75% for most sediment in the Coastal Plain and Piedmont regions of the southeastern United States:

$A = 0.01q$

where A is the basin surface area in acres, and q is the peak inflow rate in cubic feet per second.
It estimates average total suspended solids (TSS) removal rate for all sediment basins from 55% to 100%, with an average effectiveness of 70%.

SC2.1.1.23 Sediment Trap

Sediment traps are small impoundments that allow sediment to settle out of runoff water. They are usually installed in a drainage way or other point of discharge from a disturbed area. Temporary diversions can be used to direct runoff to the sediment trap. Sediment traps are used to detain sediments in storm water runoff and trap the sediment to protect receiving streams, lakes, drainage systems, and the surrounding area.

Sediment traps are formed by excavating an area or by placing an earthen embankment across a low area or drainage swale. An outlet or spillway is often constructed using large stones or aggregate to slow the release of runoff.

Sediment traps are generally temporary control measures to slow concentrated runoff velocity and catch sediment, and they can be used with other temporary storm water control measures. They are commonly used at the outlets of storm water diversion structures, channels, slope drains, construction site entrance wash racks, or any other runoff conveyance that discharges waters containing erosion sediment and debris. Sediment traps can also be used as part of a storm water drop intake protection system when the inlet is located below a disturbed area and will receive runoff with large amounts of sediment.

Sediment traps can simplify the storm water control plan design process by trapping sediment at specific spots at a construction site. Therefore, they should be installed as early in the construction process as possible. Natural drainage patterns should be noted, and sites where runoff from potential erosion can be directed into the traps should be selected. Sediment traps should not be located in areas where their failure due to storm water runoff excess can lead to further erosive damage of the landscape. Alternative diversion pathways should be designed to accommodate these potential overflows.

A sediment trap should be designed to maximize surface area for infiltration and sediment settling. This will increase the effectiveness of the trap and decrease the likelihood of backup during and after periods of high runoff intensity. Although site conditions will dictate specific design criteria, the approximate storage capacity of each trap should be at least 1,800 ft^3 per acre of total drainage area. The volume of a natural sedimentation trap can be approximated by the following equation:

Volume (ft^3) = 0.4 x surface area (ft^2) x maximum pool depth (ft)

Care should be taken in the siting and design phase to situate sediment traps for easy access by maintenance crews. This will allow for proper inspection and maintenance on a periodic basis. When excavating an area for sediment trap implementation, side slopes should not be steeper than 2:1 and embankment height should not exceed 5 feet from the original ground surface. All embankments should be machine compacted to ensure stability. To reduce flow rate from the trap, the outlet should be lined with well-graded stone.

The spillway weir for each temporary sediment trap should be at least 4 feet long for a 1-acre drainage area and increased by 2 feet for each additional drainage acre added, up to a maximum drainage area of 5 acres.

Sediment traps should not be used for drainage areas greater than 5 acres. The effective life span of these temporary structures is usually limited to 24 months. Although sediment traps allow for settling of eroded soils, because of their short detention periods for storm water, they typically do not remove fine particles such as silts and clays.

The primary maintenance consideration for temporary sediment traps is the removal of accumulated sediment from the basin. This must be done periodically to ensure the continued effectiveness of the sediment trap. Sediments should be removed when the basin reaches approximately 50% sediment capacity. A sediment trap should be inspected after each rainfall event to ensure that the trap is draining properly. Inspectors should also check the structure for damage from erosion. The depth of the spillway should be checked and maintained at a minimum of 1.5 feet below the low point of the trap embankment. Sediment trapping efficiency is a function of surface area, inflow rate, and the sediment properties. Those traps that provide pools with large length-to-width ratios have a greater chance of success. Sediment traps have a useful life of approximately 18 to 24 months, although ultimately effectiveness depends on the amount and intensity of rainfall and erosion, and proper maintenance. An estimate average total suspended solids removal rate of 60%. An efficiency rate of 75% can be obtained for most Coastal Plain and Piedmont soils by using the following equation:

Surface area at design flow (acres) = (0.01) peak inflow rate (cfs)

The cost of installing temporary sediment traps ranges from $0.20 to $2.00 per cubic foot of storage (about $1,100 per acre of drainage). The average cost is approximately $0.60 per cubic foot of storage
A temporary slope drain is a flexible conduit extending the length of a disturbed slope and serving as a temporary outlet for a diversion. Temporary slope drains, also called pipe slope drains, convey runoff without causing erosion on or at the bottom of the slope. This practice is a temporary measure used during grading operations until permanent drainage structures are installed and until slopes are permanently stabilized. They are typically used for less than two years. Temporary slope drains can be used on most disturbed slopes to eliminate gully erosion problems resulting from concentrated flows discharged at a diversion outlet.

Recently graded slopes that do not have permanent drainage measures installed should have a temporary slope drain and a temporary diversion installed. A temporary slope drain used in conjunction with a diversion conveys storm water flows and reduces erosion until permanent drainage structures are installed.

The following are design recommendations for temporary slope drains:

- The drain should consist of heavy-duty material manufactured for the purpose and have grommets for anchoring at a spacing of 10 feet or less.
- Minimum slope drain diameters should be observed for varying drainage areas.

- The entrance to the pipe should consist of a standard flared section of corrugated metal; the corrugated metal pipe should have watertight joints at the ends; the rest of the pipe is typically corrugated plastic or flexible tubing, although for flatter, shorter slopes, a polyethylene-lined channel is sometimes used.
- The height of the diversion at the pipe should be the diameter of the pipe plus 0.5 foot.
- The outlet should be located at a reinforced or erosion-resistant location.
- The area drained by a temporary slope drain should not exceed 5 acres. Physical obstructions substantially reduce the effectiveness of the drain. Other concerns are failures from overtopping because of inadequate pipe inlet capacity and reduced diversion channel capacity and ridge height.

The slope drain should be inspected after each rainfall to determine if capacity was exceeded or if blockages occurred. Repairs should be made promptly. Construction equipment and vehicular traffic must be rerouted around slope drains.

SC2.1.1.24 Temporary Stream Crossings

A temporary steam crossing is a structure erected to provide a safe and stable way for construction vehicles to cross a running watercourse. The primary purpose of such a structure is to provide streambank stabilization, reduce the risk of damaging the streambed or channel, and reduce the risk of sediment loading from construction traffic. A temporary stream crossing may be a bridge, a culvert, or a ford.

Temporary stream crossings are applicable wherever heavy construction equipment must be moved from one side of a stream channel to the other, or where lighter construction vehicles will cross the stream a number of times during the construction period. In either case, an appropriate method for ensuring the stability of the streambanks and preventing large-scale erosion is necessary.

A bridge or culvert is the best choice for most temporary stream crossings. If properly designed, each can support heavy loads and materials used to construct most bridges, and culverts can be salvaged after they are removed. Fords are appropriate in steep areas subject to flash flooding, where normal flow is shallow or intermittent across a wide channel. Fords should be used only where stream crossings are expected to be infrequent. Stream crossings shall be made from bank-to-bank in a direction substantially perpendicular to the direction of stream flow. Stream crossings shall be made only at locations with gradually sloping banks, not at sheer or cut banks. Timing restrictions for crossing a stream may apply depending on type of fish species are present and habitat type.

Because of the potential for stream degradation, flooding, and safety hazards, stream crossings should be avoided on a construction site whenever possible. Consideration should be given to alternative routes to accessing a site before arrangements are made to erect a temporary stream crossing. If it is determined that a stream crossing is necessary, an area where the potential for erosion is low should be selected. If possible, the stream crossing structure should be selected during a dry period to reduce sediment transport into the stream.

If needed, over-stream bridges are generally the preferred temporary stream crossing structure. The expected load and frequency of the stream crossing and fish habitat and species present, however, will govern the selection of a bridge as the correct choice for a temporary stream crossing. Bridges usually cause minimal disturbance to a stream's banks and cause the least obstruction to stream flow and fish migration. They should be constructed only under the supervision and approval of a qualified engineer.

As general guidelines for constructing temporary bridges, clearing and excavation of the stream shores and bed should be kept to a minimum. Sufficient clearance should be provided for floating objects to pass

under the bridge. Abutments should be parallel to the stream and on stable banks. If the stream is less than 8-feet wide at the point a crossing is needed, no additional in-stream supports should be used. If the crossing is to extend across a channel wider than 8 feet (as measured from top of bank to top of bank), the bridge should be designed with one in-water support for each 8 feet of stream width.

A temporary bridge should be anchored by steel cable or chain on one side only to a stable structure on shore. Examples of anchoring structures include large-diameter trees, large boulders, and steel anchors. By anchoring the bridge on one side only, there is a decreased risk of downstream blockage or flow diversion if a bridge is washed out.

When constructing a culvert, filter cloth should be used to cover the streambed and streambanks to reduce settlement and improve the stability of the culvert structure. The filter cloth should extend a minimum of 6 inches and a maximum of 1 foot beyond the end of the culvert and bedding material. The culvert piping should not exceed 40 feet in length and should be of sufficient diameter to allow for complete passage of flow during peak flow periods. In addition, if fish are present in the stream, the culvert diameter should be designed in relation to the stream width and depth and fish use in that portion of the water body. The culvert pipes should be covered with a minimum of 1 foot of aggregate. If multiple culverts are used, at least 1 foot of aggregate should separate the pipes.

Fords should be constructed of stabilizing material such as large rocks, but keep in mind that fish passage must be maintained at all times when a structure is placed across a stream. Material and size need to be considered carefully.

Bridges can be considered the greatest safety hazard of all temporary stream crossing structures if not properly designed and constructed. Bridges might also prove to be more costly in terms of repair costs and lost construction time if they are washed out or collapse.

However, the construction and removal of culverts are usually very disturbing to the surrounding area, and erosion and downstream movement of soils is often great. Culverts can also create obstructions to flow in a stream and inhibit fish migration. Depending on their size, culverts can be blocked by large debris in a stream and are therefore vulnerable to frequent washout.

If given a choice between building a bridge or a culvert as a temporary stream crossing, a bridge is preferred because of the relative minimal disturbance to streambanks and the opportunity for unimpeded flow through the channel.

The approaches to fords often have high erosion potential. In addition, excavation of the streambed and the approach to lay riprap or other stabilization material causes major stream disturbance. Mud and other debris are transported directly into the stream unless the crossing is used only during periods of low flow. Temporary stream crossings should be inspected at least once a week and after all significant rainfall events. If any structural damage is reported to a bridge or culvert, construction traffic should stop use of the structure until appropriate repairs are made. Evidence of streambank erosion should be repaired immediately.

Fords should be inspected closely after major storm events to ensure that stabilization materials remain in place. If the material has moved downstream during periods of peak flow, the lost material should be replaced immediately.

Both temporary bridges and culverts provide an adequate path for construction traffic crossing a stream or watercourse.

Generally speaking, temporary bridges are more expensive to design and construct than culverts. Bridges are also associated with higher maintenance and repair costs should they fail. Additional costs may accrue to the site team in terms of lost construction time if a temporary structure is washed out or otherwise fails.

SC2.1.1.25 Pipe Slope Drains

A temporary slope drain is a flexible conduit extending the length of a disturbed slope and serving as a temporary outlet for a diversion. Temporary slope drains, also called pipe slope drains, convey runoff without causing erosion on or at the bottom of the slope. This practice is a temporary measure used during grading operations until permanent drainage structures are installed and until slopes are permanently stabilized. They are typically used for less than two years. Temporary slope drains can be used on most disturbed slopes to eliminate gully erosion problems resulting from concentrated flows discharged at a diversion outlet.

SC2.1.2 Gravel Pit Development

Pits sites are typically between 0.5 to 4.9 acres in size and require access upgrades. The pit extraction of gravel material is categorized into three activities: vertical, horizontal and pond. Pit boundaries are established and include extraction areas, overburden dumps and stockpile areas. Pits are developed to maintain adequate drainage through the strategic placement of berms, ditches and culverts. In addition, pits are developed and operated to provide for efficient and effective reclamation.

Approximately 5,000cy to12,000cy of gravel material are extracted from project specific pits, such as hilltops and small (>0.5 acre) gravel deposits. These pits remain in operation during a 1 to 2 year project cycle and are typically located adjacent to improved roads. Large material sites (<2 acres) are developed to provide a minimum of 100,000cy of material and are typically located off a hardened, 20’ wide, single lane spur road with a minimum of four 10’w x 50’l turn-outs, two on each side of road spaced evenly along entire road length. The average footprint of a large material pit site is 4 - 4.9 acres.

The two types of gravel material sites used on USAG-AK land are formal pits and meandering side barrow. These material sites are typically developed within three miles of proposed construction activity sites and are chosen based on soils maps, ground truthing and sample testing. Sample tests include soil and aggregate typing, sieve analysis and compaction proctors. Overburden should be stockpiled and kept separated from mining activities as it can be a valuable tool when used for reclamation once the material site has been exhausted.

A. Vertical Extraction

Vertical extraction requires the exposure of gravel aggregates by removing and stockpiling surface vegetation and overburden, which is typically 6” to 36” in depth and comprised of organics and silts. This activity is accomplished with a medium to large sized CAT D7 - D9 or equivalent, crawler tractor (dozer) with a straight “bull” blade. The overburden and vegetation material is rolled to the outer edges of the pit footprint and piled to an average height of 10’ to 15’. Overburden piles are placed and notched to facilitate adequate drainage.

Once the overburden is removed and piled, gravel aggregate is excavated by three methods. The most common method is large dozers (CAT D7 D9) pushing 12” + layers of gravel material into loose piles. The second method involves tracked excavators (CAT 320/245) that dig down 20’ + into gravel deposit and loose-pile the material on the surface. The third method of gravel excavation requires the use of scrapers (CAT 627/631). Scrapers peel 6” layers of gravel material into the scraper box and then spread the material on a large sloping stockpile or directly at the project site. Stockpiles typically do not exceed 30’ in height.

Stockpiled material is loaded into end dumps and semi rock trailers (i.e., belly and side dumps) by loaders (CAT 266/288) or excavators (CAT 320/245) and transported to the project site.

B. Horizontal Extraction

Horizontal extraction requires the exposure of hillside gravel aggregates by removing and stockpiling surface vegetation and overburden, which is typically 3” to 24” in depth and comprised of organics and silts. This activity is accomplished with a medium to large sized CAT D6 - D9 or equivalent, crawler tractor (dozer) with a straight “bull” blade. The hillside overburden and vegetation material is push to the outer sides of the pit. Care is taken to avoid overburden deposits uphill and downhill of the excavation activity. A 100’ x 50’ (minimum) pad at the base of the hill is also cleared of overburden and leveled to provide a pad for stockpiling and loading activities. Overburden piles average a height of 8’ to 10’ and are placed to facilitate adequate drainage.

Once the overburden is removed and piled, gravel aggregate is excavated by two methods. The most common method is large dozers (CAT D7 D9) pushing 12” + layers of gravel material downhill into loose piles. The second method involves tracked excavators (CAT 320/245) that dig into the hillside gravel deposit and loose pile the material on the pad.

Stockpiled material is loaded into end dumps and semi rock trailers (i.e., belly and side dumps) by loaders (CAT 266/288) or excavators (CAT 320/245) and transported to the project site.

C. Pond Extraction

Pond extraction of gravel materials requires the use of a dragline. This equipment utilizes 0.75cy to 3cy cabled buckets to dredge gravel material 15’ to 40’ deep from the pond bank and bed. A 100’ x 100’ pad is hardened adjacent to the pond, and the dragline casts dredged material into loose stockpiles on the pad. Stockpiles can reach 30’ in height.

Stockpiled material is loaded into end dumps and semi rock trailers (i.e., belly and side dumps) by loaders (CAT 266/288) or excavators (CAT 320/245) and transported to the project site.

D. Pit Material

The gravel materials excavated from pit operations can used “as is” or modified, depending on aggregate size and percentages. Gravels are categorized as pitrun or manufactured.

Pitrun, the most commonly used gravel material on USAG-AK lands, is excavated gravel material that contains the appropriate aggregate sizes and %ages required for hardening activities and does not require modification or mixing. Pitrun quality is variable and may contain large aggregates or excessive fines.

Pitrun is used directly from excavated stockpiles and is typically installed as a base and capping material for roads and pads that do not require a uniform finished surface.

E. Side Barrow

Side barrow material is typically associated with road upgrade and meander within an established road footprint. Gravel materials are excavated along the sides of road footprints in areas where appropriate gravel material deposits exist. Side barrow activities result in wide concave ditches.

Side barrow extraction requires the removal and stockpiling of overburden within a 10’ to 20’ wide section of ground immediately adjacent to a road base. This is accomplished with a backhoe (Case 235) or excavator (CAT 320). The bucket is extended to the outside reach of the side barrow area and a 6” layer of material scraped inward to load the bucket. Overburden layers are loosely piled outside of the clearing limits. Exposed gravel material is excavated and deposited on the road surface. Once the deposit has been depleted or sufficient gravel has been installed in the immediate section of road, the overburden is spread on top of the excavated area. The overburden is shaped, smoothed and compacted into a wide concave ditch to provide for effective site drainage.

Side barrow deposits are also loaded into end dumps and rock trailers for installation outside of the reach of the backhoe or excavator.

SC2.1.3 Gravel Pit Reclamation

Gravel pit activities will include a reclamation plan designed to restore or create fish and wildlife habitat. Upland pits not likely to retain any water that are no longer in service are reclaimed by shaping and smoothing exposed areas and spreading and compacting stockpiled overburden. Slopes within a reclaimed pit do not exceed 2:1 and are track-walked (parallel to the pit) for re-seeding and/or fertilizing.

Pits that are in water or are likely to retain water should have reclamation plans that include (1) constructing 20-foot-wide shallow littoral zones (underwater shelves along the bank with slopes no steeper than 1V:10H, (2) constructing irregular shorelines and perhaps islands to maximize the shore-to-water interface, and (3) spreading 2-4 inches of organic materials along the shallow littoral shelf and shoreline to maximize natural revegetation and productivity. Although specific site designs will vary (for example, steeper littoral zones may be necessary along some shorelines), the goal should be to attract a variety of fish and wildlife. Additionally, a 25-foot buffer should be established around most, if not all, of the pond perimeter to help filter sediment and pollutants before they enter the pond.

SC2.1.4 Guard Rail, Gate, Fencing and Post Installation

Guard rails are installed at bridge crossings, roads with adverse shoulder slopes and along watercourses. Guard rails are installed with a backhoe (Case 235) and include 8” square posts set 4’ into the ground with D1 gravel backfill.

Gates, fencing and posts are used to close down an area for the purposes of rehabilitating or repairing an area. The intent is to keep military training and recreationalists out of the area while it is being rehabilitated. Sometime these are used in conjunction with one another; other times posts are use in the middle of a trail or road and act as barriers to entry.

SC2.1.5 Sign and Seibert Stake Installation

Signs and institutional controls include small reflective aluminum marker signs set on pounded T-posts, wooden two-sided kiosks set in D1 gravel-filled holes and large aluminum signs attached to drill stems and set in D1 gravel-filled holes. Depending on sign dimensions and weight, posts are set 2’ - 6’ below natural ground surface. Holes are excavated and backfilled by hand shovel.

SC2.1.6 Soil Stabilization Practices (Permanent)

SC2.1.6.1 Brush Layering

Brush layering is used to rebuild the streambank. Branches are placed on horizontal benches that follow the contour of the slope and provide reinforcement to the soil. Additional stability is provided when the

front of the soil layer is seeded with grass while the woody plants are becoming established. Please note that over-seeding with grass can lead to low success of willows due to competition for water and nutrients.

SC2.1.6.2 Land Grading

Land grading involves reshaping the ground surface to planned grades as determined by an engineering survey, evaluation, and layout. Land grading provides more suitable topography for buildings, facilities, and other land uses and helps to control surface runoff, soil erosion, and sedimentation during and after construction.

SC2.1.6.3 Live Bundle (Fascines)

Fascines are installed along streambanks, water courses and erosive-prone slopes to stabilize soils and prevent bank slope failure. Fascines are effective at controlling erosion and stabilizing slopes immediately after installation and their efficacy improves as the dormant branches sprout and take root. (See Revegetation #20)

SC2.1.6.4 Permanent Geotextiles

Permanent geotextiles are porous fabrics also known as filter fabrics, road rugs, synthetic fabrics, construction fabrics, or simply fabrics. Geotextiles are manufactured by weaving or bonding fibers made from synthetic materials such as polypropylene, polyester, polyethylene, nylon, polyvinyl chloride, glass, and various mixtures of these materials. As a synthetic construction material, geotextiles are used for a variety of purposes such as separators, reinforcement, filtration and drainage, and erosion control.

SC2.1.6.5 Permanent Seeding and Planting

Permanent seeding is used to control runoff and erosion on disturbed areas by establishing perennial vegetative cover from seed. It is used to reduce erosion, to decrease sediment yields from disturbed areas, and to provide permanent stabilization. This practice is economical, adaptable to different site conditions, and allows selection of the most appropriate plant materials.

Permanent seeding is well-suited in areas where permanent, long-lived vegetative cover is the most practical or most effective method of stabilizing the soil. Permanent seeding can be used on roughly graded areas that will not be regraded for at least a year. Vegetation controls erosion by protecting bare soil surfaces from displacement by raindrop impacts and by reducing the velocity and quantity of overland flow. The advantages of seeding over other means of establishing plants include lower initial costs and labor inputs.

Areas to be stabilized with permanent vegetation must be seeded or planted one to four months after the final grade is achieved unless temporary stabilization measures are in place. Successful plant establishment can be maximized with proper planning; consideration of soil characteristics; selection of plant materials that are suitable for the site; adequate seedbed preparation, liming, and fertilization; timely planting; and regular maintenance. Climate, soils, and topography are major factors that dictate the suitability of plants for a particular site. The soil on a disturbed site might require amendments to provide sufficient nutrients for seed germination and seedling growth. The surface soil must be loose enough for water infiltration and root penetration. Soil pH should be between 6.0 and 6.5 and can be increased with liming if soils are too acidic. Seeds can be protected with mulch to retain moisture, regulate soil temperatures, and prevent erosion during seedling establishment.

Depending on the amount of use permanently seeded areas receive, they can be considered high or low maintenance areas. High maintenance areas are mowed frequently, limed and fertilized regularly, and either (1) receive intense use (e.g., athletic fields) or (2) require maintenance to an aesthetic standard (e.g., home lawns). Grasses used for high-maintenance areas are long-lived perennials that form a tight sod and

are fine-leaved. High maintenance vegetative cover is used for homes, industrial parks, schools, churches, and recreational areas.

Low maintenance areas are mowed infrequently or not at all and do not receive lime or fertilizer on a regular basis. Plants must be able to persist with minimal maintenance over long periods of time. Grass and legume mixtures are favored for these sites because legumes fix nitrogen from the atmosphere. Sites suitable for low maintenance vegetation include steep slopes, stream or channel banks, some commercial properties, and "utility" turf areas such as road banks.

The effectiveness of permanent seeding can be limited because of the high erosion potential during establishment, the need to reseed areas that fail to establish, limited seeding times depending on the season, and the need for stable soil temperature and soil moisture content during germination and early growth. Permanent seeding does not immediately stabilize soils—temporary erosion and sediment control measures should be in place to prevent off-site transport of pollutants from disturbed areas.

Grasses should emerge within 4–28 days and legumes 5–28 days after seeding, with legumes following grasses. A successful stand should exhibit the following:

- Vigorous dark green or bluish green seedlings, not yellow.
- Uniform density, with nurse plants, legumes, and grasses well intermixed.
- Green leaves—perennials should remain green throughout the summer, at least at the plant bases.

Seeded areas should be inspected for failure, and necessary repairs and reseeding should be made as soon as possible. If a stand has inadequate cover, the choice of plant materials and quantities of lime and fertilizer should be reevaluated. Depending on the condition of the stand, areas can be repaired by overseeding or reseeding after complete seedbed preparation. If timing is bad, rye grain or German millet can be overseeded to thicken the stand until a suitable time for seeding perennials. Consider seeding temporary, annual species if the season is not appropriate for permanent seeding. If vegetation fails to grow, soil should be tested to determine if low pH or nutrient imbalances are responsible.

On a typical disturbed site, full plant establishment usually requires refertilization in the second growing season. Soil tests can be used to determine if more fertilizer needs to be added. Do not fertilize cool season grasses in late May through July. Grass that looks yellow may be nitrogen deficient. Do not use nitrogen fertilizer if the stand contains more than 20% legumes.

Perennial vegetative cover from seeding has been shown to remove between 50 and 100% of total suspended solids from storm water runoff, with an average removal of 90%.

Seeding costs range from $200 to $1,000 per acre and average $400 per acre. Maintenance costs range from 15 to 25% of initial costs and average 20%.

SC2.1.6.6 Sod Stabilization

Sodding is a permanent erosion control practice that involves laying a continuous cover of grass sod on exposed soils. In addition to stabilizing soils, sodding can reduce the velocity of storm water runoff. Sodding can provide immediate vegetative cover for critical areas and stabilize areas that cannot be vegetated by seed. It also can stabilize channels or swales that convey concentrated flows and can reduce flow velocities.

Sodding is appropriate for any graded or cleared area that might erode, requiring immediate vegetative cover. Locations particularly well-suited to sod stabilization are:

- Residential or commercial lawns and golf courses where prompt use and aesthetics are important.
- Steeply-sloped areas.
- Waterways and channels carrying intermittent flow.
- Areas around drop inlets that require stabilization.

Sodding eliminates the need for seeding and mulching and produces more reliable results with less maintenance. Sod can be laid during times of the year when seeded grasses are likely to fail. The sod must be watered frequently within the first few weeks of installation. The type of sod selected should be composed of plants adapted to site conditions. Sod composition should reflect environmental conditions as well as the function of the area where the sod will be laid. The sod should be of known genetic origin and be free of noxious weeds, diseases, and insects. The sod should be machine cut at a uniform soil thickness of 15 to 25 mm at the time of establishment (this does not include top growth or thatch).

Soil preparation and additions of lime and fertilizer may be needed; soils should be tested to determine if amendments are needed. Sod should be laid in strips perpendicular to the direction of water flow and staggered in a brick-like pattern. The corners and middle of each strip should be stapled firmly. Jute or plastic netting may be pegged over the sod for further protection against washout during establishment. Areas to be sodded should be cleared of trash, debris, roots, branches, stones and clods larger than 2 inches in diameter. Sod should be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period should be inspected and approved prior to its installation.

Compared to seed, sod is more expensive and more difficult to obtain, transport, and store. Care must be taken to prepare the soil and provide adequate moisture before, during, and after installation to ensure successful establishment. If sod is laid on poorly prepared soil or unsuitable surface, the grass will die quickly because it is unable to root. Installed sod that is not adequately irrigated may cause root dieback because grass does not root rapidly and is subject to drying out.

Watering is very important to maintain adequate moisture in the root zone and to prevent dormancy, especially within the first few weeks of installation, until it is fully rooted. Mowing should not result in the removal of more than one-third of the shoot. Grass height should be maintained between 2 and 3 inches. After the first growing season, sod might require additional fertilization or liming. Permanent, fine turf areas require yearly maintenance fertilization. Warm season grass should be fertilized in late spring to early summer, and cool season grass, in late winter and again in early fall.

Sod has been shown to remove up to 99% of total suspended solids in runoff. It is therefore a highly effective management practice for erosion and sediment control, but its trapping efficiency is highly variable depending on hydrologic, hydraulic, vegetation, and sediment characteristics.

SC2.1.6.7 Vegetative Matting

A vegetative mat is a large transplant of plants with roots and soil intact. Dimensions of the mats vary from one to several feet square and may contain woody and/or herbaceous vegetation. The greatest benefit of this transplanting technique is that vegetative cover is provided immediately after the mat is placed at the new location. The mats often contain many plant species, especially native plants that cannot be obtained elsewhere.

SC2.1.6.8 Willow Live Staking

Dormant cuttings are the primary plant material used in live staking. Dormant cuttings are harvested from living woody plants in a dormant (not actively growing) state. The cuttings are collected from plants that can root easily, without special treatment, such as certain willow species, poplar and cottonwood.

SC2.1.6.9 Water Bars

Water bars are installed to prevent rill erosion by draining water from the entire width of a roadway with a slope in excess of 5%. They are installed with a road grader (CAT 140G) fitted with a mould board blade and result in a shallow ditch with a parallel berm on the downhill side. The berm is comprised of material excavated from the uphill trench. The berm is installed at a minimum of 12" above the roadway surface with the uphill ditch 6 inches below the road surface. The ditch is typically twice the width of berm. Water bars are spaced at least 10 feet apart, set at 30-45 angles to the road shoulder and connected to side ditches, cutouts or other drainage features.

SC2.1.6.10 Grass Lined Channels

Grass-lined channels convey storm water runoff through a stable conduit. Vegetation lining the channel reduces the flow velocity of concentrated runoff. Grassed channels usually are not designed to control peak runoff loads by themselves and are often used in combination with other best management practices, such as subsurface drains and riprap stabilization.

Where moderately steep slopes require drainage, grassed channels can include excavated depressions or check dams to enhance runoff storage, decrease flow rates, and enhance pollutant removal. Peak discharges can be reduced through temporary detention in the channel. Pollutants can be removed from storm water by filtration through vegetation, by deposition, or in some cases by infiltration of soluble nutrients into the soil. The degree of pollutant removal in a channel depends on the residence time of water in the channel and the amount of contact with vegetation and the soil surface. As a result, removal efficiency is highly dependent on local conditions.

Grassed channels should be used in areas where erosion resistant conveyances are needed, including areas with highly erodible soils and moderately steep slopes (although less than 5%). They should only be installed where space is available for a relatively large cross section. Grassed channels have a limited ability to control runoff from large storms and should not be used in areas where flow rates exceed 5 feet per second.

Grass-lined channels should be sited in accordance with the natural drainage system and should not cross ridges. The channel design should not have sharp curves or significant changes in slope. The channel should not receive direct sedimentation from disturbed areas and should be sited only on the perimeter of a construction site to convey relatively clean storm water runoff. Channels should be separated from disturbed areas by a vegetated buffer or other best management practice to reduce sediment loads.

Basic design recommendations for grassed channels include the following:

- Construction and vegetation of the channel should occur before grading and paving activities begin.
- Design velocities should be less than 5 feet per second.
- Geotextiles can be used to stabilize vegetation until it is fully established.
- Covering the bare soil with sod, mulches with netting, or geotextiles can provide reinforced storm water conveyance immediately.
- Triangular-shaped channels are used with low velocities and small quantities of runoff; parabolic grass channels are used for larger flows and where space is available; trapezoidal channels are used with large flows of low velocity (low slope).
- Outlet stabilization structures should be installed if the runoff volume or velocity has the potential to exceed the capacity of the receiving area.
- Channels should be designed to convey runoff from a 10-year storm without erosion.

- The sides of the channel should be sloped less than 2:1, and triangular-shaped channels along roads should be sloped 2:1 or less for safety.
- All trees, brushes, stumps, and other debris should be removed during construction.

Grass-lined channels can effectively transport storm water from construction areas if they are designed for expected flow rates and velocities and if they do not receive sediment directly from disturbed areas.

Grassed channels, if improperly installed, can alter the natural flow of surface water and have adverse impacts on downstream waters. Additionally, if the design capacity is exceeded by a large storm event, the vegetation might not be sufficient to prevent erosion and the channel might be destroyed. Clogging with sediment and debris reduces the effectiveness of grass-lined channels for storm water conveyance.

Maintenance requirements for grass channels are relatively minimal. During the vegetation establishment period, the channels should be inspected after every rainfall. Other maintenance activities that should be carried out after vegetation is established are mowing, litter removal, and spot vegetation repair. The most important objective in the maintenance of grassed channels is maintaining a dense and vigorous growth of turf. Periodic cleaning of vegetation and soil buildup in curb cuts is required so that water flow into the channel is unobstructed. During the growing season, channel grass should be cut no shorter than the level of design flow.

Costs of grassed channels range according to depth, with a 1.5-foot-deep, 10-foot-wide grassed channel estimated between $6,395 and $17,075 per trench, while a 3.0-foot-deep, 21-foot-wide grassed channel is estimated at $12,909 to $33,404 per trench. Grassed channels can be left in place permanently after the construction site is stabilized to contribute to long-term storm water management. The channels, in combination with other practices that detain, filter, and infiltrate runoff, can substantially reduce the size of permanent detention facilities such as storm water ponds and wetlands, thereby reducing the overall cost of storm water management.

SC2.1.6.11 Soil Retention

Soil retention measures are practices that are used to hold soil in place or to keep it contained within a site boundary. They may include grading or reshaping the ground to lessen steep slopes or shoring excavated areas with wood, concrete, or steel structures. Some soil-retaining measures are used for erosion control, while others are used for protection of workers during construction projects such as excavations.

Grading to reduce steep slopes can be implemented at any construction site by assessing site conditions before breaking ground and reducing steep slopes where possible. Reinforced soil-retaining structures should be used when sites have very steep slopes or loose, highly erodible soils that cause other methods, such as chemical or vegetative stabilization or regrading, to be ineffective. The preconstruction drainage pattern should be maintained to the extent possible.

Continuous Sheeting involves using a material that covers the entire slope continuously, with struts and boards placed along the slope to support the slope face – steel, concrete, or wood should be used as the materials.

Permanent Retaining Walls are concrete masonry or wood (railroad ties) that are left in place after construction is complete in order to provide continued support of the slope.

Skeleton Sheeting is an inexpensive soil bracing system that requires soil to be cohesive and consists of construction grade lumber being used to support the excavated face of a slope.

The proper design of reinforced soil retaining structures is crucial for erosion control and safety. To ensure safety of the retaining structure, it should be designed by a qualified engineer who understands all of the design considerations, such as the nature of the soil, location of the groundwater table, and the expected loads. Care should be taken to ensure that hydraulic pressure does not build up behind the retaining structure and cause failure.

To be effective, soil retention structures must be designed to handle expected loads. However, heavy rains or mass wasting may damage or destroy these structures and result in sediment inputs to water bodies. They must be properly installed and maintained to avoid failure.

Soil stabilization structures should be inspected periodically, particularly after rainstorms, to check for erosion, damage, or other signs of deterioration. Any damage to the actual slope or ditch, such as washouts or breakage, should be repaired prior to any reinstallation of the materials for the soil stabilization structure.

Soil retention structures, if properly designed and installed, can effectively prevent erosion and mass wasting in areas with steep slopes and erodible soils. Their potential for failure depends on their design, installation, maintenance, and the likelihood of catastrophic events such as heavy rains, earthquakes, and landslides.

Slope reduction can be accomplished during site development and might not incur any additional costs. Soil stabilization structures can be expensive because they require a professional engineer to develop a design (estimated to be 25 to 30% of construction costs. Depending on the size of the proposed structure and the relief of the surrounding area, excavation and installation costs might be high. Capital costs include mobilization, grading, grooving, tracking and compacting fill, and installing the structures. Labor costs for regular inspection and repairs are also a consideration.

SC2.1.6.12 Spruce Tree Revetment

Spruce tree revetments consist of whole spruce trees laid parallel to the streambank and are installed to provide immediate erosion control and bank protection. The trees are secured tightly to the bank with cable and earth anchors and preferably to the streambed below the water level. Tree tops are pointed downstream and overlapped a minimum of 30% of the whole tree length. Care should be taken to avoid unnecessary damage to, or removal of, tree limbs. (See Alaska Streambank Repair #27)

SC2.1.6.13 Root Wads

Root wads are a streambank protection technique that provides immediate riverbank stabilization, protects the toe of slope and provides excellent fish habitat, especially for juvenile fish. Root wads are particularly well suited for higher velocity river systems and riverbanks which are severely eroded. They provide toe support for bank revegetation techniques and collect sediment and debris that will enhance bank structure over time. The root fan of the structure is placed in a dredged channel parallel to the toe of the bank streambed elevation. The bole of the tree is securely anchored and set into the bank (often the existing bank is removed and backfilled over the boles). The boles are placed close enough so the root fans overlap.

SC2.1.6.14 Vegetative Buffer

Vegetated buffers are areas of either natural or established vegetation that are maintained to protect the water quality of neighboring areas. Buffer zones reduce the velocity of storm water runoff, provide an area for the runoff to permeate the soil, contribute to groundwater recharge, and act as filters to catch sediment. The reduction in velocity also helps to prevent soil erosion, catch sediment and toxic chemicals (e.g., pesticides, fertilizers).

Vegetated buffers can be used in any area that is able to support vegetation, but they are most effective and beneficial on floodplains, near wetlands, along streambanks, and on steep, unstable slopes. They are also effective in separating land use areas that are not compatible and in protecting wetlands or water bodies by displacing activities that might be potential sources of non-point source pollution.

To establish an effective vegetative buffer, the following guidelines should be followed:

- Soils should not be compacted.
- Slopes should be less than 5%.
- Buffer widths should be determined after careful consideration of slope, vegetation, soils, depth to impermeable layers, runoff sediment characteristics, type and quantity of storm water pollutants, annual rainfall, and primary land use of adjacent property.
- Buffer widths should increase as slope increases.
- Zones of vegetation (native vegetation in particular), including grasses, deciduous and evergreen shrubs, and understory and overstory trees, should be intermixed.
- In areas where flows are concentrated and velocities are high, buffer zones should be combined with other structural or nonstructural best management practices as a pretreatment.

Vegetated buffers require plant growth before they can be effective, and land on which to plant the vegetation must be available. If the cost of the land is very high, buffer zones might not be cost effective. Although vegetated buffers help to protect water quality, they usually do not effectively counteract concentrated storm water flows to neighboring or downstream wetlands.

Inspection and maintenance are most important when buffer areas are first installed. Once established, vegetated buffers do not require much maintenance beyond the routine procedures listed earlier and periodic inspections of the areas, especially after any heavy rainfall and at least once a year. Inspections should focus on encroachment, gully erosion, density of vegetation, evidence of concentrated flows through the areas, and any damage from foot or vehicular traffic. If there is more than 6 inches of sediment in one place, it should be removed.

Several researchers have measured greater than 90% reductions in sediment and nitrate concentrations. Buffer/filter strips do a reasonably good job of removing phosphorus attached to sediment but are relatively ineffective in removing dissolved phosphorus.

SC2.1.6.15 Retention ponds

Wet ponds (a.k.a., storm water ponds, retention ponds, wet extended detention ponds) are constructed basins that have a permanent pool of water throughout the year (or at least throughout the wet season). Ponds treat incoming storm water runoff by settling and algal uptake. The primary removal mechanism is settling as storm water runoff resides in this pool, and pollutant uptake, particularly of nutrients, also occurs through biological activity in the pond.

SC2.1.6.16 Detention ponds (including wet ponds)

Wet detention ponds are storm water control structures providing both retention and treatment of contaminated storm water runoff. The pond consists of a permanent pool of water into which storm water runoff is directed. Runoff from each rain event is detained and treated in the pond until it is displaced by runoff from the next storm.

SC2.1.6.17 Infiltration Measures

Infiltration measures can include drainfields that are designed to promote storm water infiltration into subsoils. These drainfields help to control runoff and prevent the contamination of local watersheds. The system is usually composed of a pretreatment structure, a manifold system, and a drainfield.

SC2.1.6.18 Open Vegetated Swales

The term swale (a.k.a., grassed channel, dry swale, wet swale, biofilter) refers to a series of vegetated, open channel management practices designed specifically to treat and attenuate storm water runoff for a specified water quality volume. As storm water runoff flows through these channels, it is treated through filtering by the vegetation in the channel, filtering through a subsoil matrix, and/or infilitration into the underlying soils. Variations of the grassed swale include the grassed channel, dry swale, and wet swale.

SC2.1.6.19 Natural Depression

Natural depressions are naturally occurring areas where storm water runoff can settle.

SC2.1.7 Soil Stabilization Practices (Temporary)

SC2.1.7.1 Buffer Zones

Buffer zones are vegetated strips of land used for temporary or permanent water quality benefits. Buffer zones are used to decrease the velocity of storm water runoff, which in turn helps to prevent soil erosion. Buffer zones are different from vegetated filter strips because buffer zone effectiveness is not measured by its ability to improve infiltration (allow water to go into the ground). The buffer zone can be an area of vegetation that is left undisturbed during construction, or it can be newly planted.

Buffer zones techniques can be used at any site that can support vegetation. Buffer zones are particularly effective on floodplans, next to wetlands, along streambanks, and on steep, unstable slopes.

If buffer zones are preserved, existing vegetation, good planning, and site management are needed to protect against disturbances such as grade changes, excavation, damage from equipment, and other activities. Establishing new buffer strips requires the establishment of a good dense turf, trees, and shrubs. Careful maintenance is important to ensure healthy vegetation. The need for routine maintenance such as mowing, fertilizing, liming, irrigating, pruning, and weed and pest control will depend on the species of plants and trees involved, soil types, climatic conditions and location. Maintaining planted areas may require debris removal and protection against unintended uses or traffic.

SC2.1.7.2 Mulching

Mulching is a temporary erosion control practice in which materials such as grass, hay, wood chips, wood fibers, straw, or gravel are placed on exposed or recently planted soil surfaces. Mulching is highly recommended as a stabilization method and is most effective when used in conjunction with vegetation establishment. In addition to stabilizing soils, mulching can reduce storm water runoff velocity. When used in combination with seeding or planting, mulching can aid plant growth by holding seeds, fertilizers, and topsoil in place, preventing birds from eating seeds, retaining moisture, and insulating plant roots against extreme temperatures.

Mulch mattings are materials such as jute or other wood fibers that are formed into sheets and are more stable than loose mulch. Jute and other wood fibers, plastic, paper, or cotton can be used individually or combined into mats to hold mulch to the ground. Netting can be used to stabilize soils while plants are growing, although netting does not retain moisture or insulate against extreme temperatures. Mulch binders consist of asphalt or synthetic materials that are sometimes used instead of netting to bind loose mulches.

Mulching is often used in areas where temporary seeding cannot be used because of environmental constraints. Mulching can provide immediate, effective, and inexpensive erosion control. On steep slopes and critical areas such as waterways, mulch matting is used with netting or anchoring to hold it in place.

Mulches can be used on seeded and planted areas where slopes are steeper than 2:1 or where sensitive seedlings require insulation from extreme temperatures or moisture retention.

When possible, organic mulches should be used for erosion control and plant material establishment. Suggested materials include loose straw, netting, wood cellulose, or agricultural silage. All materials should be free of seed, and loose hay or straw should be anchored by applying tackifier, stapling netting over the top, or crimping with a mulch crimping tool. Materials that are heavy enough to stay in place (for example, gravel or bark or wood chips on flat slopes) do not need anchoring. Other examples include hydraulic mulch products with 100% post-consumer paper content, yard trimming composts, and wood mulch from recycled stumps and tree parts. Inorganic mulches such as pea gravel or crushed granite can be used in unvegetated areas.

Mulches may or may not require a binder, netting, or tacking. Effective use of netting and matting material requires firm, continuous contact between the materials and the soil. If there is no contact, the material will not hold the soil and erosion will occur underneath the material. Grading is not necessary before mulching.

There must be adequate coverage to prevent erosion, washout, and poor plant establishment. If an appropriate tacking agent is not applied, or is applied in insufficient amounts, mulch is lost to wind and runoff. The channel grade and liner must be appropriate for the amount of runoff, or there will be resulting erosion of the channel bottom. Also, hydromulch should be applied in spring, summer, or fall to prevent deterioration of mulch before plants can become established. Table SC2.3 presents guidelines for installing mulches.

Table SC2.3. Typical mulching materials and application rates.

Material	**Rate per Acre**	**Requirements**	**Notes**
Organic Mulches			
Straw	1 - 2 tons	Dry, unchopped, unweathered; avoid weeds.	Spread by hand or machine; must be tacked or tied down.
Wood fiber or wood cellulose	½ - 1 ton		Use with hydroseeder; may be used to tack straw. Do not use in hot, dry weather.
Wood chips	5 - 6 tons	Air dry. Add fertilizer N, 12 lb/ton.	Apply with blower, chip handler, or by hand. Not for fine turf areas.
Bark	35 yd^3	Air dry, shredded, or hammermilled, or chips	Apply with mulch blower, chip handler, or by hand. Do not use asphalt tack.

Nets and Mats			
Jute net	Cover area	Heavy, uniform; woven of single jute yarn. Used with organic mulch.	Withstands water flow.
Excelsior (wood fiber) mat	Cover area		
Fiberglass roving	½ - 1 ton	Continuous fibers of drawn glass bound together with a non-toxic agent.	Apply with compressed air ejector. Tack with emulsified asphalt at a rate of 25 - 35 gal./1000 $ft.^2$

Mulching, matting, and netting might delay seed germination because the cover changes soil surface temperatures. The mulches themselves are subject to erosion and may be washed away in a large storm. Maintenance is necessary to ensure that mulches provide effective erosion control and are removed when protection is no longer needed and disposed of in a landfill or composted. Mulched areas should be inspected frequently to identify areas where mulch has loosened or been removed, especially after rainstorms. Such areas should be reseeded (if necessary) and the mulch cover replaced immediately. Mulch binders should be applied at rates recommended by the manufacturer. If washout, breakage, or erosion occurs, surfaces should be repaired, reseeded, and remulched, and new netting should be installed. Inspections should continue until vegetation is firmly established.

Mulching effectiveness varies according to the type of mulch used. Soil loss reduction for different mulches ranges from 53 to 99.8%. Water velocity reductions range from 24 to 78%. Table SC2.4 shows soil loss and water velocity reductions for different mulch treatments.

Table SC2.4. Measured reductions in soil loss for different mulch treatments.

Mulch Characteristics	Soil Loss Reduction (%)	Water Velocity Reduction (% relative to bare soil)
100% wheat straw/top net	97.5	73
100% wheat straw/two nets	98.6	56
70% wheat straw/30% coconut fiber	98.7	71
70% wheat straw/30% coconut fiber	99.5	78
100% coconut fiber	98.4	77
Nylon monofilament/two nets	99.8	74
Nylon monofilament/rigid/bonded	53.0	24
Vinyl monofilament/flexible/bonded	89.6	32
Curled wood fibers/top net	90.4	47
Curled wood fibers/two nets	93.5	59
Antiwash netting(jute)	91.8	59
Interwoven paper and thread	93.0	53
Uncrimped wheat straw, 2,242 kg/ha	84.0	45
Uncrimped wheat straw, 4,484 kg/ha	89.3	59

In addition, mulching provides a high rate of sediment and nutrient pollution prevention. This study also found that seeding or mulching added value to a site in the eyes of the developers, real estate agents, and homebuyers that more than offset the cost of seeding or mulching.

SC2.1.7.3 Temporary Geotextiles

Geotextiles are porous fabrics also known as filter fabrics, road rugs, synthetic fabrics, construction fabrics, or simply fabrics. Geotextiles are manufactured by weaving or bonding fibers made from synthetic materials such as polypropylene, polyester, polyethylene, nylon, polyvinyl chloride, glass, and various mixtures of these materials. As a synthetic construction material, geotextiles are used for a variety of purposes such as separators, reinforcement, filtration and drainage, and erosion control. Some geotextiles are made of biodegradable materials such as mulch matting and netting. Mulch mattings are jute or other wood fibers that have been formed into sheets and are more stable than normal mulch. Netting is typically made from jute, wood fiber, plastic, paper, or cotton and can be used to hold the mulching and matting to the ground. Netting can also be used alone to stabilize soils while the plants are growing; however, it does not retain moisture or temperature well. Mulch binders (either asphalt or synthetic) are sometimes used instead of netting to hold loose mulches together. Geotextiles can aid in plant growth by holding seeds, fertilizers, and topsoil in place. Fabrics are relatively inexpensive for certain applications. A wide variety of geotextiles exist to match the specific needs of the site.

Geotextiles can be used alone for erosion control. Geotextiles can be used as matting to stabilize the flow of channels or swales or to protect seedlings on recently planted slopes until they become established. Matting may be used on tidal or streambanks, where moving water is likely to wash out new plantings. They can also be used to protect exposed soils immediately and temporarily, such as when active piles of soil are left overnight. Geotextiles are also used as separators; for example, as a separator between riprap and soil. This "sandwiching" prevents the soil from being eroded from beneath the riprap and maintains the riprap's base.

There are many types of geotextiles available. Therefore, the selected fabric should match its purpose. State or local requirements, design procedures, and any other applicable requirements should be considered. Effective netting and matting require firm, continuous contact between the materials and the soil. If there is no contact, the material will not hold the soil, and erosion will occur underneath the material.

Geotextiles (primarily synthetic types) have the potential disadvantage of being sensitive to light and must be protected prior to installation. Some geotextiles might promote increased runoff and might blow away if not firmly anchored. Depending on the type of material used, geotextiles might need to be disposed of in a landfill, making them less desirable than vegetative stabilization. If the fabric is not properly selected, designed, or installed, the effectiveness may be reduced drastically.

Regular inspections should be made to determine if cracks, tears, or breaches have formed in the fabric; if so, it should be repaired or replaced immediately. It is necessary to maintain contact between the ground and the geotextile at all times. Trapped sediment should be removed after each storm event.

Geotextiles' effectiveness depends upon the strength of the fabric and proper installation. For example, when protecting a cut slope with a geotextile, it is important to properly anchor the fabric. This will ensure that it will not be undermined by a storm event.

SC2.1.7.4 Temporary Seeding

Temporary seeding means growing a short-term vegetative cover (plants) on a disturbed site areas that may be in danger of erosion. The purpose of temporary seeding is to reduce erosion and sedimentation by stabilizing disturbed areas that will not be stabilized for long periods of time or where permanent plant growth is not necessary or appropriate. This practice uses fast-growing annual or short-lived perennial grasses whose root systems hold down the soils so that they are less apt to be carried off-site by storm water runoff or wind. Temporary seeding also reduces the problems associated with mud and dust from bare soil surfaces during construction.

Temporary seeding should be performed on areas which have been disturbed by construction and are likely to be redisturbed, but not for several weeks or more. Typical areas might include denuded areas, soil stockpiles, dikes, dams, sides of sediment basins, and temporary roadbanks. Temporary seeding should take place as soon as practicable after the last land-disturbing activity in an area.

Proper seed bed preparation and the use of high quality seed are needed to grow plants for effective erosion control. Soil that has been compacted by heavy traffic or machinery may need to be loosened. Successful growth usually requires that the soil be tilled before the seed is applied. Topsoiling is not necessary for temporary seeding; however, it may improve the chances of establishing temporary vegetation in an area. Seed bed preparation may also require applying fertilizer and/or lime to the soil to make conditions more suitable for plant growth. Proper fertilizer, seeding mixtures, and seeding rates vary depending on the location of the site, soil types, slopes, and season.

Seeded areas should be covered with mulch to provide protection from the weather. Seeding on slopes of 2:1 or more, in adverse soil conditions, during excessively hot or dry weather, or where heavy rain is expected should be followed by spreading mulch. Frequent inspections are necessary to check that conditions for growth are good. If the plants do not grow quickly or thick enough to prevent erosion, the area should be reseeded as soon as possible. Seeded areas should be kept adequately moist. If normal rainfall will not be enough, mulching, matting, and controlled watering should be done. If seeded areas are watered, watering rates should be watched so that over-irrigation (which can cause erosion itself) does not occur.

SC2.1.7.5 Soil Roughening

Soil roughening is a temporary erosion control practice often used in conjunction with grading. Soil roughening involves increasing the relief of a bare soil surface with horizontal grooves, stair-stepping (running parallel to the contour of the land), or tracking using construction equipment. Slopes that are not fine graded and that are left in a roughened condition can also reduce erosion. Soil roughening reduces runoff velocity, increases infiltration, reduces erosion, traps sediment, and prepares the soil for seeding and planting by giving seed an opportunity to take hold and grow.

Soil roughening is appropriate for all slopes. Soil roughening works well on slopes greater than 3:1, on piles of excavated soil, and in areas with highly erodible soils. This technique is especially appropriate for soils that are frequently mowed or disturbed because roughening is relatively easy to accomplish. To slow erosion, roughening should be done as soon as possible after the vegetation has been removed from the slope. Roughening can be used with both seeding and planting and temporary mulching to stabilize an area. For steeper slopes and slopes that will be left roughened for longer periods of time, a combination of surface roughening and vegetation is appropriate. Roughening should be performed immediately after grading activities have ceased (temporarily or permanently) in an area.

Rough slope surfaces are preferred because they aid the establishment of vegetation, improve infiltration, and decrease runoff velocity. Graded areas with smooth, hard surfaces might seem appropriate, but such surfaces may increase erosion potential. A rough soil surface allows surface ponding that protects lime, fertilizer, and seed. Grooves in the soil are cooler and provide more favorable moisture conditions than hard, smooth surfaces. These conditions promote seed germination and vegetative growth.

It is important to avoid excessive compacting of the soil surface, especially when tracking, because soil compaction inhibits vegetation growth and causes higher runoff velocity. Therefore, it is best to limit roughening with tracked machinery to sandy soils that do not compact easily and to avoid tracking on heavy clay soils, particularly when wet. Roughened areas should be seeded as quickly as possible. Proper dust control procedures also should be followed when soil roughening.

There are different methods for achieving a roughened soil surface on a slope. The selection of an appropriate method depends on the type of slope and the available equipment. Roughening methods include stair-step grading, grooving, and tracking. Factors to consider when choosing a method are slope steepness, mowing requirements, whether the slope is formed by cutting or filling, and available equipment. The following methods can be used for surface roughening.

Cut slope roughening for areas that will not be mowed. Stair-step grades or groove-cut slopes should be used for gradients steeper than 3:1. Stair-step grading should be used on any erodible material that is soft enough to be ripped with a bulldozer. Slopes consisting of soft rock with some subsoil are particularly suited to stair-step grading. The vertical cut distance should be less than the horizontal distance, and the horizontal portion of the step should be slightly sloped toward the vertical wall. Individual vertical cuts should not be made more than 2 feet deep in soft materials or more than 3 feet deep in rocky materials.

Grooving. This technique uses machinery to create a series of ridges and depressions that run across the slope along the contour. Grooves should be made using any appropriate implement that can be safely operated on the slope, such as disks, tillers, spring harrows, or the teeth on a front-end loader bucket. The grooves should be made more than 3 inches deep and less than 15 inches apart.

Fill slope roughening for areas that will not be mowed. Fill slopes with a gradient steeper than 3:1 should be placed in lifts less than 9 inches, and each lift should be properly compacted. The face of the slope should consist of loose, uncompacted fill 4 to 6 inches deep. Grooving should be used as described above to roughen the face of the slopes, if necessary. The final slope face should not be bladed or scraped.

Cuts, fills, and graded areas that will be mowed. Mowed slopes should be made no steeper than 3:1. These areas should be roughened with shallow grooves less than 10 inches apart and more than 1 inch deep using normal tilling, disking, or harrowing equipment (a cultipacker-seeder can also be used). Excessive roughness is undesirable where mowing is planned.

Roughening with tracked machinery. Roughening with tracked machinery should be limited to sandy soils to avoid undue compaction of the soil surface. Tracked machinery should be operated perpendicular to the slope to leave horizontal depressions in the soil. Tracking is generally not as effective as other roughening methods.

Soil roughening is not appropriate for rocky slopes. Soil compaction might occur when roughening with tracked machinery. Soil roughening is of limited effectiveness in anything more than a gentle or shallow depth rain. If roughening is washed away in a heavy storm, the surface will have to be re-roughened and new seed laid.

Areas need to be inspected after storms, since roughening might need to be repeated. Regular inspection of roughened slopes will indicate where additional erosion and sediment control measures are needed. If rills (small watercourses that have steep sides and are usually only a few inches deep) appear, they should be filled, graded again, and reseeded immediately. Proper dust control methods should be used.

Soil roughening provides moderate erosion protection for bare soils while vegetative cover is being established. It is inexpensive and simple for short-term erosion control when used with other erosion and sediment controls.

SC2.1.7.6 Temporary Storm Drain Diversion

Temporary storm drain diversions are storm drain pipes or temporary berms which redirect an existing storm drain system or outfall channel to discharge into a sediment trap or basin.

SC2.1.7.7 Chemical Stabilization

Chemical stabilizers, also known as soil binders or soil palliatives, provide temporary soil stabilization. Materials made of vinyl, asphalt, or rubber are sprayed onto the surface of exposed soils to hold the soil in place and protect against erosion from runoff and wind. Chemicals used for stabilization are easily applied to the surface of the soil, can be effective in stabilizing areas where vegetative practices cannot be established, and provide immediate protection.

Chemical stabilization can be used in areas where other methods of stabilization, such as temporary seeding or permanent vegetation, are not effective because of environmental constraints. They can also be used in combination with vegetative or perimeter practices to enhance erosion and sediment control.

The application rates and procedures recommended by the manufacturer of a chemical stabilization product should be followed as closely as possible to prevent the products from forming ponds and to avoid creating impervious areas where storm water cannot infiltrate.

Chemical stabilization can create impervious surfaces where water cannot infiltrate and which might increase storm water runoff. Overuse of chemical stabilizers might adversely affect water quality, although the chemicals' impacts on wildlife are still unknown. Additionally, chemical stabilization is usually more expensive than vegetative practices.

Chemically stabilized areas should be regularly inspected for signs of erosion. Stabilizers should be reapplied if necessary.

Effectiveness of polymer stabilization methods ranges from 70% to 90%, although effectiveness of a particular polymer depends on soil type, application method, and individual chemical characteristics of the polymer.

SC2.2 Vegetation Management

The following section details the standard procedures used for vegetation management on USAG-AK lands. These procedures include biological and chemical controls, prescribed burning, revegetation, and mechanical and hand vegetation cutting and clearing.

SC2.2.1 Biological and Chemical Controls

SC2.2.1.1 Biological and Chemical Controls

For wetland restoration, biological control and chemical control are carried out to insure that a practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance). These controls are used to control undesirable plant species and pests (e.g., using predator or parasitic species) is implemented where available and feasible.

SC2.2.1.2 Water/Chemical Suppression

Chemicals can also be used for soil stabilization practices, often referred to as chemical mulch, soil binder, or soil palliative, and are temporary erosion control practices. Materials made of vinyl, asphalt, or rubber are sprayed onto the surface of the soil to hold the soil in place and protect against erosion from storm water runoff and wind. Many of the products used for chemical stabilization are human-made, and many different products are on the market.

SC2.2.2 Prescribed Burning

Prescribe burning consists of the following procedures. A burn plan is prepared and detailed parameters are identified for when burning can take place. When the burn prescription window is open, crews assemble at the burn unit. The edge of the burn unit is lit using hand lighting or aerial lighting techniques. The units are surrounded by roads, trails or changes in vegetation types, and these are used to burn off of. Next the interior of the unit is lit using hand lighting or aerial lighting techniques. The interior is lit using systematic girding patterns. After the entire unit is lit, the mop-up process starts. Mop-up consists of extinguishing all hot spots within a specified distance from the burn perimeter. During mop-up, burning trees and shrubs are cut down and extinguished. Smoldering sites are dug up with hand tools and extinguished. Water is applied on an as-needed basis during mop-up either by backpack pumps, draft pumps, fire engines, or helicopter buckets. The final process involves monitoring the burn unit until the fire is completely out; this process can take anywhere from several days to several months. The Bureau

of Land Management, Alaska Fire Service, State of Alaska, Division of Forestry, or the USAG-AK Fire Department working with the USAG-AK Natural Resource Office prepare burn plans and implement prescribed fires.

Fire management practices, including suppression and prescribed burning, are designed to implement the land management policies. Prescribed fires are used for silvicultural treatment of sites, preparation for reforestation, hazard fuel reduction, habitat enhancement, and insect and disease control. Prescribe fires are also used as a tool to reduce fuel loading on ranges where the risk of wildfire limits military training opportunities. Wildland fire escapement from impact areas are reduced through prescribed fires and mechanical treatments along the boundaries of impact areas.

SC2.2.3 Revegetation

Re-vegetation practices are installed to prevent erosion, stabilize soils and restore native flora and include a variety of plant and seed based practices.

SC2.2.3.1 Seeding

Seeding exposed soils is the most common re-vegetation activity on USAG-AK lands. Effective seeding requires appropriate timing and weather conditions. Seeding is installed prior to August 1st to allow for adequate root growth for successful over-wintering. Adequate moisture is required for all seeding installations. Seeding typically occurs just prior to imminent or forecasted precipitation. If adequate moisture is not present or predicted, water is applied to the project site by a water truck or tanker. Seeds are hand broadcast in small seeding areas. Large areas are seeded with tractor (John Deere 4020)-pulled Brillion-type grass seeder.

I. Type

Native type seed mixes are used whenever appropriate. These mixes often include a single non-native annual (i.e. annual rye) with an accelerated emergence as a “quick” cover, allowing for the protection of native seed and there slower germination. These annuals are not persistent and typically disappear from the stand within two to three years.

Native seed mix recommendations and installation requirements practices are developed using the University of Alaska, Fairbanks, Cooperative Extension Service’s “A Revegetative Guide for Conservation Use in Alaska.”

The most common native seeds used on USAG-AK lands are Wainwright wheatgrass, arctared red fescue, sourdough bluejoint reedgrass and nortran tufted hairgrass.

II. Seed Bed Preparation

Seed beds are prepared by hand and heavy equipment. Small seeding areas are raked by hand or track walked with a dozer (CAT D4 –D6). Large areas are tracked by a dozer or raked by a pulled light tine harrow. Rake, track and harrow indentation are installed perpendicular to the prevailing winds or downhill slope. Indentations are effective at holding seed, fertilizer and moisture for improved germination.

SC2.2.3.2 Fertilizing

The application of commercial chemical fertilizer, consisting of nitrogen, phosphorous, potassium and sulfur, is an essential component of effective revegetation. Fertilizer is applied to small areas with

regulated hand broadcasters. Large area application requires a bulk fertilizer spreader pulled by a tractor (John Deere 4020).

Fertilizer mix and application rates are determined by seed mix, soil type and season. Fertilizer is applied to planted ground and exposed soils with local sources of native seed.

SC2.2.3.3 Live Staking

Dormant cuttings are the primary plant material used in live staking. Dormant cuttings are harvested from living woody plants in a dormant (not actively growing) state. The cuttings are collected from plants that can root easily without special treatment, such as certain willow species, poplar and cottonwood.

Live staking will be implemented to install the dormant cutting directly into the ground. This technique is often utilized where single stem plantings will provide adequate plant cover, slope stability and fish habitat.

Several live stakes can be prepared from one dormant cutting. Stakes should be cut as long as possible, ¼ to ½ inches in diameter (slightly larger diameter cuttings will also work). Discard flower buds ("pussy willows"). Flower buds typically occur at the top 2/3 of a branch that was produced during the past growing season. At least one or two leaf buds, which are smaller than flower buds, must be present near the top of each live stake.

Use rebar, ½ inch or less in diameter, to create a planting hole for longer stakes, particularly when planting in compact and gravelly soils. Tightly pack the soil around the stake so that no air pockets remain.

Plant stakes upright 1 to 3 feet on center. Stakes should be planted as vertically as possible, placing at least ¾ of the stake below ground so that only one or two leaf buds are left exposed above the ground. The intent is to maximize the surface area for rooting so a good root system can develop and support a healthy shoot system. If more than one or two buds, ¼ of the stake, or 4 inches of the live stake is extending above the soil surface, trim the stake.

The contractor will water the live stakes during the re-vegetation process to help remove air pockets and increase contact between the soil and surface of the live stake. Moist soil is needed during the period the live stake is rooting and becoming established. Topsoil is not required. Survival rates for drier sites may be increased if larger cuttings are used.

Willow harvest sites need to be identified and permission obtained to collect cuttings. Harvest sites are easier to identify when leaves are present. Collect cuttings during winter/early spring before leaves appear, preferably before March 31, if they are to be used for spring and early summer plantings. For fall plantings, collect cuttings in the late summer/early fall, after plants have gone dormant and the leaves have changed color or have dropped. Select cuttings with leaf buds near the top of each cut line. Avoid flower buds ("pussy willows") if possible; these buds typically occur at the tips of branches produced during the last growing season. These branch tips tend to be smaller than ¼ inch in diameter. Select branches ¼ to 2 inches in diameter and at least 3 to 4 feet long. If necessary, branches can be cut to a shorter length at the time of installation. The potential for drying during storage is reduced when the cuttings are stored in longer pieces.

Cuttings need to be stored to maintain viability. If collection occurs while daytime temperatures remain below freezing, freeze or refrigerate the cuttings until planting. If daytime temperatures are above freezing during collection, cuttings should be refrigerated. Frozen cuttings can be stored with a small amount of snow to help reduce drying. Refrigerated cuttings should be stored at 31° F to 40° F and 60 to

70% humidity. Monitor the condition of the cuttings regularly to detect problems such as drying, sprouting or mold.

Take cuttings directly from cold storage to the planting site. Only the plant material required for each day should be removed from storage, particularly if the weather is windy and/or warm. On site, the cuttings should be stored away from direct sunlight, heeled into moist soil, or stored in water until planting.

Plant dormant cuttings as soon as the soil has thawed and no later than July 1, or plant in late summer/fall before the ground freezes. The ability of plantings to become established and resume growth the following spring declines quickly for plantings made after July 1. If the project is delayed and rescheduled for fall, do not try to store the cuttings that were collected in the spring until fall. You should plan on preparing new cuttings once the plants have gone dormant.

Collect different species of woody cuttings that root easily and can be mixed in the layers; rooted plants can also be added to create a hedge-brush layer. If the brush layer is installed below the ordinary high water level, branches from alders and willows that do not root readily may be used, since these plant layers probably will not survive and become established, living plants.

SC2.2.3.4 Fascines

Facines are installed along streambanks, water courses and erosive prone slopes to stabilize soils and prevent bank slope failure. Fascines are effective at controlling erosion and stabilizing slopes immediately after installation, and their efficacy improves as the dormant branches sprout and take root.

Fascines are comprised of tightly wrapped bundles of dormant felt leaf willow. Bundles are typically 12” to 24” in diameter and wrapped with a biodegradable twine. The bundles are installed into a trench slightly wider than the bundle diameter. Trenches are excavated by a backhoe (Case 235) or hand shovel. Fascines are buried to a depth 2/3 of the bundle height and staked to the ground with wood wedge stakes. Excavated soil is placed on top of the fascine and walked down into the bundle to fill voids between branches and promote stem budding through soil contact. Fascines are laid parallel to surface water flows and act as water bars. Fascine spacing is dependant on slope, soil type and predicted surface flows.

SC2.2.4 Vegetation Cutting and Clearing (Mechanical)

Tree clearing is conducted by hand and machine. Trees are removed within a specific area and cut to length and piled for personal firewood harvest, piled and burned, chipped and spread out, or buried on site. Any clearing in wetlands that disturbs the soil, especially masticating, requires a Section 404 Clean Water Act permit from the U.S Army Corps of Engineers Regulatory Branch.

Trees are typically cut, ground or sheared to ground level with minimal to moderate intrusion into mineral soil. Some tree thinning operations require the use of a dozer, which can result in the removal of the root balls and associated soil. Most mechanical clearing operations are conducted on frozen soil conditions. When clearing or cutting near water bodies, it is necessary to maintain a riparian buffer zone if possible.

SC2.2.4.1 Mechanical Thinning

Mechanical thinning is conducted with a feller buncher (cut), an excavator (CAT 320) with a thumb attachment (pull), or a hydro-axe (grind). Specific areas of trees are removed by cutting, grinding or pulling. Mechanical clearing typically involves large areas and wide spacings. Mechanical thinning operations are conducted in hazardous fuel reduction, maneuver corridor and training facility line-of-sight projects.

SC2.2.4.2 Mechanical Clearing

Mechanical clearing is conducted with a feller buncher (cut), a dozer fitted with a straight or shear blade (shear) or a hydro-axe (grind). Specific areas of trees are removed by cutting, grinding or shearing. Mechanical clearing typically involves large areas and wide spacings. Mechanical thinning operations are conducted in hazardous fuel reduction, maneuver corridor and training facility line-of-sight projects.

I. Shear Blade

Shear blades (Rome KG) are fitted to the front of large dozers (CAT D8 or larger) and consist of a curved face with a flat cutting edge that rides on the ground surface. Shearblades are used to cut off trees and vegetation at the ground surface in a spiral pattern during frozen soil conditions. Sheared material is rolled into windrows. Shearblades allow for effective stem and trunk cutting with minimal root ball and soil disturbance. Shearbladed material can be left to decompose or piled and burned.

Shearblading is performed on hazardous fuel reduction, fire break and wildlife food plot projects.

II. Straight Blade

Straight blades are fitted to the front of small to large sized dozers (CAT D4-D9) and are used to shear trees and surface organics into piles during clearing operations. Straight blades are used on frozen soil conditions when soil intrusion is an issue. Straight blades are also used for material piling during burning operations.

III. Hydro-axe (Masticating)

A masticating head hydro-axe (Fecon) is used to grind whole trees and woody vegetation into small chip-like residue. Masticating heads are rotating cylinders with offset rows of teeth and can be used to grind to ground surface or deeper. Sub-surface grinding incorporates wood material into the soil. Masticating hydro-axe work is performed during frozen and non-frozen soil conditions, depending on soil type and ground moisture. Masticating hydro-axes are used in hazardous fuel reduction, fire break, line-of-sight and roadside clearing projects.

IV. Hydro-axe (Flail)

A flail head hydro-axe is an attachment on an excavator (CAT 320) body and is used to grind whole trees and woody vegetation into large chip residue. Flail heads are rotating blades attached to an articulating arm and are used to grind to ground surface level. Flail head hydro-axe work is performed during frozen and non-frozen soil conditions, depending on soil type and ground moisture. Flail head hydro-axes are used in hazardous fuel reduction, fire break, line-of-sight and roadside clearing projects.

SC2.2.4.3 Mowing

Mowing is performed on areas with woody vegetation less than 2” in diameter. Areas are mowed with a tractor (John Deere 4020)-pulled brush mower. Mowing allows for residue to remain on-site and act as a mulch layer. Mowing is performed on roadside clearing, drop zone management and wildlife food plot projects. Mowing is typically conducted on a 3-5 year rotation cycle.

SC2.2.5 Vegetation Cutting and Thinning (Hand)

Hand thinning is individual tree specific and results in limited residual tree damage. Trees are thinned to a determined stem-per-acre specification. Hand crews use chain saws and axes to remove trees. Hand

thinning operations are conducted in hazardous fuel reduction and maneuver corridor projects. Hand thinning is utilized in areas with unfrozen hydric soils.

Hand clearing is small area specific and results in limited residual tree damage around clearing perimeters. Hand crews use chain saws and axes to remove trees. Hand clearing operations are conducted around vertical training facilities and areas to small to maneuver equipment. Hand clearing is utilized in areas with unfrozen hydric soils.

SC2.2.6 Vegetation Protection

The preservation of natural vegetation (existing trees, vines, brushes, and grasses) provides natural buffer zones. By preserving stabilized areas, it minimizes erosion potential, protects water quality, and provides aesthetic benefits. This practice is used as a permanent control measure.

This technique is applicable to all types of sites. Areas where preserving vegetation can be particularly beneficial are floodplains, wetlands, streambanks, steep slopes, and other areas where erosion controls would be difficult to establish, install, or maintain.

Preservation of vegetation on a site should be planned before any site disturbance begins. Preservation requires good site management to minimize the impact of construction activities on existing vegetation. Clearly mark the trees to be preserved and protect them from ground disturbances around the base of the tree. Proper maintenance is important to ensure healthy vegetation that can control erosion. Different species, soil types, and climatic conditions will require different maintenance activities such as mowing, fertilizing, liming, irrigation, pruning, and weed and pest control.

The principal advantage of preserving natural vegetation is the protection of desirable trees, vines, bushes, and grasses from damage during project development. Vegetation provides erosion control, storm water detention, biofiltration, and aesthetic values to a site during and after construction activities. Other benefits from preserving natural areas are because natural vegetation:

- Can process higher quantities of storm water runoff than newly seeded areas.
- Does not require time to establish.
- Has a higher filtering capacity than newly planted vegetation because aboveground and root structures are typically denser.
- Reduces storm water runoff by intercepting rainfall, promoting infiltration, and lowering the water table through transpiration.
- Provides buffers and screens against noise and visual disturbance.
- Provides a fully developed habitat for wildlife.
- Usually requires less maintenance (e.g., irrigation, fertilizer) than planting new vegetation.
- Enhances aesthetics.

Preservation of natural vegetation is applicable to all construction sites where vegetation exists in the predevelopment condition. Areas where preserving vegetation can be particularly beneficial are floodplains, wetlands, streambanks, steep slopes, and other areas where erosion controls would be difficult to establish, install, or maintain. Only land needed for building activities and vehicle traffic needs to be cleared.

Vegetation should be marked for preservation before clearing activities begin. A site map should be prepared with the locations of trees and boundaries of environmentally sensitive areas and buffer zones to be preserved. The location of roads, buildings, and other structures can be planned to avoid these areas. Preservation requires careful site management to minimize the impact of construction activities on

existing vegetation. Large trees located near construction zones should be protected because damage during construction activities may result in reduced vigor or death after construction has ceased. The boundaries around contiguous natural areas and tree drip lines should be extended and marked to protect the root zone from damage. Although direct contact by equipment is an obvious means of damage to trees and other vegetation, compaction, filling, or excavation of land too close to the vegetation also can cause severe damage.

When selecting trees for preservation, the following factors should be considered:

Tree vigor. Preserving healthy trees that will be less susceptible to damage, disease, and insects. Indicators of poor vigor include dead tips of branches, stunted leaf growth, sparse foliage, and pale foliage color. Hollow, rotten, split, cracked, or leaning trees also have less chance of survival.

Tree age. Older trees are more aesthetically pleasing as long as they are healthy.

Tree species. Species well-suited to present and future site conditions should be chosen. Preserving a mixture of evergreens and hardwoods can help to conserve energy when evergreens are preserved on the northern side of the site to protect against cold winter winds and deciduous trees are preserved on the southern side to provide shade in the summer and sunshine in the winter.

Wildlife benefits. Trees that are preferred by wildlife for food, cover, and nesting should be chosen.

Other considerations include following natural contours and maintaining pre-construction drainage patterns. Alteration of hydrology might result in die-off of preserved vegetation because their environmental requirements are no longer met.

The following are basic considerations for preservation of natural vegetation:

- Boards should not be nailed to trees during building operations.
- Tree roots inside the tree drip line should not be cut.
- Barriers should be used to prevent the approach of equipment within protected areas.
- Equipment, construction materials, topsoil, and fill dirt should not be placed within the limit of preserved areas.
- If a tree or shrub that is marked for preservation is damaged, it should be removed and replaced with a tree of the same or similar species with a 2-inch or larger caliper width from balled and burlaped nursery stock when construction activity is complete.
- During final site cleanup, barriers around preserved areas and trees should be removed.

Preservation of vegetation is limited by the extent of existing vegetation in pre-construction conditions. It requires planning to preserve and maintain the existing vegetation. It is also limited by the size of the site relative to the size of structures to be built. High land prices might prohibit preservation of natural areas. Additionally, equipment must have enough room to maneuver; in some cases preserved vegetation might block equipment traffic and may constrict the area available for construction activities. Finally, improper grading of a site might result in changes in environmental conditions that result in vegetation die-off. Consideration should be given to the hydrology of natural or preserved areas when planning the site.

Even if precautions are taken, some damage to protected areas may occur. In such cases, damaged vegetation should be repaired or replaced immediately to maintain the integrity of the natural system. Continued maintenance is needed to ensure that protected areas are not adversely impacted by new structures. Newly planted vegetation should be planned to enhance the existing vegetation.

Natural vegetation (existing trees, vines, brushes, and grasses) can provide water quality benefits by intercepting rainfall, filtering storm water runoff, and preventing off-site transport of sediments and other pollutants.

A potential cost associated with preservation of natural vegetation is increased labor that might be required to maneuver around trees or protected areas.

SC2.3 Wetlands Management

The following section details the standard practices and procedures used for wetlands reclamation on USAG-AK lands (U.S. Department of Agriculture Natural Resources Conservation Service ALASKA – Conservation Practice 657).

Wetland restoration practices are conducted to rehabilitate drained or degraded wetland by returning the soils, hydrology, vegetative community, and biological habitat to the natural condition to the extent practicable. This practice applies only to sites with hydric soil, which were natural wetlands that have been previously degraded hydrologically and/or vegetatively.

Upon completion of the restoration, the site will meet the current Natural Resources Conservation Service soil, hydrology, and vegetation criteria of a wetland. This practice is applicable only if natural hydrologic conditions can be approximated by modifying drainage and/or artificial flooding of a duration and frequency similar to natural conditions.

If the presence of hazardous waste materials in the sediment or fill is suspected, soil samples will be collected and analyzed for the presence of hazardous waste as defined by local, state, or federal authorities. Sites containing hazardous waste will not be restored under this standard.

This practice does not apply to a constructed wetland intended to treat point and non-point sources of water pollution, wetland enhancement intended to rehabilitate a degraded wetland where specific functions and/or values are enhanced beyond original conditions, or wetland creation for creating a wetland on a site location which historically was not a wetland or was formerly a wetland but will be replaced with a wetland type not naturally occurring on the site.

SC2.3.1.1 Criteria

I. General Criteria

- Applicable local, state, and federal permits are secured before restoration.
- Water rights are assured prior to restoration if required.
- Vegetative buffers on surrounding uplands are established to reduce the movement of sediment and soluble and sediment-attached substances carried by runoff.
- The soil, hydrology and vegetative characteristics existing on the site and the contributing watershed are documented before restoration of the site begins.

II. Criteria for Hydric Soil Conditions

Restoration sites are located on hydric soils. If the hydric soil is covered by fill, sediment, spoil, or other depositional material, the material covering the hydric soil is removed only to the surface of the buried (or original) hydric soil, reestablishing an approximation of the original soil microtopography.

III. Criteria for Hydrology Restoration

A permanent water supply should be available approximating the needs of the wetlands. The hydrology of the site is defined as the rate, path, and timing of inflow and outflow; duration, frequency, and depth of flooding, ponding or saturation. The maximum hydrology and the overall hydraulic variability of the restored site will approximate the conditions that existed before alteration, e.g., dynamic and static water levels, soil saturation.

The standards and specifications for Dike (356) and Structure for Water Control (587) will be used as appropriate. Refer to the U.S. Department of Agriculture Natural Resources Conservation Service Engineering Field Handbook, Chapter 13, "Wetland Restoration, Enhancement, and Creation," and Chapter 6, "Structures," for additional design information. Existing drainage systems are utilized, removed, or modified as needed to achieve the intended purpose.

IV. Criteria for Vegetation Restoration

The vegetation is restored as close to the original natural plant community as the restored site conditions will allow. Determination of the original plant community's species and % composition is based upon reference wetlands of the type being restored or suitable technical reference.

Plantings, seeding, or other types of vegetative establishment is comprised of native species that occur on the wetland type being restored. Preference is given to native wetland plants with localized genetic material. Plant materials collected or grown from material collected within the same Major Land Resource Area is considered local.

In soils where seed banks realistically exist, or where natural colonization of selected native species (identified from reference wetlands) will dominate within five years, then natural regeneration is allowed. The standard and specification of U.S. Department of Agriculture Natural Resources Conservation Service Native Plant Community Restoration and Management (767) is used as appropriate. Adequate substrate material and site preparation necessary for proper establishment of the selected plant species is included in the design.

On sites which were predominantly herbaceous vegetation prior to modification and planting and/or seeding is necessary, the minimum number of native species to be established is based upon the number of ecological sites present. Sites restored to only one ecological site are established with at least two species adapted to the site. Sites with two or more ecological sites (i.e., wet meadow, shallow marsh, or slough eco-sites, etc.) are established with at least one native species on each ecological site.

Herbaceous vegetation is established by a variety of methods including: mechanical or aerial seeding, topsoiling, organic mat placement, wetland sod, vegetative sprigs, wetland hay, or etc., over the entire site or a portion of the site and at densities and depths appropriate.

Forested wetland plantings and/or seeding include a minimum of two tree or shrub species on each ecological site where appropriate. Tree (and shrub) seeding and planting follow the criteria of Natural Resources Conservation Service Conservation Practice 612 - Tree/Shrub Establishment.

V. Criteria for Wetland Functions

A functional assessment (hydrogeomorphic approach or similar method) is performed on the site prior to restoration. Restoration goals and objectives include targeted natural wetland functions for the wetland

type and the site location as determined by the functional assessment and reference site data. A post-project assessment is performed after an adequate period to assess the success of the restoration.

SC2.3.1.2 Considerations

The following considerations are included in the wetland restoration practice:

- Effect of volumes and rates of runoff, infiltration, evaporation, and transpiration on the water budget.
- Potential for a change in rates of plant growth and transpiration because of changes in the volume of available soil water.
- Effects on downstream flows or aquifers that would affect other water uses or users.
- Effects on wetlands or water-related resources wildlife habitats that would be associated with the practice.
- High priority sites adjacent to existing wetlands that increase wetland system complexity and diversity, decrease habitat fragmentation, and ensure colonization of the site by wetland flora and fauna.
- Linking wetlands by corridors wherever appropriate to enhance the wetland's use and colonization by the flora and fauna.
- Effects of varying water levels in response to potential climatic events such as wet or dry periods.
- Changes in salt movement/concentrations in the soil resulting from hydrologic alterations.
- The nutrient and pesticide tolerance of the plant species planned where known nutrient and pesticide contamination exists.
- Effects of temperature on water resources to prevent undesired effects on aquatic and wildlife communities.
- Upslope water/groundwater source availability for discharge wetland.

SC2.3.1.3 Operation and Maintenance

The following actions are carried out to insure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance):

- Appropriate use of fertilizers, mechanical treatments, prescribed burning, pesticides and other chemicals to assure the wetland restoration function will not compromise the intended purpose.
- Biological control of undesirable plant species and pests (e.g., using predator or parasitic species) is implemented where available and feasible.
- Timing and level setting of water control structures required for the establishment of desired hydrologic conditions or for management of vegetation is determined.
- Inspection schedule for embankments and structures for damage assessment is developed.
- Depth of sediment accumulation to be allowed before removal is required.
- Management needed to maintain vegetation, including control of unwanted vegetation.

SC2.4 Water Resources Management

The following section details the management practices for water resources management on USAG-AK lands. Standard practices and procedures are listed for low water crossings and streambank repair for both interior Alaska and south-central Alaska. The structures in this section that can be used in-stream or on a streambank below the ordinary high water of the water body (e.g., low water crossing) would require permits from state (Alaska Department of Natural Resources Office of Habitat Management and Permitting, Alaska Department of Environmental Conservation) and federal agencies (U.S. Army Corps

of Engineers). Any streambank stabilization project would also require a permit from the same state and federal agencies.

SC2.4.1 Low Water Crossing Hardening

Low water crossings are installed in areas where significant seasonal hydrological features inconsistent with culvert installation are present. These structures provide for substantial flow capacity while maintaining accessibility.

Low water crossings are typically excavated 1' to 1.5' below the stream or channel bed. The excavated area is backfilled with angular or rounded cobble ranging in aggregate sizes of 3" to 7" with no fines. Banks are cut to 10:1 to 8:1 slopes with cobbles placed up and over the side lip of the crossing. Low water crossings prone to highly erosive seasonal flows will have cobbles mortared in place.

Two lane road low water crossings are constructed at a 20' width minimum.

SC2.4.2 Streambank Repair (Interior Alaska)

Streambank stabilization is used to prevent streambank erosion from high velocities and quantities of storm water runoff. The procedures in this section that can be used in-stream or on a streambank below the ordinary high water of the water body (e.g., low water crossing) would require permits from state (Alaska Department of Natural Resources Office of Habitat Management and Permitting, Alaska Department of Environmental Conservation) and federal agencies (U.S. Army Corps of Engineers). Methods for the interior of Alaska include all the south-central Alaska techniques. In addition to the south-central Alaska techniques, there are several other methods that may be utilized in the Interior. They are:

1. Riprap - Large angular stones placed along the streambank or lake usually to the ordinary high water line.
2. Gabion – Rock-filled wire cages that are used in place of riprap to construct an apron and prevent further erosion of the toe of the bank.
3. Log Cribbing – Retaining walls built of logs to anchor the soils against erosive forces. These are usually built on the outside of stream bends.

These types of streambank stabilization may be used where vegetative stabilization practices are not practical and where the streambanks are subject to heavy erosion from increased flows or disturbance during construction. Stabilization should occur before any land development in the watershed area. Stabilization can also be retrofitted when erosion of a streambank occurs.

Streambank stabilization structures should be planned and designed by a professional engineer licensed in the state where the site is located. An important design feature of streambank stabilization methods is the foundation of the structure; the potential for the stream to erode the sides and bottom of the channel should be considered to make sure the stabilization measure will be supported properly. Structures can be designed to protect and improve natural wildlife habitats; for example, log structures can be designed to keep vegetation. Log structures are often constructed with spruce or birch tree boles. Permanent structures should be designed to handle expected flood conditions. A well designed layer of stone can be used in many ways and in many locations to control erosion and sedimentation. Riprap can also be used for flow channel liners, inlet and outlet protection at culverts, streambank protection, and protection of shore lines subject to wave action. It is used to expose the water to air as well as to reduce water energy. Riprap and gabion (wire mesh cages filled with rock) are usually placed over a filter blanket (i.e., a gravel layer of

filter cloth). Riprap is either a uniform size or graded (different sizes) and is usually applied in an even layer along the streambank.

Streambank stabilization structures should be inspected regularly and after each large storm event. Structures should be maintained as installed. Structural damage should be repaired as soon as possible to prevent further damage or erosion to the streambank.

SC2.4.3 Streambank Repair (South Central)

Streambank stabilization practices are installed along banks that are eroding or unstable and include bio-engineering with plant materials and engineered rock structures. These practices restore and/or protect damaged or compromised banks. On-site conditions, including soil type, area hydrology, vegetation, water velocity and icing impacts, determine which practice is installed.

The main bio-engineering stabilization practices used on USAG-AK lands are live staking, fascines, spruce tree revetments, brush layering, root wads emplacements and vegetative matting. The standard practices for live staking and fascines are included in the re-vegetation section.

SC2.4.3.1 Spruce Tree Revetments

Spruce tree revetments consist of whole spruce trees laid parallel to the streambank and are installed to provide immediate erosion control and bank protection. The trees are secured tightly to the bank with cable and earth anchors. Tree tops are pointed downstream and overlapped a minimum of 30% of the whole tree length. Care should be taken to avoid unnecessary damage to, or removal of, tree limbs.

A combination of the three bio-engineering practices is used at sites with varying conditions and stabilization opportunities.

SC2.4.3.2 Rock Armoring

The most common engineered structure for streambank stabilization is rock armoring, also known as riprap. Riprap consists or large angular rock strategically placed in a continuous layer or blanket on a shaped slope and toe. The rock protects the bank from erosion and scour. The length of a riprap blanket is determined by stream dimensions, water velocity and soil types. These structures are always “keyed-in” at both the upstream and downstream end of the structure and most often, placed on top of permeable geo-textile fabric.

Riprap is installed with a backhoe (Case 235) or excavator (CAT 320) from the top of the bank. Riprap is strategically placed to prevent excess rock in streambed.

I. Bank Preparation

Banks are prepared by removing vegetation, shaping side slopes to a 3:1 slope (maintaining existing bank height and streambed width) and cutting a trench at the toe of the bank below base elevation into the creek bed.

II. Geotextile

Non-woven geotextile (Natural Resources Conservation Service Spec CS-61) is installed from bottom of trench to 18” over the top of the bank. Riprap is carefully placed on top of the geo-textile.

IV. Riprap

Riprap is made up of a mix of classified angular or round rock and varies in size. Rock sizes are dependant on streambank dimensions and water velocity.

Rock riprap is typically installed with a minimum blanket thickness of 18”. Common rock riprap gradation is:

Size Opening	% Passing on a Dry Weight Basis
12”	100
10”	85
7.5”	50
3”	15

SC2.4.3.3 Rock Barb

Rock barbs, consist of constructed rock piles set in the streambed and are installed to deflect erosive water forces away from vulnerable streambanks. Rock barbs are keyed into the existing bank slope and streambed, extend into the stream and are pointed upstream. Dike length, barb spacing, rock size and gradation and depth of bed and bank keying are dependant on stream size and hydrology, soils and protection requirements. Barb dikes can include wire basket enclosures for rock placement. It should be noted that these structures must be designed by an experienced hydrologist/engineer.

Rock barbs are installed with a backhoe (Case 235) or excavator (CAT 320). Silt fences or other erosion control practices are installed during construction to help prevent downstream siltation. Dike rock is strategically placed to prevent excess rock in streambed and to ensure correct placement. Appropriate re-vegetation practices are installed on exposed bank soils after dike installation.

A specific example of a rock barb construction for Ship Creek Creek is as follows. All applications for rock barbs are very site specific and need to be designed by an engineer/hydrologist.

For Ship Creek, rock barbs are to be angled from 10 to 25 degrees upstream and built of a well graded stone with an upper weight limit of 650 to 1000 pounds. The deflectors are to be spaced 50 feet apart starting from the upper extent of the damage area down to the lower extent. The height of the deflector at the bank end rise will be at the annual high water mark (i.e., 2 ½ feet deep for Ship Creek at Fort Richardson) and taper down to the annual low flow level mark (i.e., 1 ½ feet deep for Ship Creek at Fort Richardson) at the stream end rise. Approximately 4 inches will be spaced between each boulder to accommodate small fish fry moving up and down the stream. The length of each weir will be one half the base flow width of the stream. Each weir will be approximately 3 feet wide. Trenches will be dug to accommodate the length, width and depth of the stones to be utilized for each barb. The trenches will be dug at a minimum of 1 ½ feet deep below the creek bottom in order to key the boulders into the streambed and minimize shifting during high water. The trench may be deeper in order to accommodate the individual boulders utilized. The main goal is to achieve the correct height of the boulders at the bank end and stream end rise.

SC2.4.3.4 Root Wad Stabilization

There are many ways to install root wad structures. Footer logs, header logs and geotech fabric can be incorporated into these structures as well as the specific method described below.

One particular method is to emplace overlapping tree root wads that will span from the upper extent of the streambank to the lower extent of the damaged area. The root wad fans will start approximately 8 feet out from the edge of the existing road. Each root wad will have a trunk that is a minimum of 12 feet in length. The contractor will dig trenches into the road approximately 4 to 5 feet down, which will be accommodate each tree trunk accordingly and ensure that the root wad portion of the tree is low enough

to be partially embedded into the river bottom. The contractor may need to dig shallow trenches (1 foot or less) to ensure that the root fan will be embedded into the river bottom. Riprap may be included for a base or to help anchor the boles. Anchoring boles with dead man anchors or other such devices is acceptable.

Once the root wads have been emplaced, the contractor will backfill the root wad trenches with dirt and cobble stone approximately 8 feet out to the root wads and spanning the entire length of the damaged area. The height of the backfill material needs to match the current height of the existing bank and then gently slope down to embedded root wads at the stream end rise.

SC2.4.3.5 Willow Live Staking

Dormant cuttings are the primary plant material used in live staking. Dormant cuttings are harvested from living woody plants in a dormant (not actively growing) state. The cuttings are collected from plants that can root easily, without special treatment, such as certain willow species, poplar and cottonwood.

Live staking will be implemented to install the dormant cutting directly into the ground. This technique is often utilized where single stem plantings will provide adequate plant cover, slope stability and fish habitat.

Several live stakes can be prepared from one dormant cutting. Cut stakes 24 to 36 inches long, ¼ to ½ inches in diameter (slightly larger diameter cuttings will also work). Soaking the end of the willow stakes for 3-15 days prior to planting increases survival rates too. Discard flower buds ("pussy willows"). Flower buds typically occur at the top 2/3 of a branch that was produced during the past growing season. At least one or two leaf buds, which are smaller than flower buds, must be present near the top of each live stake.

Use rebar, ½ inch or less in diameter, to create a planting hole for longer stakes, particularly when planting in compact and gravelly soils. Tightly pack the soil around the stake so that no air pockets remain.

Plant stakes upright 1 to 3 feet on center. Stakes should be planted as vertically as possible, placing at least ¾ of the stake below ground so that only one or two leaf buds are left exposed above the ground. The intent is to maximize the surface area for rooting so a good root system can develop and support a healthy shoot system. If more than one or two buds, ¼ of the stake, or 4 inches of the live stake is extending above the soil surface, trim the stake.

The contractor will water the live stakes during the re-vegetation process to help remove air pockets and increase contact between the soil and surface of the live stake. Moist soil is needed during the period the live stake is rooting and becoming established. Topsoil is not required. Survival rates for drier sites may be increased if larger cuttings are used.

Willow harvest sites need to be identified and permission obtained to collect cuttings. Harvest sites are easier to identify when leaves are present. Collect cuttings during winter/early spring before leaves appear, preferably before March 31, if they are to be used for spring and early summer plantings. For fall plantings, collect cuttings in the late summer/early fall, after plants have gone dormant and the leaves have changed color or have dropped. Select cuttings with leaf buds near the top of each cut line. Avoid flower buds ("pussy willows") if possible; these buds typically occur at the tips of branches produced during the last growing season. These branch tips tend to be smaller than ¼ inch in diameter. Select branches ¼ to 2 inches in diameter and at least 3 to 4 feet long. If necessary, branches can be cut to a shorter length at the time of installation. The potential for drying during storage is reduced when the cuttings are stored in longer pieces.

Cuttings need to be stored to maintain viability. If collection occurs while daytime temperatures remain below freezing, freeze or refrigerate the cuttings until planting. If daytime temperatures are above freezing during collection, cuttings should be refrigerated. Frozen cuttings can be stored with a small amount of snow to help reduce drying. Refrigerated cuttings should be stored at 31° F to 40° F and 60 to 70% humidity. Monitor the condition of the cuttings regularly to detect problems such as drying, sprouting or mold.

Take cuttings directly from cold storage to the planting site. Only the plant material required for each day should be removed from storage, particularly if the weather is windy and/or warm. On site, the cuttings should be stored away from direct sunlight, heeled into moist soil, or stored in water until planting.

Plant dormant cuttings as soon as the soil has thawed and no later than July 1, or plant in late summer/fall before the ground freezes. The ability of plantings to become established and resume growth the following spring declines quickly for plantings made after July 1. If the project is delayed and rescheduled for fall, do not try to store the cuttings that were collected in the spring until fall. Plan on preparing new cuttings once the plants have gone dormant.

Collect different species of woody cuttings that root easily and can be mixed in the layers; rooted plants can also be added to create a hedge-brush layer. If the brush layer is installed below the ordinary high water level, branches from alders and willows that do not root readily may be used, since these plant layers probably will not survive and become established, living plants.

SC2.4.3.6 Vegetative Matting

A vegetative mat is a large transplant of plants with roots and soil intact. Dimensions of the mats vary from one to several feet square and may contain woody and/or herbaceous vegetation. The greatest benefit of this transplanting technique is that vegetative cover is provided immediately after the mat is placed at the new location. The mats often contain many plant species, especially native plants that cannot be obtained elsewhere. Often, the cost will be for labor and machinery for moving and installing the mat.

The contractor will harvest a vegetative mat by cutting the shoots and root/soil mass into a block. The root/soil mass is cut as deeply as possible. The mat is then lifted from the ground by hand or with mechanized equipment and transported to the planting site.

Prepare the planting site by creating a depression in the soil that will accommodate the dimensions of the mat. The sides of the mat should be covered by soil. If the mat is placed directly on the surface with other mats immediately adjacent to each other, make sure that the edges of the mat are not left exposed to the air, which would cause damage to the roots. If needed, soil should be placed in the spaces between mats to cover the roots.

SC2.4.3.7 Brush Layering

Brush layering is used to rebuild the streambank. Branches are placed on horizontal benches that follow the contour of the slope and provide reinforcement to the soil. Additional stability is provided when the front of the soil layer is needed with grass while the woody plants are becoming established.

Dormant willow cuttings are the primary plant material used in brush layering. Dormant cuttings are harvested from living woody plants in a dormant (not actively growing) state. The cuttings are collected from plants that can root easily, without special treatment, such as certain willow species, poplar and cottonwood.

Begin layering at the bottom of the slope at the ordinary high water level, often identified by the line of growing vegetation. Excavate a bench 2 to 3 feet deep so that it angles slightly down and into the slope.

Twenty to 25 branches are placed on the bench, slightly crisscrossed. The cut ends are placed into the slope with the tips extending beyond the edge of the bench no more than ¼ the total branch length. Place 2 to 4 inches of soil on top of the branches and tamp into place. Re-vegetation fabric will be used to keep soil in place when a brush layer is installed on steep slopes and streambanks. The fabric is installed by placing it on top of the soil so that at least two to three feet can be anchored by wooden stakes and the next soil-gravel layer. Allow 5 to 6 feet of fabric to extend beyond the brush layer so that it will lap over and cover the soil-gravel mix, then stake into place.

Repeat the branch, topsoil, wrapped soil-gravel mix layering sequence in order to rebuild the bank up to the original bank height. Fill slopes can be created at the same time a brush layer is installed. On a cut slope and existing streambanks, each layer is excavated at the time the brush layer is installed.

SC2.4.3.8 Brush Mattressing

This procedure involves using live, woody material ½ to 3 inches in diameter and random lengths. This material is placed 4 to 6 inches deep on sloped areas. Generally starting at the bottom of the slope, they are laid in a crisscross pattern protecting 6 or more feet of slope. They are held in place with wedge- like dead stakes (pieces of wood cut in long wedges. They measure 1½" by 3" inches by 2½ feet long). These dead stakes are driven into the soil to secure wattles, brush mattressing and other applications of soil bioengineering and secured with string or wire. Four inches of loose soil is placed on top to sufficiently cover the majority of the branches. The brush mattressing will act as an immediate sediment trap and grows into a shrubby carpet-like protective barrier. This is effective on slopes with 2:1 ratio or flatter.

SC3 Forestry and Wildfire Management

The following section details the standard procedures and practices for forestry and wildfire management.

SC3.1 Forest Management

Forest management includes standard practices and procedures for timber sales, timber stand improvement, firewood and personal use timber, reforestation, urban forestry, and forest health.

SC3.1.1 Timber Sales

Bureau of Land Management and Army timber management practices and contract stipulations will govern timber sales on USAG-AK lands. Timber sales on withdrawals where the Army holds vegetation rights will be governed by Army practices and contract stipulations. Contract examples and procedures for timber sales can be found in Army Guidance Procedures for Installation Conducted Timber Sales, 2004. The Garrison Commander has the authority to conduct timber sales and must work through a Contracting Officer. All proceeds from the sale of Army timber and forest products must be deposited to Deposit Fund Account 21F3875.3960-C S99999. Some common timber sale requirements include:

- The construction, improvement, and maintenance of safe and environmentally sound road systems.
- Adherence to National Environmental Policy Act, National Historic Preservation Act, and other applicable requirements.
- Minimal damage to wetlands as defined by the wetland management plan.
- The felling and yarding of timber in such a way as to protect soil and water quality, residual trees, and human safety.
- The treatment of logged sites to prepare them for the next generation of trees.

- The disposal of logging slash for silvicultural, insect control, and/or fire hazard reduction purposes.
- Mitigation measures for protecting wildlife habitat.
- Adherence to best management practices to preclude erosion from roads and harvest operations.
- Other miscellaneous provisions, where appropriate, such as meeting minimum fire requirements and application of disease control measures.
- Adherence to State of Alaska Forest Practices Act Guidelines.

Forest land use plans are prepared prior to commercial sales of forest products. Plans include sale boundaries, cruised volume, silvicultural prescription, road layout, best management practices for prevention of soil erosion and sedimentation, water quality considerations, cultural resources protection, wildlife considerations, harvest method(s), scaling requirements, slash disposal, site preparation, and regeneration requirements. Documentation for compliance with National Environmental Policy Act as well as required cultural resources surveys would be completed prior to sales. The timber sale program is designed to utilize material to be clearing for military mission support and offsets clearing costs.

USAG-AK Timber Sale Guidance

Installation Commanders have the authority and responsibility to execute timber sales—draft, distribute, and advertise invitations for bids; review and accept bids; award and administer timber sales contracts; and collect, deposit and account for fees. This authority may involve the following installation personnel—installation foresters and natural resources managers, Directorate of Public Works Environmental Division, legal and contracting offices. The Commander/Contracting Officer designates the Contracting Officer's representative. This document was developed from Installation Army Guidance for Timber Sales, Procedures for Installation-Conducted Timber Sales (2004).

1. Prerequisites for Timber Harvest

According to Army Regulation 200-2—*Environmental Analysis of Army Actions*, all natural resources management plans must undergo a National Environmental Policy Act evaluation. Installations must have an approved Integrated Natural Resources Management Plan (INRMP) that addresses forest management. The effects of timber sales must be consistent with the purpose of the INRMP. Actions associated with forest management must undergo a National Environmental Policy Act analysis and documentation. Installations must have adequate contract support dedicated to timber sale contracts. This should include a qualified appraiser, contract specialist specializing in sales rather than purchases, legal counsel specializing in contracts, a financial officer authorized and qualified to receive and account for proceeds, and Contracting Officer's representative. The installation forester must work in conjunction with a certified Contracting Officer's representative.

2. Coordination

Installation foresters must coordinate harvest operations with range managers and training schedules. Installation foresters should develop a coordination system with G-3 Section or Range Officers. Clearance must then be verified daily by the purchaser by calling the Range Officer requesting activity in certain training areas. The installation forester should review objectives with the range manager periodically to be sure that they clearly understand and continue to understand the assigned functions of the forestry program. Installation foresters will require support from range managers, installation resource management, contracting, and legal offices. Installation foresters must coordinate with the appropriate staff as necessary.

3. Methods of Disposal

The sale of timber from government lands is adaptable to both lump sum and unit price methods. Interruptions or interference by military training or project operations, metal contamination, the lack of time to prepare accurate and reliable cruise estimates, and the possibility of having markings on trees destroyed by range fires should be considered before the method of sale is determined. Under the unit price sale, the timber is advertised or offered for sale on a timber product basis, such as sawtimber, poles, piling, or pulpwood, by species or groups of species within designated logging units, or groups of logging units and bids invited and accepted on a per unit price. When the weight method is used, the weight determines the volume by converting weight to units (thousand board feet, cords, or tons) through a conversion factor determined by test scale or as a predetermined factor. A lump sum sale is one where all marked or designated trees are sold for a lump sum amount. The lump sum sale method should be used whenever the volumes to be sold can be substantiated and metal contamination and military interferences are not anticipated. The savings which ordinarily accrue from lump sum sales are the difference between the cost of weighing or otherwise measuring the product (which is eliminated) and the cost of estimating the product to be produced by tally or cruise.

Forest product sales are to be performed in accordance with Installation Management Agency policy, AR 200-1, AR 405-90, AR 405-80, and AR 200-1 implementation guidance. All revenue from the sale of forest products dollars shall be deposited into the CRFA (Budget Clearing Account 21F3875.3960 20-C S99999). When forest products are removed from Army land by any means other than a forest product sale (e.g., generating energy on the installation), a dollar amount equal to the fair market value is to be deposited in the CRFA by the proponent of the activity removing the forest products. The exception is that forest products may be removed or used to directly assist the military mission without payment. Forest products will not be given away, abandoned, carelessly destroyed, used to offset costs of contracts, or traded for products, supplies, or services. All forest products are to be accounted for and harvests completed prior to the start of any construction that may impact forest resources. Lessees of Army real property, such as the Residential Community Initiative developers, cannot be given authority to remove and dispose of timber. All forest products disposals remain the responsibility of the Army. Forest products may be harvested to generate electricity or heat, provided a dollar amount equal to the fair market value is deposited to CRFA, and the installation's program where the timber was harvested is credited with the income. The installation's approved INRMP, and forest management plan should note that installation forest products may be harvested for the purpose of generating electricity or heat on the installation and a record of such action is maintained by the Directorate of Public Works. Forest management will continue on land reported as excess until land transfer occurs. Clear-cuts on Army forest areas are prohibited unless approved for a specific management purpose. Thinnings, intermediate harvests, and salvage cuts are to be continued if the actions are described and planned in the approved INRMP/forest management plan. That portion of the proceeds from sales of land that is attributable to the value of standing timber on the land sold will be deposited to the CRFA. Installation sawmills and the logging operations incident thereto are not authorized except:

- To the degree required to train troops in specialized construction activities.
- When necessary to prevent the compromise of security information.
- Temporary response to natural disasters.

Reports of Availability are required for the disposal of forest products. See Section VII for clarification. All Army solicitations and contracts for timber sales affected by the Forest Resources Conservation and Shortage Relief Act of 1990 shall contain a provision restricting the export of unprocessed timber procured on Army lands. Installations required to have an INRMP may not sell forest products unless the effects of the sale or leasing are compatible with the purposes of the INRMP. Individuals may be allowed to collect edible or non-timber forest products (including firewood) in designated areas if the removal would be a cost savings to the installation and the value is not high enough to justify the expense of a sale. All of these uses must be addressed in the INRMP. Clear-cuts on Army forest areas are prohibited

unless approved for a specific management purpose. Installations have the option of U.S. Army Corps of Engineers (U.S. Army Corps of Engineers)-conducted sales, conducting timber sales in-house, using the services of other groups or agencies, or combinations of these options (see appendix 4, *Army Timber Sale Guidance*). The planning for timber sales begins with the development of an INRMP and/or a forest management plan that outlines the forecasted timber sales over a given five year period. Installations must comply with National Environmental Policy Act, National Historic Preservation Act, and other environmental laws/regulations when conducting forest product disposal. Installations and U.S. Army Corps of Engineers Districts are responsible for collecting and accounting for forest product disposal proceeds.

The level of National Environmental Policy Act documentation required for a proposed action is to be determined from the Baseline Data and a Biological Assessment or Evaluation. The INRMP (including the forest anagement section) is to be integrated with the Installation Master Plan Environmental Assessment/Environmental Impact Statement. An environmental assessment is normally required for commercial timber sales and harvests. Based on National Environmental Policy Act policies and procedures, some actions do not individually or cumulatively have a significant impact to the environment and therefore may be Categorically Excluded (CX) from an environmental assessment or environmental impact statement documentation. CXs may include the salvaging of wood products from dead and dying trees, trees that are designated to be removed based on approved construction and applicable environmental assessment or environmental impact statement, thinning of young overstocked timber stands, or timber stand and/or wildlife habitat improvement activities which do not include the use of pesticides. A Record of Environmental Consideration is required for each CX. The National Environmental Policy Act evaluation process must be adhered to for all proposed actions. Refer to AR 200–1.

After informal coordination with the U.S. Army Corps of Engineers District Commander and public notice of availability, Installation Commanders or their delegates (but not below the Director of Engineering and Housing) are authorized to sell standing timber and other forest products with an estimated value under $15,000, in conformity with the forest management plan. This authority should be used whenever possible to improve the efficiency and economy of the timber sales program. Timber may not be given away. The total of such sales in any fiscal year will not exceed $30,000 at each installation. Installations are authorized to administer, advertise, and award minor timber sales and emergency timber that do not exceed $15,000. Master reports of availability, sale specific reports of availability, and installation contracting officers are not required for this method of timber disposal. Additional information can be found in AR 405-90, *Disposal of Real Estate*.

Garrison Commanders, using relevant and appropriate statutory authorities, have the authority and responsibility to execute timber sales; draft, distribute, and advertise invitations for bids; review and accept bids; award and administer timber sales contracts; and collect, deposit and account for fees. This authority will involve a warranted Contracting Officer. This authority may involve the following installation personnel: installation foresters and natural resources managers, Director of Public Works (or Environment), resource management, or legal and contracting offices. The contracting officer designates the Contracting Officer’s representative, usually the installation forester. A U.S. Purchasing and Fiscal Officer has the authority to execute timber sales on federally owned Department of Army lands for which he/she is accountable via DD Form 1354 that are licensed to a State Army National Guard. Disposal of forest products is further detailed in the Army Timber Sale Guidance.

In the event of a declared natural disaster that affects installations, timber must be salvaged while it is merchantable to recover Army property value, to prevent costly and unnecessary clean-up actions, and to reduce the risk of catastrophic fire events and insect/disease outbreak. Special provisions or federal agency exemptions may apply to National Environmental Policy Act, National Historic Preservation Act,

and other environmental laws and regulations during federally recognized natural disasters. Natural resource managers should coordinate with their proponent organization to identify if any exemptions exist. All methods of disposal should be explored when salvaging timber, including U.S. Army Corps of Engineers and installation-conducted timber sales, and commanders' sales. Installations should work to quickly remove salvageable timber while it is still merchantable. Installations should coordinate with their proponent organization and the U.S. Army Environmental Center to identify if any special exemptions to environmental laws and regulations exist regarding the salvage of timber. Natural resources managers should ensure that the emergency salvage timber is addressed in installation environmental assessments, environmental impact statements, Master Plans, and other appropriate environmental planning documents. Some actions do not individually or cumulatively have a significant impact to the environment and therefore may be Categorically Excluded from an environmental assessment or environmental impact statement documentation. Categorical exclusions may include the salvaging of wood products from dead and dying trees. Installations should work with their proponent organization and U.S. Army Corps of Engineers District to identify potential natural disasters that would require the salvage of installation timber, and develop a plan of action to expedite the salvage of timber caused by a natural disaster.

4. Pre-Disposal Planning

a. Reports of Availability

Installation Commanders will submit an annual Timber Availability Report to the Major Command 90 days in advance of the fiscal year. The Major Command will review and approve as appropriate, timber declared available for harvest. The Timber Availability Reports should contain the following: volume and type of timber, acreage of sale area, type of sale (e.g., selective thinning, seedtree, or clearcut), timing of the sale and justification, any special requirements or restrictions for the sale, map of sale area, volume tables of products to be advertised for bid, anticipated method of sale (e.g., U.S. Army Corps of Engineers or in-house). Installations must indicate in the Timber Availability Report the proportion of sales that will be conducted in-house and the proportion that will be conducted by the U.S. Army Corps of Engineers. The Major Commands will forward the Timber Availability Reports to the appropriate U.S. Army Corps of Engineers District. If the total annual revenue generated from installation-conducted sales exceeds $75,000, the installation must get Headquarters, Department of Army approval.

b. Appraisal

The installation forester shall obtain an appraisal, by an experienced and qualified person, of the fair market value of the timber to be sold. A formal appraisal is not required when the fair market value does not exceed $50,000; however it is recommended that appraisals be conducted for all timber sales. When the estimated value is less than $50,000, a short form appraisal may be used. The appraised value shall be considered the minimum desirable bid. Stumpage value is determined by comparison with current stumpage prices in the area with adjustments for timber quality and logging costs. Various applications are: comparison with nearby and recently advertised sale of timber similar in quality and logging costs, and average stumpage prices by state or locality usually adjusted for timber volume and quality, distance to mill, military mission restrictions, and geographic location.

c. Invitations for Bid

Invitations for bid will be prepared in writing by designated installation personnel and provided to all prospective purchasers. The installation organization shall maintain a mailing list of prospective purchasers for distribution of invitations. Each bid will be assigned a consecutive number. The invitation for bid shall contain or incorporate by reference all terms and conditions of the sale. Prospective bidders may inspect the timber upon request. It is recommended that the installation hold one pre-bid showing for all prospective bidders. While showing timber offered for sale, the installation forester should explain the general terms and conditions of the sale, time limits established for harvesting, type of equipment necessary, and any special conditions or restrictions for the sale (i.e., sensitive areas or cultural resources to be protected). The installation forester must widely publicize all timber sales, giving adequate information for all individuals that may be interested in making an offer, through such means that will

allow for full and free competition. The advertisement shall state the place where the bids are to be delivered or mailed and shall state the place, date, and time of bid opening. The invitation for bid should be advertised for a minimum of 30 days. The installation forester should allow at least a 30-day response time from the date of publication of the invitation for bid. Bid deposits, generally 20% of the total sale value, must accompany the offer. The installation forester or Contracting Officer's representative may adjust the required deposit when circumstances warrant. When small volumes of timber, having an estimated fair market value of $25,000 or less, are made available on an emergency basis, such as timber in the way of construction, within utility or road rights-of-way, or within range training areas, the installation forester may be authorized to solicit quotations by telephone or by contacting at least three interested timber purchasers. If the value of timber in an emergency timber sale is less than $1,000 the entire amount must be paid before harvesting can occur. If the value of timber is over $1,000 the purchaser should pay 25% of the bid price before harvesting. Performance bonds are not required for emergency timber sales. When carrying out this type of solicitation, a memorandum of record should be prepared for the official file. It should explain the reasons for the emergency sale, prospective bidders contacted, and the bids received.

5. Receipt and Review of Bids

All bids will be sealed, in writing, accompanied by the required deposit, and submitted to the Contracting Officer's representative or installation designee. All bids will be opened and publicly disclosed, per the invitation for bid, by the Contracting Officer's representative. All bids should be recorded on an Abstract of Offers, Standard Form 1409. When bid deposits are received, the bidder, time, and date should be recorded on a Record of, and Receipt for Bids and Responses, GSA Form 1378. The installation forester or Contracting Officer's representative shall review the bids and determine that the bid prices are reasonable, i.e., commensurate with the fair market value of the timber to be sold and were independently arrived at in open competition, and that the purchaser meets the necessary qualifications. It is within the discretion of the installation to determine if acceptable bids are received. When an acceptable bid is not received, the installation forester may allow the highest bidder an opportunity to increase his bid. The bidder shall be given a reasonable period of time, not to exceed a period of 15 working days, to increase the offered price. The Contracting Officer may decide to accept the highest bid, even if it does not meet the appraised estimate.

6. Award of Contract

Contracts are legal documents that the bind the government. Timber sales contracts must be awarded and administered by a warranted Contracting Officer. The Contracting Officer delegates authority and responsibility to the Contracting Officer's representative. Award shall be made with reasonable promptness by notice to the bidder whose bid, conforming to the invitation, will be most advantageous to the installation, price, responsiveness, and responsibility considered. When an offer is accepted, the Contracting Officer's representative shall notify all other bidders and return their deposits. The Contracting Officer's representative should document a summary of the bids, recommendation for award, and the justification for award. A sample timber sales contract template is available from the Army Environmental Center. Minor Forest Products Sales Contracts may be used for the sale of fuelwood and other forest products sales of small lots that do not require a timber contract, the value must be less than $50,000. A performance bond is required from the purchaser to mitigate any damages that may be incurred. Performance bonds should be based on the potential for damage and can be a fixed amount or a %age of the total sale (generally 10-15%). The bond can be a cash deposit or a surety bond. The purchaser and surety company must complete Standard Form 25. Performance bonds are deposited into suspense account 21F3875.3960. At the completion of logging operations, if no damages are incurred, performance bonds are refunded.

7. Contract Administration

All parties involved in administering the contract, including but not limited to the Contracting Officer's representative, installation forester and staff, range manager, installation resource management, contracts, and legal personnel, the purchaser and field crews, shall be familiar with the terms and conditions of the timber sales contract. It is the responsibility of the Contracting Officer's representative and the installation forester to fairly and firmly administer the timber sales contract to ensure that all parties meet their obligations and comply with the terms of the contract. Provisions for contract modification should be stipulated in the original contract. Contract modifications must be in writing through a supplemental agreement (Standard Form 30). Modifications should be within the limits that preserve the original sale premise. Modifications shall apply only to the uncompleted portions of the contract. All contract modifications require agreement by the Contracting Officer's representative and the purchaser. Contract extensions shall not be made unless the purchaser has operated in diligent manner and in accordance with the approved plan of operation or if an extension would be in the best interest of the installation.

8. Operations Planning and Procedures

Prior to commencement of any cutting on a sale area, the installation forester will hold a pre-work conference with the purchaser's representative and the woods superintendent for the purpose of explaining and discussing harvesting and contract procedures. The Pre-Harvest Conference Checklist should be used for the conference. On completion of the discussion, the checklist should be signed by all parties and filed in the timber sale folder. Of major importance will be a discussion of all aspects of contract administration; best management practices; sensitive areas; equipment and personnel requirements; security measures; range firing schedules; method of payment for timber; utilization standards; installation regulations; assignment, inspection, and operation of vehicles; fire and installation safety regulations; and assignment of logging units. The installation forester is responsible for informing purchasers of installation access and security restrictions. The installation forester should ensure that all personnel, vehicles, and equipment have the necessary identification and documentation. The installation forester will always require the purchaser to retain sufficient personnel and equipment in order to maintain the level of production specified in the contract. If the order of cutting is not designated under the terms of the contract, it will be the responsibility of the installation forester to designate the same. If there is a choice, the installation forester will assign the most undesirable portions of the sale first.
The sale of metal-contaminated timber shall be segregated from other sales. All contracts will contain a clause on how to deal with military metal encountered. When military metal is located in logs or stands of timber, the purchaser should be informed of procedures required to be followed under the terms of the sale contract. The formal decision as to whether the timber is too contaminated to harvest will be made by the installation. The installation must, through inspections of field activities, follow and keep abreast of all phases of harvest operations throughout the contract period. Detailed instructions must be given to the purchaser, or purchaser's representative, concerning special contract requirements and, also, conditions unique to the particular installation or operational area. Assignments and instructions to inspectors must be clear and given sufficiently in advance to permit the inspector to plan work. Contracts will be inspected frequently by the installation forester or designated personnel to ensure compliance with contract terms and to preclude the development of problems, such as unsatisfactory restoration.

9. Collection of Bills

Bid deposits and subsequent payments will be in cash, cashier's check, certified checks, traveler's checks, bank drafts, or postal telegraphic orders. Personal checks may be accepted only when a bond or bank letter of credit is on hand that will cover the amount due. Bid deposits should be retained and secured at the installation until the contract is awarded. Accounting for and disposing of bid deposits from unsuccessful bidders will be achieved by returning guaranteed negotiable instruments to the bidders. Advance stumpage payments will be collected from the purchaser prior to cutting for unit sales. Total payment will be collected prior to logging for lump sum sales. Payments must be recorded. It is suggested that installations use a Cash Collection Voucher, DD Form 1131 for recording payments. Deposit bids

received from successful bidders, performance bonds, and subsequent collections into Account 21F3875.3960. As further assistance in the collecting of bills, it is suggested that a simple electronic recording system be established at the installation forestry office for each sale contract indicating: contract number, amount of bill, date of bill, date bill received, deadline date for payment of bill, date of collection. Review of this system at the appropriate time will indicate any outstanding bills and action necessary to be taken by the Contracting Officer's representative. The Contracting Officer's representative is also obligated to request and collect advance payments from the purchaser as required.

10. Proceeds and Expenses

The Army forestry program is an automatic reimbursement program. Proceeds are deposited into the U.S. Army General Fund Budget Clearing Account, 21F3875.3960 20C S99999 and recorded on the RCS CSCFA-302 report. Within 90 days after the conclusion of each fiscal year, DFAS-IN, Directorate of Accounting, Budget Execution and Reporting Division (DFAS-IN/AAB) will compute the concluding fiscal year's unfilled forestry orders (transferring excess to or removing required funds from that fiscal year's Army General Fund Budget Clearing Account 21F3875.3960), compute and provide 40% of the net proceeds per installation to the appropriate states and deposit the remaining net proceeds into the DOD Forestry Reserve Account (21X5285). Forestry Reserve Account funds are made available for military departments for use in CONUS, for improvements of forest lands, unanticipated contingencies in the administration of forest lands, and natural resources management that implements approved plans and agreements. The Army is the executive agent for the DOD Forestry Reserve Account.

11. Keeping Records

For unit sales, the purchaser shall mail or deliver to the Contracting Officer's representative by no later than Saturday of each week, a summary report or statement showing the timber harvested from each cutting unit during the preceding week. The report will reflect the volume of sawtimber and/or pulpwood harvested, together with weight tickets substantiating the report. If the summary report is not received by the date indicated above, all operations under the contract shall be suspended until the above requested volume data is received.

To minimize the amount of required paperwork and logging supervision a lump sum sale is recommended. The buyer pays for the entire sale amount at the contract signing, rather than in multiple future payments. Another benefit is that this method removes all need to sort timber by product classification. The buyer has already paid for the products and how the products are sorted is irrelevant to the government. Lump sum sales work equally for all types of sales—clear-cut, marked thinning, or operator select. The installation forester must conduct inspections for lump sum sales to ensure that only timber included in the sale is removed.

12. Security, Inspections, and Quality Assurance

Installation inspection personnel will be assigned to make periodic inspections of the logging operation. Where possible, the same inspector should continue with the operation throughout the tenure of the contract. Inspections should be conducted regularly, daily or weekly, as appropriate. For ready reference, the inspector of a designated contract will keep a copy of the contract and sale area progress maps available in the field at all times. The inspections will be conducted in all field operational areas as often as necessary, giving particular attention to the amount of equipment and personnel being used by the purchaser, methods and manner of timber felling, removal, conditions of roads, security measures, if progress within sale area logging units is proper, and production is adequate to complete the contract on schedule. Cut-over areas will be inspected and approved as the contract progresses and as field work is completed in a given logging or cutting unit. It is recommended that the inspector keep a Daily Timber Inspection Report on each contract they are responsible for while on duty. The inspector's activities will be inserted each day. It will be turned in to the installation forester or Contracting Officer's representative

for review. The date and initials of the person making the review will be placed on the form. Since the form is a permanent record while the contract is in force, it will be filed at the installation and will be available in the event the information is needed to address contract issues. When violations of contractual terms are detected for which liquidated damages are established under the contract, the installation forester should gather pertinent information. This information will include: the number and diameter of trees involved, the circumstances surrounding the violation, whether the violation was willful or through the carelessness or negligence of the purchaser, and the installation forester's recommendations. Deficiencies will be brought immediately to the attention of the purchaser's designated field superintendent with directions for necessary corrective action. At no time will the inspector give instructions concerning deficiencies or violations to other than the purchaser or the purchaser's field superintendent unless such deficiency or violation is of such a nature that immediate remedial action is necessary. The Contracting Officer's representative will check all contract violations as they are reported to have a firsthand knowledge of the violation as it happened in the field. On major or repeated violations, the Contracting Officer's representative will inform the purchaser in a brief, concise, courteous letter of the existing violation and how it shall be remedied. The Contracting Officer's representative will be advised of all major or repeated violations with recommendations for involving penalties. Information on decisions will be promptly furnished to the installation forester. Security of forest products is another prime factor in good contract administration. It is of primary importance because without adequate security there would be no satisfactory way to determine the amount of timber products removed from an installation. Good security not only provides for protection of government property, but reflects the integrity of the government employees engaged in timber sales. The installation foresters are responsible at the field level, as part of their contract administration, to conduct a vigorous and continuous security program.

13. Contract Completion and Closure

Completion dates are designated on the Timber Availability Report and will be made part of the contract. Timber sale contracts generally last for a period of 18 to 24 months. Any changes in the assigned completion date will be coordinated with the installation forester and the Contracting Officer's representative. Assigned completion dates will be made by the installation forester or Contracting Officer's representative considering the following conditions: market conditions, military mission, contamination, logging conditions, silvicultural needs, and management objectives. The installation forester will inspect the area after all contracted forest products are removed. A satisfactory letter of clearance or final completion notice from the Directorate of Public Works will then be obtained for the entire area. The procedure gives opportunity for both the Directorate of Public Works and the installation forester to review areas and note the progress of harvesting without duplicating inspection trips. The completion notice will be forwarded to the Contracting Office. If any timber made available was left un-harvested in the sale area, its acreage and location, volume and species, and the reason why the timber was not removed will be reported. A separate report explaining the reasons for overcut and undercut should accompany the completion notice if the volume removed was more than plus or minus 10% of the volume made available.

14. Aids in Contract Administration

Listed below are points that will help the installation carry out more effective contract administration. The installation forester or Contracting Officer's representative should adhere to the following guidelines. Recognize that timber contracts are legal documents and require compliance with all terms and conditions. Do not arbitrate or alter contract specifications to obtain a higher value for the government timber or for any other reason. Always recommend modifications to invitations or contracts to the Contracting Office. Induce compliance through an effective application of education and cooperation rather than through the exercise of police power. It is important to establish a good relationship with the purchaser. Approach the purchaser properly. Each one requires a different approach. Some are sensitive while others require planned approaches. If the purchaser has done good work, let the purchaser know

about it. Be firm, fair and impartial with all operators. Discuss the problems quietly but confidently. Contracting Officer's representatives and installation foresters with reputations of firmness will command more respect and cooperation than one the operators feel they can sway and take advantage of. Recognize the importance of timing. The crucial times in the life of a contract are the pre-work conference with the purchaser to discuss terms and the start of the different phases of the operation. Follow-up at the beginning of each significant phase of operation will get work off to a proper start. Keep informed. Require employees to report field activities on different sales. Require "planned" timber removal from sale areas; ask the subcontractors about their activities; intelligent decisions cannot be made without knowing the facts. Problems can be minimized by anticipating likely areas of trouble before it is too late. Try to anticipate problems that may arise from changes in operator personnel, equipment breakdowns, weather changes, reduced quotas, and changes in market conditions.

SC3.1.2 Timber Stand Improvement

Timber stand improvement activities are designed to improve the quality of forest stands, support military training activities, and improve wildlife habitat. Timber stand improvement is often categorized as noncommercial activities used to improve the quality of commercial timber, but it may also be used to improve forest conditions for other uses. Timber stand improvement may include thinning, spacing, chemical injection, chipping, prescribed burning, etc., all of which are designed to improve species composition, quality, and/or growth rate of existing stands by removing competing vegetation to allow preferred trees to grow faster. Timber stand improvement is also an effective treatment for wildland fire hazard fuel reductions and insect and disease control. Usable material from timber stand improvement projects will be disposed of through timber sales or the personal use firewood program.

SC3.1.3 Firewood/Personal Use

The Firewood/Personal Use program consists of Christmas tree cutting, house log harvesting, and firewood cutting. Christmas tree permits are free and available starting December 1 each year. Designated cutting areas vary year by year. The topping of larger trees is not allowed, nor is cutting trees over 15 feet tall. House log harvesting is allowed in designed areas by permit. Up to five permits may be issued annually. Permits are issued on a first-come basis starting the first working day of January each year. The permit is good for two years and allows the permit holder to cut up to 50 trees. The permit fee is $1,000 paid at time of issue. Tree cutting must adhere to all regulations applied to timber sales. Firewood permits are sold for five dollars a cord with a three-cord minimum and five dollars for each additional cord. Areas to be cleared or thinned for military training, construction, and habitat enhancement are selected for cutting; consequently, available volume will vary year by year depending on the amount of clearing and thinning. Long-term designated firewood cutting areas are established in several training areas. These areas undergo extensive environmental review and are subject to the same stipulations as timber sales. Firewood permits are available year-round and expire one year after the date of acquisition. Personal use permits for firewood, Christmas trees and house logs are made available for military personnel, their families, and local residents. The Firewood/Personal Use program is designed to utilize material to be cleared for military mission support and to offset clearing costs.

SC3.1.4 Reforestation

The objective of the forest regeneration program is to quickly reestablish trees on cleared and harvested sites. Regeneration of forests, either naturally or artificially, is an essential part of forest ecosystem development. A regeneration plan is required for each harvested site as part of the forest land use plan, unless the area is to be converted to a non-forest condition or the stand is composed of insect and disease-killed trees, fire killed, wind thrown, or fatally damaged trees. Exempt stands from regeneration plans must be approved on an individual basis from Natural Resource personnel with a written explanation for

exemption. In areas exempted from reforestation requirements, existing reproduction must be protected from damage where feasible. Decisions will be made whether to try to guide future forest development through planned regeneration or to allow natural conditions and processes to prevail.

The first step in establishing trees on a site is the preparation of the seed/planting bed. The reduction of competition from existing plants, allowing sunlight to reach the ground, and exposure of mineral soil is critical in the establishment of trees. Scarification and prescribed fire are effective techniques for site preparation. Distance from seed source should not exceed 200 feet for white spruce and 400 feet for hardwoods (Table SC3.1). Coppice, vegetative reproduction, is an effective method for regenerating hardwoods on sites previously occupied by hardwoods. Artificial regeneration of forests occurs in limited instances when sites need to be reclaimed quickly, natural regeneration has failed or needs to be supplemented, and when target tree species for a site cannot be established by natural regeneration. Seed source and seedlings for artificial regeneration should come from genetic stock originating from the area to be planted and follow guidelines set forth in the *Provisional Tree Seed Zones and Transfer Guidelines for Alaska* (Alden 1991). Only appropriate tree species for a specific site will be planted with emphasis given to native species. Natural regeneration is mostly relied upon following harvest and other disturbance activities. Table SC3.1 lists acceptable reforestation methods for major tree species.

Reforestation plans are to be developed for sites regenerated after harvest or disturbance. A reforestation plan outlines the objective of the regeneration project and additional treatments needed if the objective is not being met. The plan defines site preparation, regeneration technique, seed/seedling source, planting technique, spacing, and target stems per acre at maturity. The plan discusses the stand type and composition to be achieved at the target year. Stand maintenance/improvement treatments are outlined. Natural Resource staff will periodically conduct site visits to ensure minimal regeneration standards and the objective of the reforestation plan is met. The reforestation plan is a part of the forest land use plan.

Minimal regeneration standards adopted from the State of Alaska's Forest Practices Act should be followed. Land must be reforested seven years after harvest. The number of vigorous, well-distributed residual trees free from significant damage, or a combination of trees and seedlings, must average a minimum of 450 trees per acre and must have survived on site a minimum of two years. No more than 10% of the harvest area or contiguous areas may be below the stocking level. To determine residual tree stocking levels, first estimate the number of residual trees that will be left after timber harvest in each size class. Then divide, by size class, the number of stems per acre needed to meet the minimum stocking standard into the estimated number of trees per acre left after harvest and multiply by 100 to determine stocking percentage. Percentages from each size class are then added to determine overall residual stocking levels. An example is provided in Table SC3.2.

Table SC3.1. Probability of success by recommended reproduction methods (Shively 2000).

Species	**Artificial**	**Natural**		
	Planting	Seeding	Seeding	Sprouting
Spruce	High (Note 1)	Low (Note 2)	Medium (Note 3)	
Birch			High (Note 1)	Medium (Note 2)
Aspen and Balsam Poplar			Medium (Note 1)	High (Note 2)

Notes:
For spruce

- Plant immediately following harvest or site preparation.

- Spot seed on mineral soil seedbed; site preparation recommended.
- Seed is only available every 3 to 5 years depending on cone crop; mineral soil seedbed and seed source within 200 feet is required.

For birch
- Mineral soil seedbed required with seed trees within 400 feet.
- Sprouting is unreliable for trees over 70 years.

For aspen and balsam poplar
- Mineral soil seedbed needed.
- All stems in clone should be cut; leave uncut 15+ native stems/acre if it is desired to minimize sprouting.

Table SC3.2. Residual stocking calculation.
Example Residual Stocking Table

Average DBH	**Estimated Number of Residual Trees per Acre**	**Minimum Stocking Standard**	**Stocking percentage**
>9”	20 trees	120 trees/acre	17%
6”-8”	30 trees	170 trees/acre	18%
1”-5”	60 trees	200 trees/acre	30%

Residual Stocking %age = 65% Total

Determination of Minimum Seedling Requirements
In the example above with 65% residual stocking, 158 additional tree seedlings per acre will be needed to satisfy the minimum stocking requirement. This is determined by multiplying the minimum 450 trees/acre times the balance stocking %age of 35% to achieve the minimum stocking level. The required number of seedlings may be achieved through natural regeneration, planting, or artificial seeding and must have survived on site a minimum of two years within seven years of harvest.

Example of a Residual Stocking Calculation Table

Average DBH	Estimated Number of Residual Trees per Acre	Minimum Stocking Standard	Stocking %age
>9”	__trees	120 trees/acre	__%
6”-8”	__trees	170 trees/acre	__%
1”-5”	__trees	200 trees/acre	__%

Residual Stocking %age = __% Total

Seedlings Required
%age Understocked: 100 - _____ Residual Stocking %age = _____
%age Understocked _____ x 450 = Seedlings/Acre

SC3.1.5 Urban Forestry

The National Arbor Day Foundation, in cooperation with the United States Department of Agriculture, Forest Service and the National Association of State Foresters, recognizes towns and cities across

America that achieve the standards of the Tree City USA program. The Tree City USA program is designed to recognize those communities that effectively manage their public tree resources, and to encourage the implementation of community tree management based on four Tree City USA standards. These four standards provide structure for a community forestry program, require that a program demonstrate success based on the judgment of the state forester's office, and provide for an awareness and appreciation of trees among the residents of the community. The four standards are: establish a Tree Board which consists of representatives from the Natural Resource offices, with the installation forester serving as the lead; develop and follow a Community Tree Ordinance; a minimum of $2 per capita must be spent annually on the Community Forestry Program; and Arbor Day must be observed annually with media coverage and a proclamation must be given by the Post Commander.

The Tree Board Ordinance (USAG-AK 2002), in accordance with Army Regulation 200-3 - *Natural Resources-Land, Forest and Wildlife Management*, and other applicable regulations, establishes policies and standards for the planting, maintenance, and protection of trees in the Fort Wainwright and Fort Richardson community forest, to include the cantonment area, travel corridors and established recreation areas. There will be a conscious and active concern for the inherent value of trees in all installation plans, decisions, actions, and programs. The provisions of this document are enacted to maintain urban trees in a healthy and non-hazardous condition through good cultural practices, and to establish and maintain diversity in tree species and age classes to provide a stable and sustainable community forest. Along with the Tree Board Ordinance, Fort Richardson and Fort Wainwright also have developed landscape management plans (U.S. Army Garrison Alaska, 2005; Baxter 2005). Landscaping is the responsibility of the Directorate of Public Works (Directorate of Public Works) in accordance with AR 200-3, DA Pam 420-7, TM 631, the Integrated Natural Resource Management Plan, and utilization of the Installation Design Guide. These plans present the user with information regarding procedures for landscape planting on the cantonment areas and provide principles and techniques for maximum benefit and beautification. Although not a complete list, those plants are known to grow and survive in Alaska's climate. Many of the trees and shrubs listed, particularly those native to interior Alaska, will require minimal maintenance once they are well established in their new environment. All landscaping efforts at Fort Wainwright should concentrate on establishing plants grown in Alaska north of the Alaska Range. Attempts at unproven exotics should be avoided. Handling and planting techniques described within this text are standard practices and if properly employed will limit plant mortality rates to an acceptable level. Design principles should complement existing vegetation and strive for a more informal and natural look.

SC3.1.6 Forest Health

Annual insect and disease detection surveys are conducted by the United States Department of Agriculture, Forest Service in cooperation with the State Department of Natural Resources, Division of Forestry. Continuous forest inventory plots are used to detect changes in insect and disease abundance in representative forest stands across the landscape. Prevention is the primary approach to insect and disease control in intensively managed sites. Prevention will consist largely of silvicultural practices that enhance natural control of insects and diseases and removal of infested trees. Salvage timber sales can be used in stands with large outbreaks. Stands suffering extensive damage from snow and ice loading and windstorms will be targeted for salvage sales to prevent insect infestation and resulting outbreaks. Management actions may not be necessary in some areas where natural disturbance from forest insects and diseases is acceptable. Slash management for spruce trees and/or limbs greater than four inches in diameter will be accomplished by utilizing the wood and removing it from site, burning, or dried by uniform scattering in areas open to sunlight (limbs only). Monitoring for insect outbreaks will follow guidelines established by U.S. Forest Service, State and Private Forestry's Forest Health Protection Unit. Procedures include establishing bait and trapping sites and systemically identifying infected trees. Control procedures will be identified by the Forest Health Protection Unit and include bio-control, mechanical removal, and chemical control techniques.

SC3.1.7 House Log Program

In recent years there has been growing interest from the public to harvest house logs in the Tanana Flats Training Area of Fort Wainwright. USAG-AK has initiated a house log program in response to public request. The program closely follows guidelines set by the State of Alaska Division of Forestry's House Log Program. The Division of Forestry's House Log Program was discontinued due to lack of funding.

House log harvesting is allowed in designed areas by permit. Four permits will be issued for the Tanana Flats Training Area and one permit will be issued for Donnelly Training Area West. Permits for the Tanana Flats Training Area are allocated within three units. Unit 1 consists of the area along the Wood River and along the Tanana River downstream of Crooked Creek. Unit 2 consists of the area along the Tanana River down stream of Willow Creek up to Crooked Creek. Unit 3 consists of the area starting at the boundary of Tanana Flats Training Area across from Flag Hill and proceeding downstream to the upstream start of Salchaket Slough along the Tanana River. The unit located in Donnelly Training Area West goes from the Delta River to Delta Creek and lies north of the impact areas. Permits are issued starting the first working day of January each year. Permits are issued at the Environmental Resources Department located at Fort Wainwright. Permits are issued on a first-come-first-serve basis. Personal use permits for house logs are made available for military personnel, their families, and local residents. The permit holder must also obtain a USAG-AK Recreation Access Permit and any necessary Bureau of Land Management permits. The USAG-AK permit fee is $1,000 paid at time of issue. All monies collected are to be deposited in the Army's Forestry Reserve Account. The permit is good for two years and cannot be extended. No more than five permits can be active at any time. The permit allows the holder to cut up to 50 trees. The permit holder must select a site. All trees to be cut must come from the selected site. The selected site cannot exceed 5 acres in size. The permit holder must identify the site on a map and present the map to Environmental Resources Department forestry staff. The permit holder and Environmental Resources Department forestry staff will visit the site together and lay out travel routes. The permit holder must also notify Environmental Resources Department forestry staff of the method of cutting and hauling trees from the selected site. The permit holder must notify Environmental Resources Department forestry staff at the start of house log harvesting and completion. The forestry staff will flag and map the boundaries of the selected site prior to any cutting. The site will also be periodically inspected during harvest to ensure environmental compliance. If extensive environmental damage is found to have occurred, the permit will be revoked. Any activity in wetland areas must occur in winter. No ground-disturbing activities will be allowed. House log harvest activity is not allowed within 50 feet immediately adjacent to an anadromous stream or high value resident fish water body. Within the next 50 feet, a 50% minimum retention of trees must occur. Permits are required for the vehicular crossing of anadromous and resident fish streams. Permits can be obtained from the State of Alaska Department of Natural Resources. If spruce logs are to remain on site over summer, the following special precaution must be taken. All spruce logs greater than four inches in diameter must be scored the length of the log with a chainsaw to a half-inch depth so as to cause drying of the phloem to prevent bark and ips beetle infestations in nearby healthy trees. All stumps should be cut within six inches or less of the ground surface.

SC3.2 Fire

Fire management includes standard practices and procedures for prescribed fire, fire suppression, fuel breaks, and wildfire incident coordination.

SC3.2.1 Use of Prescribed Fire

Prescribed burning is defined as the controlled application of fire under specified environmental conditions that allow the fire to be confined to a predetermined area while at the same time producing fire

behavior required to attain resource management objectives. Because of the potential for unintended circumstances, extensive planning, coordination, and risk management must be completed prior to ignition of any prescribed burn. Prescribed burns also mimic the important ecosystem functions of wildfire while reducing risk to human environments and other resources. USAG-AK, in cooperation with the Alaska Fire Service, conducts prescribed burns on its installations to improve wildlife habitat, to decrease the potential for ignitions and fire escape from live firing, and to increase the size of military training areas.

The Army recognizes two types of prescribed fires: (1) those ignited by qualified personnel in accordance with an approved prescribed burn plan, and (2) wildfires managed under prescribed conditions as addressed in an approved Integrated Wildland Fire Management Plan.

The opportunity to conduct prescribed burns in Alaska is usually limited to May, between snowmelt and spring growth of plants. Often this period is very wet, which makes burning difficult. Fall is another time of the year when burns can be accomplished, but the burning window in the fall is narrower due to weather and personnel constraints. Another limiting factor is that winds must be low to prevent smoke from entering urban areas. The Alaska Fire Service prepares the burn plans for USAG-AK. These plans are used to evaluate conditions and minimize the risks associated with prescribed burning.

SC3.2.1.1 General

Prescribed burning is an effective and efficient means to reduce or prevent the accumulation of hazardous fuels, where permitted, and will be used as a recognized land management practice for natural resources management and fire protection. The decision to use prescribed burning will be based on the safety hazard involved, the hazard that will develop if burning is not accomplished, the type of natural habitat involved, the impact on the area's total ecosystem, and applicable state and local regulations and coordination with installation fire departments (Army Regulation 200-3).

In the process of developing practical fuel reduction programs, fire managers will consider the use of prescribed fire. When applied in a safe, carefully controlled situation, it is often the most cost effective means of achieving management and natural resource objectives. Consideration will be given to prescribed fire to protect habitats, natural resources, and capital improvements as well as reduce hazardous fuels, construct and reinforce fuel breaks, and control alien plants. Well placed prescribed burning units can help prevent large wildfires or slow their advance.

Prescribed burning on Army training lands will only be executed by qualified individuals. A National Wildland Coordinating Group certified prescribed Burn Boss must supervise all prescribed burns. The Burn Boss has the responsibility to make the on-site, tactical "go/no-go" decisions. The Burn Boss ensures all prescription, staffing, equipment, and other prescribed burn requirements are met before and during the burn.

Individual prescribed burns are required to have plans and appropriate National Environmental Policy Act documentation prepared after coordination between the Bureau of Land Management/NFO, the Natural Resources Branch, and the Fort Wainwright Fire Department occurs. The Alaska Fire Service prepares the burn plans for USAG-AK. Burn plans are used to evaluate and minimize risks associated with prescribed burning and include how the fire will be set. At a minimum, burn plans will include the following:

- Burn objectives.
- Acceptable weather and fuel moisture parameters.
- Required personnel and equipment resources.

- Burn area map.
- Smoke management plan.
- Safety considerations.
- Pre-burn authorization/notification checklist.
- Coordination to consider wildlife, endangered species, cultural resources, and noxious weed effects.
- Alternative plan to cover plan of action if wind direction changes during prescribed burn.
- Plan for analysis of burn success and identification of lessons learned.
- When planning for prescribed fires, and when suppressing wildfire, utilize natural and existing man-made features whenever possible. Firebreaks must be constructed, maintained, or rehabilitated to prevent erosion.

The prescribed burning window is very narrow, particularly during spring between loss of snow cover and green-up, usually occurring in May. Often this period is very wet, which makes burning difficult. Fall burns are another option, but the weather window is very narrow and resource availability is limited. In addition, winds must be such that they do not blow smoke into urban areas, which further narrows the window. It is difficult to long-range plan prescribed burning due to weather, military training, and availability of resources. An air permit from the Alaska Department of Environmental Conservation is required for any burning as well as National Environmental Policy Act documentation.

SC3.2.1.2 Objectives

The primary objective is to use management-ignited or training-ignited prescribed fires in a safe, carefully controlled, and cost effective manner as means of achieving fire management objectives. Management-ignited prescribed fires, often referred to as simply "prescribed fires," are defined as intentionally set fires used to achieve a resource management objective. Training-ignited prescribed fires are defined as fires that are unintentionally started during normal military training, but are allowed to burn to achieve a predetermined resource management objective.

Prescribed fire may be used as a management tool to support mission needs and to attain the goals and objectives of the Integrated Natural Resource Management Plan, designed to implement the land management policies. Prescribed fires are used for silvicultural treatment of sites, preparation for reforestation, hazard fuel reduction, habitat enhancement, and insect and disease control. Prescribed fires are also used as a tool to reduce fuel loading on ranges where the risk of wildfire limits military training opportunities. Wildland fire escapement from impact areas is reduced through prescribed fires and mechanical treatments along the boundaries of impact areas. Burning often opens areas to additional military training options, particularly maneuvers that are hampered by dense cover.

SC3.2.1.3 Procedures

Prescribed burning consists of the following procedures. A Management-ignited Prescribed Fire Burn Plan must be completed for all prescribed burning projects in advance of ignition. A Training-ignited Prescribed Fire Burn Plan must be in place prior to any declaration of any training-ignited fire as a training-ignited prescribed fire. In the Prescribed Fire/Training-ignited Prescribed Fire Burn Plan, appropriate actions to take must be addressed if on-site conditions change and cause one or more prescription parameters to exceed acceptable limits. A prescribed fire that exceeds, or is anticipated to exceed, one or more prescription parameters and/or line holding capability must be declared a wildfire and cannot be re-delegated as a prescribed fire. At this point, appropriate suppression action must be taken.

Each prescribed fire must be conducted in compliance with the approved burned plan. Only trained and qualified personnel may be used to execute each prescribed burn plan. The number of resources required

to safely achieve prescribed fire objectives must be based on the size and complexity of each project. Minimum manning will vary with the size and complexity of each prescribed burn. The Wildland Fire Program Manager must personally approve the Prescribed Fire/Prescribed Natural Fire Burn Plan and any changes. Only in the absence of the Wildland Fire Program Manager may this responsibility be re-delegated.

When planning for prescribed fires, and when suppressing wildfire, utilize natural and existing man-made features whenever possible. Firebreaks must be constructed, maintained, or rehabilitated to prevent erosion. When the burn prescription window is open, crews assemble at the burn unit. The edge of the burn unit is lit using hand lighting or aerial lighting techniques. Roads, trails or changes in vegetation types surround burn units and these features are utilized as fire lines. Next the interior of the unit is lit using hand lighting or aerial lighting techniques. The interior is lit using a systematic grid pattern. The mop-up process starts after the entire unit is lit. Mop-up consists of extinguishing all hot spots within a specified distance from the burn perimeter. During mop-up, burning trees and shrubs are cut down and extinguished. Smoldering sites are dug up with hand tools and extinguished. Water is applied on an as-needed basis during mop-up either by backpack pumps, draft pumps, fire engines, or helicopter buckets. The final process involves monitoring the burn unit until the fire is completely out; this process can take anywhere from several days to several months. The Bureau of Land Management Alaska Fire Service, State of Alaska, Division of Forestry, or the USAG-AK Fire Department working with the USAG-AK Natural Resource Office prepare burn plans and implement prescribed fires.

SC3.2.1.4 Prescribed Fire Ignitions

Two types of ignitions are recognized on USAG-AK lands: management ignition, resulting in a management (deliberate)-ignited prescribed fire, and training ignitions, resulting in training-ignited prescribed fire.

Determination of prescribed fire complexity shall be based on an assessment of technical difficulty and potential consequences. Complexity shall be used to delegate approval authority, set standards for personnel staffing and skill requirements, and to determine the level of burn plan detail. Prescribed fire projects should be classified as Complex, Intermediate, or Basic. Burn complexity will be determined by the Wildland Fire Program Manager and shall be made in the context of existing or potential social, political, economic, biological, and/or legal consequences.

Complex prescribed fires are defined as those where prescribed burning occurs under particularly challenging conditions and/or constraints. This classification includes prescribed fires where the difficulty of achieving resource management objectives is high, or where the consequences of project failure may be serious. All training-ignited prescribed fires shall be classified as complex fires. Intermediate classification includes prescribed fires where the difficulty of achieving resource management objectives is not particularly high or complicated, and where the consequences of project failure are less serious and can be mitigated. Prescribed fires of basic complexity are defined as those where few constraints, other than the normal prescription parameters, exist. This classification includes prescribed fires where achieving resource management objectives is routine and the probable consequences of project failure are low.

SC3.2.1.5 Prescribed Fire Burn Plan Requirements

A prescribed fire burn plan shall be completed for each management-ignited prescribed fire. Prescribed burn plans describe expected results and the conditions necessary to achieve them as part of a vegetation management program. It shall include all items outlined below. The detail needed should be commensurate with project complexity. If a given item is not applicable, it should be so indicated in the plan.

- A description of the burn unit's physical location, including a map.
- Identification of resource management objectives to be accomplished by the prescribed fire.
- Desired effects and tolerable deviations.
- Prescribed fire management of vegetation on Army training lands requires an understanding of the type, age class, condition, availability, and arrangement of the fuel that can impact the natural resources, structures, and soils. All prescribed burns must have measurable objectives. Monitoring must occur before and after each prescribed fire to document and verify that the stated objectives have been met.
- Project area description that includes unit and fuel descriptors.
- A fire prescription containing those key parameters needed to achieve desired results (i.e., acceptable fire behavior, acceptable limits of environmental elements) and provisions to record on-site conditions.
- The range of acceptable results expected, expressed in quantifiable terms.
- Prescribed burn plans shall include the following smoke management components: Actions to minimize prescribed fire emissions, evaluate smoke dispersion, public notification, air quality monitoring, and exposure reduction precautions. The Army fully supports the Clean Air Act (1967) and amendments to the Act (1972, 1977) to protect and enhance the quality of national air resources and to protect public health and welfare. The Army will comply with all applicable State of Alaska and local laws pertaining to prescribed burning and the acquisition of appropriate burning permit(s).
- Provisions for weather data collection, acceptable parameters, and forecasts.
- Provisions for public safety and protection of sensitive features.
- Provisions for inter/intra agency pre-burn coordination and, where applicable, public involvement and burn day notification to appropriate individuals, agencies, and the public. Prescribed burn plans will be coordinated with directorates to include: Bureau of Land Management Alaska Fire Service; Directorate of Public Works; USAG-AK Fire Department; Staff Judge Advocate; the Assistant Chief of Staff, G3, Directorate of Plans, Training, & Mobilization; and Installation Range Office. Technical experts from outside agencies (i.e., U.S. Forest Service, National Park Service, and State of Alaska, Division of Forestry) may review the Army's prescribed burn plans.
- Identification of the level of complexity of the fire and the appropriate organization needed. No less than the organization described in the approved plan shall be used to execute the burn. Minimum requirements for skill/knowledge element ratings of all elements of each position listed shall be stated. Describe the duties and responsibilities of positions within the organization.
- A communication plan.
- Provisions for line construction, pretreatment, and holding actions to keep the fire within prescription. Firing techniques, containment, patrols, and mop-up procedures are required. Holding actions must be defined in the prescribed burn plan. The burn plan will allow the Burn Boss to take limited holding actions on fires outside the planned perimeter. However, there must be defined limits in the amount and kind of holding that can be done before any fire is determined to have exceeded the approved plan and must be declared a wildfire. The limits of acceptable holding actions must be clearly stated in the prescribed burn plan. These limits must be defined as specific actions that can be taken, not general terms. If a prescribed burn accidentally crosses the prescribed perimeter, immediate action by the holding crews must be taken to control it.
- Identification of contingency actions to be taken if the fire exceeds prescription parameters and/or line holding capabilities and cannot be returned to prescription with project resources. If the fire exceeds the predetermined and pre-approved constraints on holding actions, the fire must be declared a wildfire and appropriate fire suppression action taken. If a single spot fire

escapes, it may be designated as a separate fire. If additional suppression forces are needed, the spot fire is declared a wildfire. The prescribed burn may continue as long as adequate holding forces remain on the prescribed burn as specified in the prescribed burn plan, separate from the suppression action on the spot fire, and the burn remains in prescription. In no case should the capability to hold the prescribed burn be jeopardized by moving essential holding forces to fight a spot fire.

- A risk assessment that portrays an estimation of the probabilities and consequences of success/failure to the approving official. A safety plan and a "go/no-go" checklist are required.
- Provisions for fire proximity to endangered species and plant boundaries; consideration of existing and predicted weather, fire behavior, and fuel conditions; and drought evaluation impact and/or effect.
- The source of funding and estimated costs.
- Provisions for a test fire and recording the results.

A site specific Training-ignited Prescribed Fire Burn Plan is required for each training-ignited prescribed fire. This plan will be developed and approved prior to declaration of any fire as a training-ignited prescribed fire. The only location that training-ignited prescribed fire will be allowed within USAG-AK is within the impact areas. No other locations are suitable for use of this designation. Training-ignited prescribed fire will not be allowed during "Extreme" fire danger. Only the Fire Department Chief or the Bureau of Land Management Wildland Fire coordinator may designate a fire as a Training Initiated Prescribed Fire. Fires must be designated as a training-ignited prescribed fire within four hours of ignition. No more than one training-ignited prescribed fire will be allowed within each impact area at any given time. Once developed, the pre-existing plan will be approved by the Wildland Fire Program Manager. The programmatic elements of the Training-igniteded Prescribed Fire Burn Plan shall include the following:

- General description of the area, history (including fire history), and map.
- Objectives to be achieved by the training-ignited prescribed fire and identification of acceptable outcomes.
- Required skills, qualifications and organization necessary to implement and manage the training-ignited prescribed fire program.
- Funding requirements.
- Inter/intra-agency coordination, including joint planning and review where fires may cross multi-agency boundaries.
- Program "Inform and Involve" actions both internally and externally. Include program planning as well as execution.
- Potential impacts of plan implementation including environmental, on/off site, socio-economic, and political impacts.
- Analysis and decision process that provides for identification of local approval authority, identification of evaluation criteria for the initial "go/no go" decision, a risk assessment that considers, at a minimum, fire growth predictions; threat to life and property; smoke management concerns; local/regional/nation fire situation, including availability of resources; potential impacts on endangered species and plants; fire proximity to endangered species and plant boundaries; assessment of the amount of training-ignited prescribed fire that is acceptable and manageable; consideration of existing and predicted weather, fire behavior, and fuel conditions; and drought evaluation impact and/or effect, provision for daily revalidation, and timely decision by the Wildland Fire Program Manager.

- Identification of fuel treatment measures needed to reduce hazard fuels in support of the Army's prescribed fire program, including identification of areas or developments that need protection from fire.
- Process for development of a Training-ignited Prescribed Fire Plan.
- Process for monitoring and evaluating the training-ignited prescribed fire.
- Escaped Fire Situation Analysis and contingency plan.
- Identification of maximum allowable perimeter.
- Monitoring actions to assure accurate and timely information on fire behavior, location, etc.
- Evaluation Plan for assessing outcome of the fire.

Some information will not be known until a training-ignited prescribed fire actually starts. Individual Training-ignited Prescribed Fire Burn Plans shall also include holding actions necessary to keep the fire within prescription, fire projections using both "expected" and "most severe" weather scenarios, an estimate of resource needs to manage the fire and cost estimates to manage the fire.

SC3.2.1.6 Prescribed fire organization

A Burn Boss, experienced with local weather, fire behavior, fuels, and terrain conditions, shall personally supervise the burning operations on each management-ignited prescribed fire. More complex burns may require an Ignitions Boss and a Holding Boss. A Prescribed Fire Manager qualified to manage prescribed management-ignited and training-ignited prescribed fires shall personally supervise operations. Every management-ignited prescribed fire requires the performance of the duties shown in these standard operating procedures. On smaller or less complex projects, one person may perform more than one of the required duties. Larger or more complex projects will require more qualified people to perform necessary duties.

The Prescribed Fire Manager will determine, through the development of the Training-ignited Prescribed Fire Burn Plan, the organization, expertise, and positions necessary to manage the prescribed natural fire. The organization required varies with the size and complexity of each prescribed fire. In the event of an escape, use personnel qualified under National Interagency Fire Qualification Handbook standards (National Wildfire Coordinating Group Guide 310-1) to accomplish the required suppression activity. The temporary use of personnel who do not meet these qualifications is appropriate for prescribed fires that escape and are declared wildfires.

The Prescribed Fire Planning Specialist develops the prescribed fire burn plan for each management-ignited or training-ignited prescribed fire. The Prescribed Fire Planning Specialist may determine by the complexity or number of prescribed fires that a Prescribed Fire Manager is necessary. On management-ignited prescribed fires, the Burn Boss is responsible directly to the designated Prescribed Fire Manager for implementation and coordination of the assigned prescribed fire activities. The Prescribed Fire Manager shall:

- Coordinate and schedule the ignition and management of two or more management-ignited prescribed fires, or the management of a single training-ignited prescribed fire.
- Develop and implement the Training-ignited Prescribed Fire Burn Plan on appropriate training-ignited fires.
- Coordinate personnel and equipment requirements, including resources called for holding actions and contingency action section of the burn plan.
- Ensure appropriate public notice is given prior to and during the prescribed fire activity.
- Coordinate prescribed burn projects to avoid exceeding holding and contingency capabilities.
- Monitor prescribed burn projects to ensure that all plan requirements are being met.

- Record and report costs and accomplishments and recommend improvements to the Wildland Fire Program Manager.

The Burn Boss has direct responsibility for on-site implementation of specific actions in strict compliance with the approved prescribed burn plan. The Burn Boss is accountable to the Prescribed Fire Manager. The Burn Boss has the following responsibilities that cannot be re-delegated:

- Ensuring safety of personnel.
- Supervise all operations on the project site.
- Ensure that all prescribed fire burn plan requirements are met and that personnel are briefed before proceeding with ignition.
- To make the decision to proceed, accelerate, defer, or curtail operations based on attainment of the approved prescription criteria or lack thereof, including daily validation of prescribed criteria on multi-day projects.
- Ensure that the fire prescription is met before proceeding with ignition.
- Ensure that the forecast on-site weather parameters are within prescription at the time of ignition and predicted to remain so during the expected life of the burn.
- Ensure the availability of suppression resources in the event the prescribed fire escapes and is declared a wildfire.
- Control directly, or through supervision of Ignitions Bosses, the method, rate, and location of firing.
- Maintain immediate and clear communications with the Ignitions Boss and Holding Boss at all times.
- Monitor fire behavior and terminate operations if fire behavior or effects are not according to prescription.
- Accomplish mop-up to predetermined standards in accordance with the prescribed fire burn plan.
- Certify that the fire is out.

The Ignitions Boss reports to the Burning Boss. The Ignitions Boss will maintain control of the ignition sources, including aerial ignition, on the burn project at all times, ensure deployment, sequence, and timing of all ignition sources to meet project objectives, supervise assigned personnel and ensure their safety, maintain immediate and clear communications with the Burning Boss and Holding Boss at all times, and if aerial ignition is used, ensure that the aerial ignition pilot is briefed on the Job Safety and Health Hazard Analysis, with emphasis on aerial flight hazards.

The Holding Boss reports to the Burning Boss on management-ignited prescribed fires. On prescribed natural fires, the Holding Boss may report directly to the Prescribed Fire Manager. The Holding Boss shall confine the prescribed fire within the planned area, take action when fire exceeds, or has the potential to exceed, the planned area, confer with the Ignitions Boss, Burning Boss, Prescribed Fire Manager, as appropriate, to match holding and contingency capability with firing sequence, supervise assigned personnel and ensure their safety and maintain immediate and clear communications with the Burning Boss, Ignitions Boss, or Prescribed Fire Manager, as appropriate, at all times.

SC3.2.2 Fire Suppression

Wildfire suppression is conducted by the Bureau of Land Management, Alaska Fire Service and/or the military fire department. The State of Alaska, Division of Forestry may be called upon for assistance as well as local fire departments. Alaska Fire Service is responsible for wildfires on USAG-AK lands in exchange for use of the facilities at Fort Wainwright (Support Agreement Alaska Fire Service / U.S.

Army Alaska, 1995). Suppression operations are undertaken on lands with fire management options of critical, full and modified or as requested by the wildfire or land managers. Wildfire on lands with a fire management option of limited are regularly monitored. Suppression actions consist of using the following resources: fire engines, dozers, saws, hand tools, pumps, aircraft and backfiring.

SC3.2.3 Fire/Fuel Breaks and Trenches

Fire fuel breaks/trenches establishment consist of the following procedures. Breaks can be created using hand thinning or tree removal techniques mentioned in the hand thinning section. Hand line/trenches may be dug to mineral soil using hand tools. Fuel breaks created with hand thinning are usually 15 - 120 feet wide. Breaks can be created using dozers with shear-blades and or straight blades. Vegetation is sheared or pushed over and windrowed or pushed into piles. The duff and or organic matter are rolled up into the windrows or piles to expose mineral soil. Piles and windrows are burned following stipulations outlined in a burn plan. The soil may then be disked creating furrows to enhance hardwood and shrub re-vegetation. Fuel breaks created with dozers are usually 15 - 30 feet wide. Breaks can be created using hydro-axes with masticating and rotary blades. Vegetation is chopped up into pieces. Masticating heads incorporate vegetation with the duff and organic layers of the soil. The soil may then be disked creating furrows to enhance hardwood and shrub re-vegetation. Fuel breaks created with hydro-axes are usually 15 - 30 feet wide.

SC3.2.4 Wildfire Incident Coordination

Wildfire suppression is conducted by the Bureau of Land Management, Alaska Fire Service and/or the military fire department. The State of Alaska, Division of Forestry may be called upon for assistance as well as local fire departments. Wildfire suppression follows the incident command system (Fireline Handbook 2004). The incident commander is responsible for suppression and management of a wildfire. The military zone of Alaska Fire Service is dedicated to the management of wildfires on USAG-AK lands. The USAG-AK Fire Chief is responsible for all fires and must be informed of the status of new and on-going wildfires (Support Agreement Alaska Fire Service/U.S. Army Alaska, 1995). G3 Range Control is the land manager and must be informed of the status of new and on-going wildfires (Support Agreement Alaska Fire Service/U.S. Army Alaska, 1995). The USAG-AK Installation Forester acts as the resource advisor and is a liaison between the fire management staff, the Fire Chief and G3 Range Control.

SC4 Fish and Wildlife Management

The following section describes standard procedures and processes used to manage fish and wildlife on USAG-AK lands.

SC4.2 Wildlife Management

Wildlife management on USAG-AK lands consists of managing wildlife harvest and habitat management.

SC4.2.1 Wildlife Harvest

SC4.2.1.1 Fort Wainwright

Fish and wildlife management on Fort Wainwright is structured on a theory of game management which supports outdoor recreational activities including hunting, trapping and fishing. These three significant outdoor activities are important on Fort Wainwright. Hunting and trapping on Fort Wainwright is very important to military personnel and civilians in Alaska. Angling on Fort Wainwright appears to be more

important to the military community, reflective of better fishing opportunities at other sites throughout the state.

The Alaska Department of Fish and Game and Fort Wainwright Natural Resources Branch jointly monitor fish and wildlife inventories, habitat and trends that were developed specifically for the ecosystem in the interior of Alaska. Fish and wildlife are monitored to ensure the most favorable conditions exist for sustained growth and reproduction to ensure optimum harvest levels and protection of all species. Hunting, fishing, and trapping on Fort Wainwright are regulated by state statute under the authority of the Alaska Department of Fish and Game. Military personnel collect data on harvest of game and furbearers on military posts and share this data with the Alaska Department of Fish and Game to assist in the regulatory decision making process. Natural Resources also work closely with Law Enforcement Command who provides enforcement of military, state and federal regulations. Law Enforcement Command also provides vital field information important to fish and wildlife management.

Trappers on Fort Wainwright are required to register their traplines. At the season's end, trappers are required to provide a harvest report to Natural Resources. Army personnel monitor harvest levels mainly through annual harvest reports and verbal reports from trapping participants. Trapping on Fort Wainwright is open in most areas with the exception of Main Post and specific sensitive areas designated as off-limits. The Yukon Training Area and Tanana Flats Training areas sustain the most trapping activity. Due to its close proximity to Fairbanks and it easy winter accessibility, trapping in the Tanana Flats Training Area continues to be done by a few trappers who fail to register their traplines or complete harvest reports.

Hunting on Fort Wainwright has seen significant increases from both military personnel and civilians. The 2004 and 2005 moose hunting seasons have seen a remarkable growth in hunting and moose taken due to the popular anterless moose hunt. The Alaska Department of Fish and Game had determined that approximately 19,000 moose live in Tanana Flats and has created a special season to lower the moose population. Thousands of hunters from throughout Alaska and the United States enter Tanana Flats to have a chance at harvesting a moose.

Hunting for both black and grizzly bears is also a popular activity on Fort Wainwright. Black bears are normally hunted over bait, and all hunters hunting over bait are required to register their bait stations with both Alaska Department of Fish and Game and Natural Resources. Hunters are required to return a harvest report, which is reviewed by military personnel to assist with issues related to wildlife management. Approximately 50% of those black bear hunters hunting over bait in the Tanana Flats Training Area fail to register their bait station with Natural Resources or fill out the required harvest report.

The majority of small game harvested is taken during the trapping season. Ruffed and spruce grouse are the most harvested small game species on Fort Wainwright. Drumming counts for ruffed grouse were conducted during the springs of 2003 and 2004. Increased surveying is necessary to improve management of ruffed grouse.

Additional outreach strategies need to be implemented to inform those intending on recreating on military lands of the required military access permit, phone-in USARTRAK system, and regulations related to outdoor recreation. An increased effort to educate recreational users will raise the compliance percentage and reduce conflicts between the military and community.

SC4.2.1.2 Fort Richardson

Fort Richardson allows hunting for moose (by drawing permit only), small game, waterfowl and coyotes. Directorate of Public Works Conservation personnel coordinate with various agencies, including the Alaska Department of Fish and Game and U.S. Fish and Wildlife Service, to manage these hunts.

Big Game

The only big game animal that is legally harvested on Fort Richardson is moose. The Alaska Department of Fish and Game issues a mix of bull, cow, and either-sex tags in order to meet management objectives. In order to participate in these hunts, drawing permit winners must pay a conservation fee of $125, which goes into a special account that can only be used for wildlife conservation projects. Hunters must also demonstrate proficiency with their chosen weapon and attend a safety briefing. Conservation personnel or Military Police Conservation Officers check and collect data on each moose that is harvested. In addition to the Harvest Report hunters must turn in to Alaska Department of Fish and Game, Fort Richardson moose hunters must also turn in a base harvest report to Directorate of Public Works Conservation personnel.

Small Game

The principal small game animals harvested from Fort Richardson are snowshoe hare and spruce grouse. There are anecdotal reports of ruffed grouse being harvested on base, but no documented reports.

Waterfowl

Waterfowl hunting is allowed north of Eagle River.

Furbearers

There is no trapping on Fort Richardson. By state law, it is legal to harvest coyote, lynx, and red fox on base under a hunting license; however, Directorate of Public Works Conservation Personnel can limit this further. Currently, the only furbearer that can be harvested on base is coyote.

Currently there is no mechanism in place to track harvest numbers of small game, waterfowl or furbearers on Fort Richardson. The Conservation Branch has plans to develop and implement a small game harvest report in order to track these harvest numbers.

SC4.2.2 Habitat Improvement

USAG-AK utilizes two primary methods of manipulating habitat: prescribed burning and mechanical removal of vegetation. USAG-AK also utilizes herbaceous and woody vegetation plantings in the cantonment area to improve habitat.

Prescribed Burning: Prescribed burning is beneficial to ecosystem maintenance because fire is an important component of the ecosystem's development. Prescribed burning is also favored by the Bureau of Land Management. It is less complicated and a more natural means of vegetation removal than using timber harvest or other mechanical means.

Mechanical Removal and Revegetation: Mechanical means of habitat manipulation is another way to accomplish habitat management. Mechanical tools used to accomplish habitat management include commercial timber sales, timber stand improvement, firewood cutting, hydro-axe and military maneuver

training. Habitat improvement areas are then planted with desired herbaceous species or left to revegetate naturally.

Wildlife Habitat Improvement Plantings: This component of habitat improvement includes management of the cantonment area that directly affects natural resources management. Routine ground maintenance on Fort Wainwright is accomplished primarily by Grounds Maintenance, Directorate of Public Works. The *Installation Design Guide* (Higginbotham/Briggs & Associates 1991), *Landscape Design Plan* (David Evans and Associates, Inc. 1987) and the *Fort Wainwright Landscape Design Plan* (Baxter 2005) provide information on using trees and shrubs for landscaping. Both documents provide lists of plant materials appropriate for use on Fort Wainwright.

This Integrated Natural Resources Management Plan does not include routine ground maintenance unless it is specifically designed for the benefit of natural resources. Natural resources personnel provide professional assistance for landscaping, particularly regarding species selection and care of the landscape.

Current habitat improvement actions will continue if this Integrated Natural Resources Management Plan is not approved and funded. However, no new habitat improvement actions will be prepared, updated, or implemented.

SC4.3 Fisheries Management

SC4.3.1 Fish Stocking

The Alaska Department of Fish and Game stocks Fort Wainwright, Donnelly Training Area, and Fort Richardson lakes through the Statewide Stocking Plan (Alaska Department of Fish and Game 2006). Alaska Department of Fish and Game annually stocks 5 lakes on Fort Wainwright, 16 lakes in the Donnelly Training Area and 4 lakes on Fort Richardson. The lakes are monitored and stocked through the state's fish stocking program. Fish harvest is mainly reviewed through annual Alaska Department of Fish and Game harvest reports. Due to the shallow nature of most on post ponds and winter kills, the levels of fish stock present are decided by the annual state fishing stocking program.

SC4.3.2 Fisheries Harvest

Fisheries harvest is accomplished through the statewide fishing season. Individuals fishing on USAG-AK lands must comply with state regulations while fishing.

SC4.3.3 Pike Removal

Water bodies visually confirmed to harbor pike (only Otter Lake thus far) are subject to a pike removal effort conducted by Army personnel. This activity requires a fish resource permit from the Alaska Department of Fish and Game. An attempt is made to begin the removal effort during the time period between ice-out and planned spring stocking by the Alaska Department of Fish and Game, but can occur throughout the summer.

The removal effort is currently confined to Otter Lake but may be extended to other water bodies as needed. Up to six variable mesh monofilament gill nets (120 feet long x 5 feet deep) are deployed from boats or canoes in likely spawning/rearing habitat within the littoral zone of Otter Lake. Net placement and configuration vary depending on local conditions but are generally set perpendicular to shore and in depths ranging from 2 feet to 10 feet. Data recorded at the time of each net deployment includes date, net location, weather, average depth across the net and water temperature. Deployment dates vary from early May to late August. Deployment times vary from mid-morning to early evening with fishing duration

ranging from 10 minutes to 4 hours. Nets are continuously observed due to presence of loons and grebes and are checked multiple times throughout the day. Pike are flushed from shoreline hiding places and herded into nets by personnel in canoes.

All fish are removed during each net check to minimize attraction of non-target animals and are either immediately dispatched (pike) or revived and released (all other fish). Data regarding species and location of capture are noted. All pike are dispatched via a sharp blow to the parietal/frontal neurocranium. A gill arch on larger fish is then severed and the fish is allowed to desanguinate to maximize flesh palatability. All dispatched fish are then immediately placed on ice. All non-target fish are revived and released if possible[6]. As soon as practicable after harvest (usually within 2 hours), all fish of edible size and quality are eviscerated. Data regarding length, sex and spawn condition are noted as well as any other remarkable findings. All fish of edible size and quality are donated to a local charity. Fish deemed not edible due to size or condition, are donated to local schools for dissection.

Current removal efforts utilize gill nets but other methods including the use of hoop traps and electrofishing equipment may be employed in the future. Hoop traps, if deployed, will be in addition to the placement of gill nets but will be fished in a static manner for a longer period of time. Disposition of fish captured in the hoop traps will be the same as for those captured in the gill nets.

Up to two backpack electrofishing units may be employed on Fort Richardson to help find and harvest pike hiding in thick vegetation. Shocking of species other than pike will be minimized through careful observation of the treatment area combined with shocking cessation upon observation of non-target species. Disposition of fish harvested while electrofishing will be the same as for those captured in the gill nets.

SC5 Outdoor Recreation Management

Most outdoor recreation management activities are the responsibilities of the Morale, Welfare and Recreation division of the Directorate of Personnel and Community Activities. However, trespass structure abatement program and removal of trespass structures remain the responsibility of natural resources.

SC5.1 Trespass Structure Abatement Program

Beginning in the 1980s, the Army in Alaska began studying the encroachment of trespass structures on military lands. During an assessment of the problem it was determined that approximately 50 structures had been built on Fort Wainwright and Fort Greely training lands with additional structures continuing to be built.

The Army determined the continual presence of trespass structures hindered its ability to manage its training lands and jeopardized the future use of the land. Trespass structures located on Army controlled lands constitute a violation of Army Regulation 405-80 paragraph 2-11 and the U.S. Enclosure Act (23 Statute 321;43 U.S.C. 1061) an act to prevent unlawful occupancy of enclosures on public lands. An outcome of this determination was the decision to remove all trespass structures from Army lands in Alaska. A resolution to the trespass structure situation was the creation of the Trespass Structure Abatement Program. Public notice was made in June 1998 of the Army's intention to initiate the abatement of all trespass structures. The Trespass Structure Abatement Program began cleaning trash sites and removing structures in 1999 and continues to this date. Although the majority of the cabins have been

[6] Any non-target fish inadvertently killed are noted for reporting to Alaska Department of Fish and Game and donated to a local charity or school.

identified, knocked down and hazardous materials removed, additional work needs to be done to remove debris. The Army supports recreational use of its lands and therefore continues to find trespass structures and litter. This section will outline Trespass Structure Abatement Program policies /procedures.

Information relating to existing trespass structures and trash sites is learned from various sources including Army personnel, hunters, trappers and others recreating on training lands. Once a site has been identified, the abatement mission cycle is initiated and broken into three major portions: site recon, personal property removal, and structure demolition/removal. The structures are also rated and placed in categories:

- "A" : Trash piles, lean-tos, and tree stands.
- "B" : Medium sized, with moderate amounts of personal property. These structures are generally constructed of natural/rough materials.
- "C" : Structures made mostly of man-made/refined building materials. These structures have moderate to high amounts of personal property and may in some cases even be suitable for year - round inhabitation. These structures have numerous creature comforts and area improvements (docks, outhouses, etc.).
- Most existing sites fall in categories "A" and "B", the majority being in category "A". Category "A" sites normally consist of trash piles and simple structures–generally wood frame and covered with tarps or inexpensive materials and lacking personal property. Category "A" sites are usually torn down and disposed of by Natural Resource and Conservation Office staff.

Category "B" and "C" structures require a more complex and thorough response from a team that may include Hazardous Materials, Environmental, Property Disposition, Public Affairs and Law Enforcement Command. A summary of responsibilities for each department follows:

Public Affairs:

- Respond to all community inquiries regarding these operations.
- Provide a photographic record.
- Coordinate all press releases, especially the property announcements with the post legal office.
- Ensure that a legal notice which includes inventories of all property removed from structures is put into the local media within 3 days of the property being removed from the structure.
- Coordinate with the Provost Marshal's Office and Staff Judge Advocate.

Directorate of Public Works:

- Provide personnel for all initial surveys to identify environmental and HAZMAT issues.
- Provide a representative for the personal property disposition board (real property).
- Provide fire department personnel for safe burning if a controlled burn technique is utilized.
- Responsible for removal of Category "A" structures.
- Provide needed signage for abatement program.

Law Enforcement Command:

- Provide a representative for personal property disposition board.
- Provide mission leader and team for the personal property removal phase of each mission.
- Provide an armed police officer for each phase for protection from wildlife.
- Provide storage for all personal property until property disposal board determines a final disposition.
- Coordinate with the U.S. Marshal Service for a marshal to be on site for all "B" or "C" structures recons and property removal efforts. The Post Commander has the authority to waive this requirement.

- Assist in transporting recovered property from the field to storage.

Staff Judge Advocate:
- Review all releases and statements to the public.
- Assist in processing all personal property claims.
- Provide assistance in any legal action that may be required for recalcitrants.

Directorate of Logistics:
- Assist with transportation and storage of recovered property if necessary.

Directorate of Plans, Training, Security and Mobilization:
- Advocate for this mission and assist in all required coordination.
- Act as the Emergency Operations Center.
- Provide needed personnel.
- Provide skills and safety training for power tool operators.
- Brief post staff and commander prior to abatement operations.

408th Signal:
- Provide communication equipment.

4-123 AVN:
- Provide monthly overflights of the training areas to ensure no new structures are being built and existing structures are identified.
- Provide aircraft during both the property removal and abatement phases if necessary.

The Trespass Structure Abatement Program must wait a minimum of 45 days from the day the property is removed from a structure before destroying the structure, to allow compliance with appropriate Army property regulations.

SC5.2 Trespass Structure Removal

The primary technique for structure disposal is controlled burn. Prior to conducting a structure burn, coordination with Fort Wainwright's Fire Department will be completed. In addition the Alaska Fire Service must be informed of the control burn. Prior to burning any structure, any materials that will cause an environmental or safety concern, when burned, must first be removed and disposed of according to standard practices. If a controlled burn is determined to be too risky based on fire conditions or other environmental concerns, the structure will be broken down into non-reusable sizes. Wood and natural materials will be left on-site to decompose. All other materials will be removed from the field.

Since the Trespass Structure Abatement Program has been initiated, nearly all the trespass structures known to the Army have been abated to some degree. Additional work will be done to clean existing sites of materials that will not decompose. Challenges to the Trespass Structure Abatement Program remain with continued structure encroachment and litter. New sites, generally in the "A" and "B" categories, continue to come to the Army's attention and will be addressed within the current policy.

Public support and compliance with Army outdoor recreation policies, including trespass structures, will be enhanced through a vitalized conservation awareness program stressing land stewardship. A conservation awareness program must be directed to both military and community users of training lands to be effective.

SD INSTITUTIONAL CONTROLS

SD1 Introduction

Institutional controls are controls the installation places on behaviors of its users. These controls often are to protect the users for safety reasons. In Comprehensive Environmental Response, Compensation and Liability Act, institutional controls are placed to prevent intentional or unintentional users from disturbing contaminated areas. More broadly defined, institutional controls also can refer to any controls placed on users. These controls are the result of laws, regulations, and policies. The following section details the requirements and controls resulting from these laws, regulations, and policies.

SD2 Laws

Both federal and state laws affect natural resource management. The primary federal laws include the National Environmental Policy Act, Clean Water Act, Coastal Zone Management, Migratory Bird Treaty Act, and National Historic Preservation Act.

SD2.1 National Environmental Policy Act

National Environmental Policy Act (NEPA) documentation must be completed on all USAG-AK natural resource management projects. NEPA requires federal agencies to consider environmental consequences of major proposed actions. NEPA documentation for this Integrated Natural Resources Management Plan is in the form of an environmental assessment, which analyzes the potential consequences of the proposed action to implement the Integrated Natural Resources Management Plan.

NEPA requires federal agencies to consider the environmental consequences of proposed major federal actions. The premise of NEPA is to provide environmental information to public officials and citizens before decisions are made and actions are taken. The process is intended to help public officials and citizens make decisions that are based on timely and scientifically accurate information. The analysis must fully disclose the environmental effects of the action and demonstrate that the project proponent and the decision-maker have taken an interdisciplinary "hard look" at the environmental consequences of implementing the major federal action. Ultimately, federal agencies must consider all practicable means to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment.

The Council on Environmental Quality was established under NEPA to implement and oversee federal policy in this decision-making process. The Council on Environmental Quality uses the *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR 1500-1508) for this function. Council on Environmental Quality regulations (40 CFR 1508.9) specify that an environmental assessment be prepared to:

- Briefly provide evidence and analysis for determining whether to prepare an environmental impact statement or a Finding of No Significant Impact.
- Aid in an agency's compliance with NEPA when no environmental impact statement is necessary.
- Facilitate preparation of an environmental impact statement when one is necessary.

In addition, according to Council on Environmental Quality regulations (40 CFR 1500.2(c)), NEPA's requirements should be integrated "with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently rather than consecutively."

AR 200-2, *Environmental Analysis of Army Actions*, dictates policies, responsibilities, and procedures for integrating environmental considerations into Army planning and decision-making. It implements the Council on Environmental Quality's NEPA regulations and directs installations to integrate environmental analysis as much as practicable with other environmental reviews, laws, directives, and executive orders. This regulation requires that natural resources management plans be evaluated for environmental impacts (32 CFR Part 651 Section 651.10 (b) of AR 200-2). The requirements of AR 200-2 will be addressed through the preparation of an environmental assessment on the potential effects of implementing an Integrated Natural Resources Management Plan on USAG-AK lands.

AR 200-3, *Natural Resources-Land, Forest and Wildlife Management*, outlines policy, procedures, and responsibilities for the conservation, management, and restoration of land and the natural resources thereon consistent with the military mission and other applicable national policies. AR 200-3 states that "Integrated Natural Resources Management Plans require appropriate environmental review according to the National Environmental Policy Act and AR 200-2…appropriate level of documentation will be determined on an installation by installation basis." AR 200-3 further states, "It is Army policy to integrate environmental reviews concurrently with other Army planning and decision-making actions to avoid delays in mission accomplishments."

AR 200-2 (32 CFR Part 651 Section 651.14 (a)) states that "The Army goal is to concurrently integrate environmental reviews with other Army planning and decision-making actions, thereby avoiding delays in mission accomplishment. To achieve this goal, proponents shall complete NEPA analysis as part of any recommendation or report to decision-makers prior to the decision (subject to 40 CFR 1506.10. Early planning (inclusions in Installation Master Plans, Integrated Natural Resources Management Plans, Integrated Cultural Resources Management Plans, Acquisition Strategies, strategic plans, etc.) will allow efficient program or project execution later in the process."

As proposed projects within this Integrated Natural Resources Management Plan are implemented, appropriate required NEPA documentation will be prepared. Projects will be evaluated to determine the need for and appropriate level of NEPA documentation, such as a Record of Environmental Consideration, environmental assessment with a Finding of No Significant Impact, or an environmental impact statement with a Record of Decision.

SD2.2 Clean Water Act

The U.S. Army Corps of Engineers has been regulating activities in the nation's waters since 1890. Until the 1960s, the primary purpose of the regulatory program was to protect navigation. Since then, as a result of laws and court decisions, the program has been broadened so that it now considers the full public interest for both the protection and utilization of water resources.

The regulatory authorities and responsibilities of the Corps of Engineers are based on the following laws:

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) prohibits the obstruction or alteration of navigable waters of the United States without a permit from the Corps of Engineers.

Section 404 of the Clean Water Act (33 U.S.C. 1344). Section 301 of this Act prohibits the discharge of dredged or fill material into waters of the United States without a permit from the Corps of Engineers.

Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (33 U.S.C. 1413) authorizes the Corps of Engineers to issue permits for the transportation of dredged material for the purpose of dumping it into ocean waters.

Other laws may also affect the processing of applications for Corps of Engineers permits. Among these are the National Environmental Policy Act, the Coastal Zone Management Act, the Fish and Wildlife Coordination Act, the Endangered Species Act, the National Historic Preservation Act, the Deep-water Port Act, the Federal Power Act, the Marine Mammal Protection Act, the Wild and Scenic Rivers Act, and the National Fishing Enhancement Act of 1984.

SD2.2.1 Section 404 Permit Application Form 4345

The application form used to apply for a permit is Engineer Form 4345, Application for a Department of the Army Permit. Applications can be obtained from one of the Corps of Engineers district regulatory offices or in Appendix C5 of the USAG-AK Integrated Training Area Management (ITAM) Management Plan. It is important to provide complete information in the requested format or processing of the application will be delayed. This information will be used to determine the appropriate form of authorization, and to evaluate your proposal. Some categories of activities have been previously authorized by nationwide or regional permits, and no further Corps approvals are required. Others projects may qualify for an abbreviated permit processing in which a permit decision can usually be reached in less than 30 days. Authorizations will usually be in the form of letters of permission. For other activities, a public notice may be required to notify federal, state, and local agencies, adjacent property owners, and the general public of the proposal to allow an opportunity for review and comment or to request a public hearing. Most applications involving public notices are completed within four months and many are completed within 60 days. The district engineer will begin to process your application immediately upon receipt of all required information. You will be sent an acknowledgement of its receipt and the application number assigned to your file. You should refer to this number when inquiring about your application. Your proposal will be reviewed, balancing the need and expected benefits against the probable impacts of the work, taking into consideration all comments received and any other relevant factors. This process is called the public interest review. The Corps' goal is to reach a decision regarding permit issuance or denial within 60 days for receipt of a complete application. However, some complex activities, issues, or requirements of law may prevent the district engineer from meeting this goal.

Applicants should provide specific plan view and elevational view project drawings at the time the Permit Form 4345 is submitted to Corps Regulatory for review. This form is located in Appendix C5 of the USAG-AK ITAM Management Plan. Applicants can also utilize the Army Corps of Engineers Guide to Permit Drawings which is located in Appendix C4 of the same plan. Applicants need to ensure that all the information on Form 4345 is filled out correctly and completely while paying particular attention to developing correct fill calculations for each project.

SD2.2.2 Storm Water Permit Application

Contractors hired to do construction projects on Army land need to comply with storm water permit requirements. Any project that disturbs one or more acres of land through clearing, grading, excavating, or stockpiling of fill material. If there is any possibility that storm water could run off of your project site, then permit cover is necessary. Failure to obtain permit coverage could result in fines up to $32,500 per day. Conservation and Integrated Training Area Management projects are managed through the Palmer and Salcha Delta Soil and Water Conservation Districts. It is the responsibility of the districts to ensure that all contractors hired to do work on USAG-AK lands obtain proper permit coverage.

There are six steps involved with obtaining permit coverage:

Step 1: Read the Environmental Protection Agency's Construction General Permit. Read this document carefully and remember that operators are legally responsible for complying with

all its provisions. The "operator" submits a Notice of Intent form. The operator is the entity (generally company, corporation, etc.) that has operational control over the construction plans or day-to-day activities that are necessary to implement the Storm Water Pollution Prevention Plan (Solid Waste Pollution Prevention Plan). On some sites, several entities may meet the definition of operator and all must file Notice of Intents. Operators may include owners, general contractors, and subcontractors.

It is the responsibility of the operator(s) to develop and implement a Solid Waste Pollution Prevention Plan and maintain all best management practices during each stage of the project. Best management practices are the techniques (buffers, silt fences, detention ponds, swales, etc.), schedules of activities, prohibitions of practices, and maintenance procedures to prevent or reduce the discharge of pollutants.

Step 2: Develop a storm water pollution prevention plan. The Solid Waste Pollution Prevention Plan is a plan for how you will control storm water runoff from your construction site. It is broader and more complicated than a typical erosion and sediment control plan, so operators might want to enlist the assistance of a professional to save time. The Solid Waste Pollution Prevention Plan must be completed before you file an Notice of Intent to apply for coverage under Environmental Protection Agency's permit. You don't have to submit the Solid Waste Pollution Prevention Plan with your Notice of Intent to obtain permit coverage, but the plan must be available on-site for review during inspection.

Because every site is unique, every Solid Waste Pollution Prevention Plan is unique. The Solid Waste Pollution Prevention Plan needs to be updated as your work progresses.

The basic Solid Waste Pollution Prevention Plan principles are as follows:

- Divert storm water away from disturbed or exposed areas of the construction site. Install best management practices to control erosion and sediment and manage storm water.
- Inspect the site regularly and properly maintain best management practices, especially after rainstorms.
- Revise the Solid Waste Pollution Prevention Plan as site conditions change during construction and improve the Solid Waste Pollution Prevention Plan if best management practices are not effectively controlling erosion and sediment.
- Minimize exposure of bare soils to precipitation to the extent practicable.
- Keep the construction site clean by putting trash in trash cans, keeping storage bins covered, and sweeping up excess sediment on roads and other impervious surfaces.

Step 3: Complete an endangered species determination for the project site. The operator must assess the potential effects of storm water runoff on federally listed endangered and threatened species and any designated critical habitat on or near the site. In making this determination, the operator needs to consider areas beyond the immediate footprint of the construction activity and beyond the property line–essentially, areas that could be affected directly or indirectly by storm water discharges.

Step 4: File a Notice of Intent. The Novice of Intent form lets the Environmental Protection Agency know that you are filing for permit coverage. It is also your certification that you have read, understood, and are implemented the requirements of the Environmental Protection

Agency's permit. The fastest and easiest way to obtain permit coverage is through the Environmental Protection Agency's new online permit application system (WWW.Epa.gov/npdes/enoi). The Environmental Protection Agency's permit requires a 7-day waiting period after a Notice of Intent is filed and posted on the Environmental Protection Agency's web site (www.epa.gov/npdes/noisearch). Using the Environmental Protection Agency's eNotice of Intent system is the fastest way to begin this process. Mailing a paper Notice of Intent to the Environmental Protection Agency can add two or more weeks to your processing time. During the waiting period, Notices of Intent are reviewed for endangered species impacts and other concerns. Permit coverage begins at the conclusion of the 7-day period unless you are notified otherwise. Your completed Notice of Intent should be posted at the construction site in a place accessible to the public.

Step 5: Implement all best management practices outlined in your Solid Waste Pollution Prevention Plan. Remember to follow your Solid Waste Pollution Prevention Plan. All best management practices must be inspected and maintained regularly. Inspections are required either (1) at least once every 7 days or (2) at least once every 14 days and within 24 hours of the end of a rain event of ½ inch or more. The plan must also be updated as site conditions and best management practices change. Remember to keep records of your maintenance activities and any Solid Waste Pollution Prevention Plan modifications for review during inspection.

Step 6: File an electronic Notice of Termination. You should terminate permit coverage when your project is completed (generally, when 70% of the density of the original vegetation is reestablished on unpaved areas), when the property has been stabilized and ownership has been transferred to the homeowner (residential projects only), or when another operator has assumed control over the site (new operators will need to file an Notice of Intent and meet the requirements of Environmental Protection Agency's permit). The electronic Notice of termination form informs Environmental Protection Agency that your construction project is complete and ends your responsibilities under the permit. The form can be completed and filed using the eNotice of Intent system at www.epa.gov/npdes/enoi.

SD2.3 Coastal Zone

SD2.3.1 Coastal Project Questionnaire and Certification Statement Form

The Alaska Coastal Management Plan requires that projects in Alaska's coastal zone be reviewed by coastal resource management professionals and found consistent with the statewide standards of the Alaska Coastal Management Plan. These standards and the enforceable policies of an affected coastal district ensure that development interests observe the vision set out for the future by the state and coastal communities. It is called the consistency review process. A finding of consistency with the Alaska Coastal Management Plan must be obtained before permits can be issued for the project.

The coastal consistency review process, or consistency review process, helps ensure your project meets the statewide standards and coastal district policies. It also serves as the review process for most permits you will need from state resource agencies. This 5-step process advances your project through review and approval requirements in a timely fashion. The consistency review process is a coordinated review process that benefits applicants and project reviewers alike. Applicants have a single, primary point of contact for their projects. Reviewers benefit by comprehensively reviewing a project only once. The Office of Project Management and Permitting, as well as state resource agencies and coastal districts, are available to help you understand and navigate your project through the consistency review process.

The Alaska Coastal Management Plan applies to projects within or affecting Alaska's coastal zone. The statewide standards (6 AAC 80) and coastal district enforceable policies of the Alaska Coastal Management Plan provide direction for coastal resources and uses, such as:

- coastal development (whether a project is water-dependent or water-related)
- habitats (such as wetlands, tideflats, or streams)
- air, land, and water quality
- transportation and utility routes and facilities
- timber harvest
- mining and mineral processing
- subsistence opportunities
- recreation designations
- geophysical hazard areas
- historical and archaeological resources
- energy facilities
- fish and seafood processing

Using the statewide standards and local enforceable policies, the Alaska Coastal Management Plan evaluates the effects a project will have on the above coastal resources and uses. Projects must be consistent with the requirements found in the standards and enforceable policies.

The Office of Project Management and Permitting is home to the Alaska Coastal Management Plan. Located in the Department of Natural Resources, the Office of Project Management and Permitting is responsible for the overall administration and operation of the Alaska Coastal Management Plan. In this role, the Office of Project Management and Permitting provides assistance to applicants, coastal districts, and state agencies in carrying out their duties and responsibilities under the Alaska Coastal Management Plan. The Office of Project Management and Permitting has connections throughout the Alaska Coastal Management Plan network.

As such, your first Alaska Coastal Management Plan contact should probably be one of Office of Project Management and Permitting 's Project Review Coordinators. The Office of Project Management and Permitting also serves as the coordinator for the consistency review process if your project requires a federal permit or permits from more than one state agency. The staff at the Office of Project Management and Permitting perform a variety of other activities that support the Alaska Coastal Management Plan, including

- pre-application meetings for applicants
- federal funding for the Alaska Coastal Management Plan
- assistance to local districts in getting their coastal management programs approved
- assistance resolving conflicts
- appeals, elevations, and petitions
- Alaska Coastal Management Plan education and training

The state of Alaska has three agencies primarily responsible for managing its natural resources and uses of those resources. These resource agencies have permitting authorities for specific activities. If your project requires a permit(s) from only one state resource agency, that agency coordinates the consistency review process. Your project will most likely require one or more permits from at least one resource agency. The state resource agencies include:

- The Department of Natural Resources (Division of Mining, Land and Water; State Historic Preservation Office; and Office of Habitat Management and Permitting) manages state-owned land and natural resources, including sales and leases. There is a possibility a project could require a permit from all three of these Department of Natural Resources offices.

- The Department of Fish and Game manages the state's fish and wildlife resources and their habitats and permits activities on state refuges.
- The Department of Environmental Conservation serves to safeguard the public health and environment from human uses.

During the consistency review process, an affected coastal district reviews your project against the enforceable policies of its coastal management program. By complying with its enforceable policies, your project can help the district achieve its goals and objectives for coastal development within its boundaries.

If your project meets the following two criteria, or if you are unsure, you should contact the Office of Project Management and Permitting. One of the Office of Project Management and Permitting 's Project Review Coordinators will help you determine if your project requires an Alaska Coastal Management Plan consistency review and guide you to the state agencies and coastal districts you may need to contact.

Your project may require an Alaska Coastal Management Plan consistency review if it is:

1) located in or will affect resources of the coastal zone and

2) requires state, federal, or local permit(s). (If you are unsure about the location of your project in relation to Alaska's coastal zone or the permits required for your project, keep reading.)

Alaska's coastal zone boundaries include more than 44,000 miles of coastline and can extend inland along river drainages as far as 250 miles. This variability can make it difficult to tell if your project is within the coastal zone.

The coastal zone map shows a representation of Alaska's coastal zone and coastal districts. If your project is located within a coastal district, you should contact either the Office of Project Management and Permitting at 269-7470 (Anchorage), or the coastal district to determine whether your project is within its coastal zone. Coastal district contact information is located on Alaska Coastal Management Plan district web page.

If you are not sure what permits your project might require, fill out a Coastal Project Questionnaire for your own information. Even if you don't require an Alaska Coastal Management Plan consistency review, the questions in the Coastal Management Questionnaire will help you identify what permits might apply to your project and who to contact for more information. If you discover your project does require an Alaska Coastal Management Plan consistency review, you will have saved valuable time. The Coastal Project Questionnaire can be found in Appendix C7 of the USAG-AK ITAM Management Plan.

SD2.4 Migratory Bird Treaty Act

SD2.4.1 Timber Clearing Guidance

Tree clearing is conducted by hand and machine. Trees are removed within a specific area and cut to length and piled for personal firewood harvest, piled and burned, chipped and spread out, or buried on site.

Trees are typically cut, ground or sheared to ground level with minimal to moderate intrusion into mineral soil. Some tree thinning operations require the use of a dozer, which can result in the removal of the root balls and associated soil. Most mechanical clearing operations are conducted on frozen soil conditions. When clearing or cutting near water bodies it is necessary to maintain a riparian buffer zone if possible.

I. Mechanical Thinning

Mechanical thinning is conducted with a feller buncher (cut), an excavator (CAT 320) with a thumb attachment (pull) or a hydro-axe (grind). Specific areas of trees are removed by cutting, grinding or pulling. Mechanical clearing typically involves large areas and wide spacing. Mechanical thinning operations are conducted in hazardous fuel reduction, maneuver corridor and training facility line-of-sight projects.

II. Mechanical Clearing

Mechanical clearing is conducted with a feller buncher (cut), a dozer fitted with a straight or shear blade (shear) or a hydro-axe (grind). Specific areas of trees are removed by cutting, grinding or shearing. Mechanical clearing typically involves large areas and wide spacings. Mechanical thinning operations are conducted in hazardous fuel reduction, maneuver corridor and training facility line-of-sight projects.

A. Shear Blade

Shear blades (Rome KG) are fitted to the front of large dozers (CAT D8 or larger) and consist of a curved face with a flat cutting edge that rides on the ground surface. Shearblades are used to cut off trees and vegetation at the ground surface in a spiral pattern during frozen soil conditions. Sheared material is rolled into windrows. Shearblades allow for effective stem and trunk cutting with minimal root ball and soil disturbance. Shearbladed material can be left to decompose or piled and burned.

Shearblading is performed during hazardous fuel reduction, fire break and wildlife food plot projects.

B.. Straight Blade

Straight blades are fitted to the front of small to large sized dozers (CAT D4-D9) and are used to shear trees and surface organics into piles during clearing operations. Straight blades are used on frozen soil conditions when soil intrusion is an issue. Straight blades are also used for material piling during burning operations.

C. Hydro-axe (Masticating)

A masticating head hydro-axe (Fecon) is used to grind whole trees and woody vegetation into small chip-like residue. Masticating heads are rotating cylinders with offset rows of teeth and can be used to grind to ground surface or deeper. Sub-surface grinding incorporates wood material into the soil. Masticating hydro-axe work is performed during frozen and non-frozen soil conditions, depending on soil type and ground moisture. Masticating hydro-axes are used in hazardous fuel reduction, fire break, line-of-sight and roadside clearing projects.

D. Hydro-axe (Flail)

A flail head hydro-axe is an attachment on an excavator (CAT 320) body and is used to grind whole trees and woody vegetation into large chip residue. Flail heads are rotating blades attached to an articulating arm and are used to grind to ground surface level. Flail head hydro-axe work is performed during frozen and non-frozen soil conditions, depending on soil type and ground moisture. Flail head hydro-axes are used in hazardous

fuel reduction, fire break, line-of-sight and roadside clearing projects.

III. Mowing

Mowing is performed on areas with woody vegetation less than 2” in diameter. Areas are mowed with a tractor (John Deere 4020)-pulled brush mower. Mowing allows for residue to remain on-site and perform as a mulch layer. Mowing is performed on roadside clearing, drop zone management and wildlife food plot projects. Mowing is typically conducted on a 3-5 year rotation cycle.

IV. Vegetation Cutting and Thinning (Hand)

Hand thinning is individual tree specific and results in limited residual tree damage. Trees are thinned to a determined stem per acre specification. Hand crews use chain saws and axes to remove trees. Hand thinning operations are conducted in hazardous fuel reduction and maneuver corridor projects. Hand thinning is utilized in areas with unfrozen hydric soils.

Hand clearing is small area specific and results in limited residual tree damage around clearing perimeters. Hand crews use chain saws and axes to remove trees. Hand clearing operations are conducted around vertical training facilities and areas to small to maneuver equipment. Hand clearing is utilized in areas with unfrozen hydric soils.

SD2.5 National Historic Preservation Act

In the past, natural resources management projects were overlooked as potential causes of adverse impacts to archeological sites. Activities such as tree removal and training land restoration are all potentially damaging. In order to reduce negative impacts to cultural resources, projects that involve ground-disturbing activities will be processed through the USAG-AK Cultural Resources Manager. Furthermore, the Cultural Resources Manager will be consulted in areas of long-range planning (such as the Integrated Natural Resources Management Plan) that define policy.

Determination of effect and consultation guidelines provided in implementing regulations for the National Historic Preservation Act (36 CFR 800) will be followed during review of projects. Any project assessed as having an effect on a cultural resources site or historic property will be coordinated with the Alaska State Historic Preservation Office. Section 106 of the National Historic Preservation Act has been considered in the preparation of this plan, and it has been determined that there are no significant issues associated with the implementation of this plan.

Natural resources-related law enforcement actions also have the potential to beneficially impact preservation of cultural resources. If natural resources enforcement officers are added to the USAG-AK Conservation staff, they will also be trained in the enforcement of various cultural resources laws, especially the Archeological Resources Protection Act.

Natural and cultural resources are not mutually exclusive. Personnel involved in both of these programs will work closely with one another to ensure their successful integration.

SD2.6 Comprehensive Environmental Response, Compensation & Liability Act

SD2.6.1 Fort Richardson, Fort Wainwright, Donnelly Training Area Dig Permit Forms

Conservation and Land Rehabilitation and Maintenance project coordination should be made with Directorate of Public Works Construction Management Branch at least two weeks prior to project execution. The utility locate process and procedures are strictly enforced by the Directorate of Public Works Construction Management Branch, the Directorate of Public Works Utility Shops, and the Fort Richardson Post Safety Office. Specific instructions for obtaining dig permits for Fort Richardson, Fort Wainwright and Donnelly Training Area are located in Appendix C8 of the USAG-AK ITAM Management Plan.

Both the contractor and the Directorate of Public Works Utility Shops must use the American Public Works Association Color codes. Prior to requesting utilities locate, it is the contractor's responsibility to field mark the limits of the proposed excavation using white paint. The Directorate of Public Works Utility Shops will field mark (locate) utilities within the limits of excavation indicated in white by the contractor on the ground in the field. It is the responsibility of the Land Rehabilitation and Maintenance project manager to ensure, at a minimum, that project submission should include a written description of the project area and the type of construction or rehabilitation techniques that will be utilized. In addition to the description, a vicinity and plan view map will be included. Some projects may require a more detailed elevation and/or cross section view map depicting the project area. The maps should be labeled accordingly and easy to understand. Specific guidance for creating Conservation and Land Rehabilitation and Maintenance project maps is located under Wetlands Permitting chapters 5.5.3.3, 5.5.3.4 and 5.5.3.5 of the USAG-AK ITAM Management Plan.

SD2.7 State Regulatory Requirements

Alaska Statute 41.14.840 (Fishway Act) requires that an individual or governmental agency notify and obtain authorization from the Alaska Department of Natural Resources for activities within or across a stream used by fish if the department determines that such uses or activities could represent an impediment to the efficient passage of fish. Culvert installation; stream realignment or diversions; dams; low-water crossings; and construction, placement, deposition, or removal of any material or structure below ordinary high water all require approval from the Department of Natural Resources.

Alaska Statute 41.14.870 (Anadromous Fish Act) requires that an individual or governmental agency provide prior notification and obtain approval from the Department of Natural Resources "to construct a hydraulic project or use, divert, obstruct, pollute, or change the natural flow or bed" of a specified anadromous water body or "to use wheeled, tracked, or excavating equipment or log-dragging equipment in the bed" of a specified anadromous water body. All activities within or across a specified anadromous water body and all in stream activities affecting a specified anadromous water body require approval from the Department of Natural Resources, including construction; road crossings; gravel removal; placer mining; water withdrawals; the use of vehicles or equipment in the waterway; stream realignment or diversion; bank stabilization; blasting; and the placement, excavation, deposition, disposal, or removal of any material. Recreational boating and fishing activities generally do not require a permit.

The description and location of specified anadromous water bodies is contained in the "Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes." Copies of the catalog may be viewed at any Office of Habitat Management and Permitting.

SD2.7.1 Fish Habitat Permit Application

Some USAG-AK Conservation and Integrated Training Area Management projects that exist along or near water bodies may require a state fish habitat permit. There are seven steps to obtaining permit coverage.

Step 1: Provide your name, address, and telephone number and the name, address, and telephone number of the contractor who will be doing the work, if known.

Step 2: **A** Name of the water body in or adjacent to which the project will occur.

B. For Anadromous stream numbers, refer to the Atlas to the Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes.

C. Plan Specifications

1. Provide plans (or field sketch) showing the following as a minimum: access to the plan view showing all project features and dimensions, or crossing/fording sites; material removal plans should also include, at a minimum, the following: 50' contour lines; nearby watercourses and lakes; location of facilities (i.e., screening, washing, and crushing plants, and commercial and private buildings); aliquot parts identified in order they are to be mined; site where fuel will be stored; a cross section view of the material site showing current land and water elevations and bank slopes and final excavation grades and slopes; and project expansion sites (scale no greater than 1 in. = 400 ft.)

2. Provide specifications, if available.

3. Provide a current aerial photograph, if available.

Step 3: Describe the type of project (e.g., bridge, culvert, utility line placement, impoundment structure bank stabilization, channelization, low water crossing, log removal, etc.) and the purpose of the project. A brief description of alternatives considered would be useful but is not required.

Step 4: Indicate the time of year when project construction will occur. Is the project temporary or permanent?

Step 5: What precautions will be taken to insure that fish and other aquatic organisms are protected from adverse impacts? Outline plan for restoring, rehabilitating, or revegetating the site if channel or bank alterations occur. What precautions will be taken to maintain state water quality standards.

Step 6: Provide the water body characteristics at the site of the project.

Step 7: Provide available hydraulic information for the types of projects indicated. For information on selecting a culvert size that will ensure fish passage, consult Office of Habitat Management and Permitting permitters or references available at the Office of Habitat Management and Permitting offices.

SD3. Regulations

USAG-AK and USAG-AK regulations also affect natural resources management. The two regulations that primarily affect natural resources management are U.S. Army Alaska Regulation 350-2, *Range Regulation* and USAG-AK Regulation 200-3, *Conservation Management*.

SD3.1 U.S. Army Alaska Range Regulation 350-2

U.S. Army Alaska Range Regulation 350-2 includes all the controls on military users on USAG-AK lands.

SD3.1.1 Environmental Protection

Restrictions on training are sometimes necessary for ecosystem protection. USAG-AK has incorporated environmental restrictions into U.S. Army Alaska Regulation 350-2, *Range Regulation*, last modified in 1995. The following section outlines the protection of environmental resources during training and is shown below.

SD3.1.1.1 General

The intent of this section is to enhance training by conserving the training environment and terrain. It is extremely important to use the training resources to your advantage while conserving them for future use. Preventing maneuver damage and maintaining the training quality is a command responsibility. Training will be conducted in a manner that ensures optimum use of the land while adhering to environmental and natural resource regulations, policies and planning decisions. The Army has an obligation to act responsibly and effectively in the use of land and other natural resources required in fulfilling its mission. The obligations include, but are not limited to:

- Watershed protection to minimize soil-disturbing activities by construction equipment and other vehicles, which can result in vegetation destruction, rutting and erosion.
- Protection of forest lands from indiscriminate tree cutting.
- Prevention and control of unwanted wildfires.
- Optimum use and management of wildlife resources.
- Cooperation in pollution abatement and waste control.
- Protection of historic and archaeological sites.
- Allowing controlled public access for recreational uses.

SD3.1.1.2 Policy

Army environmental practice is based on the National Environmental Policy Act, which commits agencies of the federal government to consider the effects of proposed actions during the decision process and to document this consideration. All Army actions must include consideration of impacts to the environment. This consideration may consist of a record of environmental consideration, an environmental assessment, or it may develop into a major project such as an environmental impact statement. Commanders must ensure that appropriate environmental documentation has been completed for all training activities. Guidance for Army implementation of National Environmental Policy Act is contained in AR 200-2, *Environmental Analysis of Army Actions*. Other laws and regulations which affect training use of military lands include the Clean Water Act, the Endangered Species Act, the Sikes Act, the National Historic Preservation Act, AR 200-1, *Environmental Protection and Enhancement*, and AR 200-3, Natural Resources - *Land, Forest and Wildlife Management*.

Integrated Natural Resource Management Plans and Integrated Training Area Management programs are being developed for each Alaskan post. They promote a realistic training environment while ensuring land stewardship and environmental compliance. Computer-generated maps depicting natural and man-made information from the posts' databases are being developed. This information will be used to evaluate land capability for sustained training and multiple use management of resources. Land conservation will be integrated into training plans by avoiding unnecessary environmental damage. Unit commanders planning to conduct training on Alaskan Army posts will be required to use these resources to minimize environmental impacts and to maximize sustainability of training land resources.

SD3.1.1.3 Environmental Considerations

Noise

Firing demolition, artillery, or mortars from 2200 to 0600 is prohibited, and demolition charge sizes are limited. In addition, any training activity that generates noise (firing of blanks, pyrotechnics, simulators, etc) between 2200 and 0600 in areas adjacent to populated areas is also prohibited. Exceptions to firing hours require public notification of late firing. An exception to firing hours can be obtained by submitting a late fire request to Range Control. Range Control will submit notification to the Public Affairs Office so that a notice of firing can be published. Late fire requests must be submitted 12 working days before the desired training event.

Digging

Foxholes, trench systems, tank traps, hull down positions, explosive excavations, etc. must be refilled and leveled before redeployment. Where excavation is required, the organic layer will be removed first and stockpiled so it can be spread over disturbed sites after back-filling is complete. All overhead cover, such as logs, must be disassembled and scattered. Wire, rope and string will be removed and disposed of properly.

Waste Disposal

- Police all training areas before, during, and after use. Even if it is not your litter, pick it up because it can give away your position. All cartridges, tubes, containers, packing material and all other material introduced into the environment in conjunction with maneuver activities will be removed to the maximum practical extent. Remove all barbed, commo, concertina, and trip wire and properly dispose of it according to post procedures.
- Under no circumstances will units bury or burn waste.
- Use permanent latrines for human waste, when available. Where permanent latrines are not available, unit commanders must provide ample portable latrines. Unit Commanders are personally responsible to prevent the contamination of water resources.
- All vehicles are required to have a supply of plastic garbage bags for trash collection.

Fires

- Immediately report all fires to Range Operations or the Fire Department. Know the grid location, nature and size. Units are to stop training and assist the fire fighters except when the fire is in an impact area.
- The use of pyrotechnics, smoke pots, and grenades may be restricted when fire danger is high. Smoke grenades and star cluster flares will be only used for emergency operations in high fire danger times.
- Burn pans are required to burn excess powder charges.
- Open fires are prohibited except in emergencies or as part of approved training exercises. Units desiring to build fires should submit a request to burn to range control which includes materials to be burned, quantity, length of burning, etc. The request should be submitted well in advance of the planned burning.

Vehicle Movement

- Vehicles should remain on marked trails and designated routes except when directed otherwise during tactical deployment. Drive on established roads during administrative time. Cross-country vehicular travel (such as small unit support vehicles) is not restricted during winter months. During breakup (usually 1 April through 15 May) all vehicles are restricted to established roads and dry trails. During

summer months (usually May through September) cross-country movement is permitted in all areas except designated creek bottoms, marshes, and moist and alpine tundra areas. A list of areas designated as closed during summer months are maintained by Range Control.

- In training areas, heavy artillery and armored tracked vehicles must keep at least 10 meters from the base of trees and all other vehicles, 5 meters away. This is to avoid erosion and soil compaction, which would eventually kill the trees.
- Movement into off-limit areas is strictly prohibited. Personnel found in violation are subject to disciplinary action.
- Vehicles are prohibited from driving across, into, or within streams, ponds, lakes and wetlands. Vehicular stream crossing is allowed in winter months (usually October through March) at permitted ice bridge sites and other areas, as approved by the Directorate of Public Works, Environmental Resources Department. The stipulations listed on ice bridge permits issued by the State of Alaska are made as part of this document. Stream crossing during the rest of the year is subject to approval by the Environmental Resources Department. Approval depends upon adherence to stipulations outlined by the Environmental Resources Department and, where applicable, when permits are received from the State of Alaska.

Off-Limit Areas

All areas within ½ mile of the military reservation boundaries are closed to training activities as a buffer to adjacent nonmilitary land uses. The ½ mile-restriction does not apply to the close-in training areas. Exceptions include all access routes and those areas specifically approved by Range Control. Improved recreational areas are closed to training unless otherwise approved by Environmental Resources Department.

Camouflage

- Live vegetation greater than 4 inches will not be cut or damaged during training without written approval from Range Operations. If trees larger than 4 inches in diameter are required, contact the Environmental Resources Department for an approved area. Destruction of trees and brush must be avoided unless it is required to achieve training objectives.
- Trees under 4 inches in diameter may be cut without coordination with Environmental Resources Department, if necessary, to achieve training objectives. Spruce boughs (limbs) may not be cut from live, standing trees; boughs may be obtained by cutting spruce trees under 4 inches in diameter. All trees will be cut less than 6 inches from the ground.
- Use camouflage nets instead of live vegetation. The nets are designed to break up the visual lines of equipment and structures. Once live vegetation is cut, it wilts quickly, and does not conceal your position.
- Communications wire, power lines and auxiliary cables should be strung along the edge of open areas or trails and run along the ground when feasible and compatible with training objectives. When it is necessary to suspend wire above the ground, care should be taken not to break trees, branches, stems, etc.; the use of nails and wire loops should be minimized.

Fish and Wildlife

Harassment of fish and wildlife is prohibited. Any action which disturbs fish and wildlife is considered harassment by federal and Alaska state law. Harassment includes such things as pursuit with vehicles or aircraft, feeding and shooting of wildlife. Individuals who harass fish and wildlife are subject to prosecution. In addition, impact and training areas may be temporarily closed to artillery fire and aerial

bombardment during periods of significant fish and wildlife use. The Alpha Impact Area at Fort Wainwright is closed 15 May through 30 June for moose calving.

Cultural Resources

Identified historical and archaeological sites will be left undisturbed. Any historical or archaeological discoveries made as a result of any military activities should also be left undisturbed and must be reported immediately to the Environmental Resources Department.

Public Access

Per Public Law 87-327 and AR 200-3, USAG-AK controlled lands are open to civilians and off duty military personnel for outdoor recreation such as hunting, fishing, trapping, berry picking, hiking and nature photography. Units may encounter these people during the conduct of training. If the presence of civilians interferes with training activities, units will contact Range Control to have the civilians removed. Under no circumstances will traplines or trapped animals be disturbed.

Petroleum, Oil and Lubricants (POL)

- Petroleum, oils and lubricants distribution points and refueling operations shall be set up and operated per USAG-AK Regulation 200-1. Drip pans must be utilized at all dispensing points. Units shall have available a spill kit consisting of at least a shovel, absorbent material (dry sweep), plastic bags, and drip pans. Improper handling of POL products constitutes gross negligence, punishable by fine or imprisonment.
- Immediately report POL spills to the Fire Department or Range Operations. Know size, location, and type of POL spill. Take immediate action to control, contain, and clean up the spill per the Installation Spill Contingency Plan. Failure to immediately report spills may result in prosecution.
- All hazardous wastes and materials will be handled per the USAG-AK Hazardous Waste and Materials Management Plan for each post. All disposal actions will be coordinated with the Directorate of Public Works, Environmental Department.
- Always turn in unused or waste oil and fog oil (see USAG-AK Regulation 200-4) for recycling along with empty drums and other hazardous wastes, such as old batteries, solvent, and paints.

SD3.1.1.4 Damage Control

Careless use of the training areas will result in terrain damage. If the mission of U.S. Army Alaska is to be fulfilled, realistic training conditions are required. Maneuver damage will decrease the training realism. This will result in substandard training conditions and will undermine the training mission. Maneuver damage needs to be kept to a minimum. The damage that occurs must be repaired. If not, the damage will result in artificial constraints on maneuver training including loss of training acreage, creation of safety hazards, decreased tactical maneuverability, increased maintenance costs, and loss of vegetation, resulting in a loss of quality training terrain, destruction of natural camouflage, and controversy with the general public.

The key to preventing maneuver damage is knowing how to respond properly to different situations. As leaders, the decisions you make will affect the training area by promoting or preventing damage. Once the training land is damaged it is extremely hard and expensive to replace or repair. Training for combat on the modern battlefield often cannot be conducted without damage, but trainers are expected to consider the impact of events, modify plans to avoid damage that violates Army policy, and ensure the repair of unavoidable scenario-driven damage. Training plans will include locations of known sensitive areas and plans for maneuver damage repair. Procedures to reduce maneuver damage include the following:

- Avoid making tactical turns, such as missile avoidance or neutral steer turns, unless absolutely necessary. These types of turns will rip up all the vegetation and it will take the terrain several years to recover.
- Avoid damage to trees.
- Drive on established roads during administrative time. Although it may take longer than moving cross- country, the expense incurred in repairing maneuver damage is very high. Units causing ruts must fill them in as soon as possible.
- Stay away from the edges of roads. Driving on the edges will cause them to break and crumble. This can cause the road to wash out from rain and result in erosion problems.
- Do not drive directly up steep hills.
- Use camouflage nets instead of live vegetation. The nets are designed to break up the visual lines of equipment and structures.
- Do required training with a concern for conservation and future use of range areas.

Units will report maneuver damage to Range Control. Range Control will determine the cause of the maneuver damage. If the damage was caused as a result of unavoidable scenario-driven maneuvers, the units will not be assessed for maneuver damage repair. However, if Range Control determines that the damage was unnecessary and negligent, Environmental Resources Department will conduct a damage assessment and offending units may be charged for maneuver damage repair. Environmental Resources Department will provide technical guidance on cleaning up hazardous materials and rehabilitation of damaged lands.

SD3.1.1.5 Information and Assistance

The range facility manager and the Environmental Resources Department will assist trainers at any stage of planning with advise on possible impacts of exercise scenarios. Trainers must use this resource early in their planning cycles to provide for protection of known sensitive areas and reduce possible maneuver damage to those areas within the training complex.

Activities which require environmental assistance and coordination include the following:

- Ground-disturbing activities, such as dozer work where soil and vegetation is displaced, disturbance of vegetation in wetlands, construction of new trails and the opening of new borrow areas, etc., will be coordinated with Environmental Resources Department before taking any action.
- Activities which will have impact on waterways or result in discharge of material into waterways will be coordinated with Environmental Resources Department before taking any action.
- Units will coordinate with Environmental Resources Department for the use of trees over 4 inches in diameter for construction or demolition purposes.

SD3.1.2 Environmental Limitations Overlay

The environmental limitations overlay is based primarily on the rules and constraints of the five-year wetland permit.

The Department of the Army determined there is a continuing military need to conduct military training in all the environments, including wetlands, available on Fort Wainwright, Donnelly Training Area (formerly part of Fort Greely) and Fort Richardson, Alaska. An environmental assessment (Conducting Military Operations in Wetlands at Fort Wainwright and Fort Greely, Alaska) was written in 1999 and included with the permit application. In February of 2000, U.S. Army Alaska received a five-year Section 404 individual wetland permit to conduct military operations that may potentially impact wetlands on

Fort Wainwright and Donnelly Training Area. An application for renewal of that permit will be submitted during summer 2005. Fort Richardson is in a different U.S. Army Corps of Engineers regulatory region, so a separate wetland permit application will be submitted to conduct military operations in wetlands at Fort Richardson.

SD3.1.2.1 Purpose and Need

The purpose of this permit is to diversify military training options at Fort Wainwright, Donnelly Training Area and Fort Richardson to including routine, reoccurring military training activities while ensuring environmental compliance in wetland areas. This opportunity will thereby enhance essential war-fighting skills. The goals of Army training are to produce a force trained to mobilize, deploy, fight, and win anywhere in the world. Army training conditions must match or closely resemble all possible environments throughout the world, including Arctic and Subarctic conditions. Training in wetlands during all seasons would enable the Army to meet its training goals.

The military has used the proposed permit lands for approximately 50 years. Current use includes military maneuvering, training, equipment development and testing, and other defense-related purposes.

The primary military mission of USARAK after the Cold War has been peacetime deployment to support U.S. interests worldwide, the defense of Alaska, and coordination of Army National Guard and Reserve activities in the state. Most USARAK combat forces, the 172nd Stryker Brigade Combat Team (SBCT), are at Fort Wainwright, with Fort Richardson as the primary support base.

In order for USARAK to fulfill its military mission, training conditions must include all environments of Fort Wainwright and Donnelly Training Area. Ultimately, military operations are affected by the environment under which they are conducted. The effect of the Arctic and Subarctic environment on materiel and personnel must be understood for survival. Battlefield conditions must be reflected in military training to adequately prepare units for combat. Military units need as much space to fire and maneuver in training as they would in combat. The need for training in wetlands and other Subarctic conditions is essential for survival in battle.

Fort Wainwright, Donnelly Training Area and Fort Richardson have been withdrawn from public use for military purposes for the past 50 years. An unavoidable and necessary part of training Soldiers to survive and win in battle is the disturbance of vegetation and soil. The U.S. Army is dedicated to providing this training opportunity. Furthermore, the Army is committed to responsible use of its training lands to provide continued training opportunities for many generations of Soldiers.

Natural resource management considerations and safety demands associated with the training mission limit other potentially more damaging land uses. Damage from training activities will be repaired under the Land Rehabilitation and Maintenance component of the Integrated Training Area Management program.

The following sections list the general and specific conditions that are part of the 2000-2005 wetland permit. Some of these conditions may change with the renewed permit. The Wetland Monitoring Protocol is an important responsibility of the Integrated Training Area Management and/or Range and Training Land Assessment coordinator at each post.

SD3.1.2.2 General Conditions:

1. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 3 below. Should you wish to cease to maintain the authorized activity or should you

desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

2. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify the U.S. Army Corps of Engineers Regulatory Branch Office of what you have found. We will initiate the federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

3. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

4. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

5. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

SD3.1.2.3 Special Conditions:

1. Prior to field exercises, as a part of planning, information provided on the environmental overlay maps shall be ground-truthed against actual conditions to avoid and minimize potential impacts to wetlands and species of concern, particularly during times of seasonal transition.

2. Prior to field exercises, as a part of planning, the 50 meter "significant restrictions" buffer shall be clearly marked on the ground and communicated to troops. Reclamation measures of the buffer zone shall include removal of any flagging or marking material.

3. Only the minimum footprint necessary shall be used for training activities. Wetlands adjacent to military operations not necessary for training will not be encroached upon, thus minimizing additional disturbance.

4. For operations on established roads passing through wetland areas, natural drainage patterns shall be maintained by culverts. Culverts shall be maintained to ensure that they are not crushed or blocked, to avoid undue flooding, and to ensure proper passage of fish and other aquatic organisms.

5. In any location, on existing roads, trails or reclaimed areas, etc. preventative measures shall be taken to minimize erosion and the need for subsequent additional reclamation measures, including but not limited to temporary closure of roads during break-up or freeze down, installation of water bars to minimize gully erosion and sediment transport, use of insulation material to prevent thawing, use of applied or modified bioengineering techniques such as willow breaks, and prohibition of driving vehicles straight up hillsides.

6. Foot traffic only shall be permitted within the 50 meter buffer, except at designated ice bridge access routes. Other training activities, such as bivouacking and off-road maneuver are prohibited within the 50 meter buffer and the ice bridge access corridor.

7. During field exercises, for operations occurring on existing roads or rights-of-way or other designated routes, vehicles shall remain on the existing path except when otherwise directed. All vehicles shall be

restricted to established roads and dry trails during break-up (usually 1 April through 15 May). The purpose of this condition is to minimize incidental damages to wetlands.

8. During field exercises, for operations occurring off-road or on winter trails, areas shall not be used to the point where more than 10% incidental clearing of the vegetative mat occurs. If incidental clearing of the vegetative mat exceeds 10%, affected trails (or areas) shall be rotated out of use until sufficient recovery occurs such that the area would again support training.

9. During field exercises where excavation is required, the organic layer must be removed and stockpiled so it can be reused for reclamation purposes. All overhead cover, such as logs and other woody debris, shall also be stockpiled.

10. During field exercises in summer months, tracked or wheeled maneuver shall not be permitted within 50 meters of all streams, lakes and any open flowing water, unless a stream crossing has been previously authorized by Alaska Department of Natural Resources, Office of Habitat Management, and occurs at a 90-degree angle to the stream. The purpose of this condition is to avoid and minimize discharge of sediment into open waters and degradation of streambanks and streambeds.

11. Fish spawning streams, as designated by Alaska Department of Natural Resources, Office of Habitat Management, shall not be crossed during summer months. The purpose of this condition is to avoid and minimize discharge of sediment into open waters and degradation of streambanks and streambeds.

12. Stream crossings by vehicles are allowed in winter months (usually October through March) at designated ice bridge sites and other areas that have been permitted by Alaska Department of Natural Resources, Office of Habitat Management, if there is no flowing water. The purpose of this condition is to avoid destruction of overwintering habitat.

13. Use of winter trails is limited to winter months when snow cover and frost depth are sufficient to protect the underlying vegetation, soil, and permafrost from undue disturbance. Undue disturbance is considered to be a greater than 10% damage to the vegetative mat, causing exposure of underlying mineral soil. If snow or freeze conditions are reasonably anticipated to be insufficient to prevent the 10% damage, such as might occur during low snow years, during maneuver in hummock areas, or under other adverse conditions, the training activity shall be rescheduled to a different area where impacts would be less.

14. When plowing trails, bivouac sites or other training areas in winter months, the snowplow blade must be kept elevated sufficiently to avoid damaging the vegetative mat or soil beneath the snow pack. Snow cover must be sufficient to allow at least 6" of snow pack on an area. No more than 10% damage to the underlying vegetative mat on a training site may occur, to avoid exposure of underlying mineral soil. Plow debris must not be left on top of any lakes or streams. Disruption of large areas of the vegetative mat or woody vegetation is not allowed.

15. After training activities, the Army shall reclaim all disturbed wetland areas associated with training activities. Training sites shall be reclaimed so that the condition of the training sites duplicates as far as practicable the condition of the sites prior to disturbance. At a minimum, foxholes, trench systems, tank traps, hull down positions and explosive excavations must be refilled and leveled, and any portion of the vegetative mat that has been disturbed and stockpiled shall be redistributed as evenly as possible over the surface of the ground. All overhead cover, such as logs, will be disassembled and scattered. The goal is to have no more than 10% disturbance of the rooty shrub mat with subsequent exposure of underlying soils. Additionally, any streambanks or other slopes that have been inadvertently disturbed shall be restored to a stable condition to an angle of repose where they are not eroding, are not encouraging additional erosion,

and where revegetation can occur. Reclamation may include but is not limited to a range of suitable measures such as breaking up large rooty clumps into smaller ones, re- distribution of smaller clumps over the disturbed areas, use of geotextiles, bioengineering, seeding or other techniques.

16. Seeding shall be used as a reclamation measure when vegetation has not re-established within a reasonable length of time as determined by agreement between resource management and Corps personnel, or when specifically required for an appropriate erosion control measure. Species to be used for reseeding and planting should be native to the site. If these species are unavailable, then species native to the area or state of Alaska should be used. The use of non-native species should be used only when the use of native species is not available.

17. Restoration work must be accomplished prior to thaw conditions of the following summer season.

18. A summary report of annual wetland impacts from training activities shall be provided to the Corps of Engineers regulatory office no later than August 31 of the summer season following training activities. The report shall generally follow the protocol outlined in the attached "Wetlands Monitoring Protocol" provided by the Army. An annual site inspection shall occur, as arranged between resource management and the Corps. The inspection and annual report shall reflect activities undertaken each year with special attention paid to trouble spots and non-compliance issues. Also, there shall be allowances to evaluate and monitor conditions for effectiveness, with the ability to delete, modify or add new conditions as needed.

19. This permit does not authorize ice bridges, construction of permanent facilities (such as roads, buildings, pads, bank stabilization structures, dams, levees, or dikes), weapons firing into impact areas, unexploded ordnance, recreational activities or other activities addressed by state or federal permits, licenses, entitlements, or environmental assessments (Environmental Assessment). These activities would be addressed under separate wetland permit requests.

SD3.1.3 Fire Danger Rating System

The fire danger rating system is outlined in USARAK Range Regulation 350-2. The system follows the Canadian Forest Fire Danger Rating System and utilizes the Fire Weather Index. The fire weather index is calculated and translated into low, moderate, high or extreme by the various post fire departments. Each level on the scale corresponds to training restrictions. G3 Range Control is responsible for conveying and implementing the Fire Danger Rating System to the Soldiers. Fire weather index calculations are based on weather observations from remote automated weather stations established in all of the major training areas. The fire weather index is calculated May through September. Waivers for training restrictions established by the fire weather index are granted by G3 Range Control after consulting with the USAG-AK Fire Chief and the Bureau of Land Management, Alaska Fire Service Military Zone Fire Management Officer.

SD3.1.4 Range Facility Management Support System

Range Facility Management Support System is a multi-user, PC-based software package that automates the real property inventory, scheduling, firing (operations) desk, and management functions at an installation Range Control Center. Range Facility Management Support System was developed to optimize the scheduling, use, and operations and maintenance functions for an installation's live-fire ranges, maneuver training areas, and other related training facilities and assets under AR 210-21, *Army Ranges and Training Land Program*.

The basic modules of Range Facility Management Support System are scheduling and fire desk operations. In addition to the basic tabular database management functions that are automated in Range

Facility Management Support System, several modules have been added to increase data collection, storage, and analytical capabilities. A brief description of two of the modules that affect natural resources management follows:

Automated Surface Danger Zone application digitizes the range firing fans and surface safety fans for all of the Army's current and projected direct fire, indirect fire, and aerial delivery systems. These surface danger zones are contained in AR 385-63, *Army Range Safety Program*. Automated surface danger zones allow Range Control managers to better serve users in the planning and conduct of complicated combined arms live-fire and non live-fire training events.

Training Facility Inventory/Utilization application is currently under development and will allow Range Control managers to quantify facility usage data (electronically or manually) and perform the mathematical functions to determine the utilization trends for each range facility or training area. This application will also interface with the Training Requirements Integration application of Integrated Training Area Management for effective and efficient land management planning consistent with current and future environmental prevention considerations.

Range, Target, and Standards in Training Commission Application automates the frequency of direct fire and indirect fire lane or firing points training requirements for specific Modified Table of Organization & Equipment and Table of Distribution & Allowances units and activities. Among other things, Range, Target, and Standards in Training Commission Application captures amounts and types of munitions fired at each range. This data is required for Emergency Planning and Community Right to Know Act reporting, an environmental reporting requirement.

SD3.2 USAG-AK Conservation Regulation 200-3

USAG-AK Regulation 200-3 is a composite regulation providing for the enforcement of outdoor recreation on U.S. Army Garrison Alaska lands and procedures for gaining access. The regulation further provides for the use and treatment of forest resources, treatment of cultural resources, harvest of fish and game resources in compliance with state (Alaska) and federal laws, possession and use of firearms (AR 190-1), and the use of off-road recreational vehicles. Specific policies, procedures and assigned responsibilities for the management and administration of the natural and cultural resources are also located in this document.

These provisions apply to all personnel, military and civilian, whose activities involve or affect the use or protection of natural and cultural resources on USAG-AK lands. The Conservation Branch of the Directorate of Public Works is the proponent agency. A review process is provided for and is conducted on an annual basis to insure compliance with changing mandates, management practices, and to minimize conflict with the Army mission.

USAG-AK Regulation 200-3 finds its origin and mandate in the Sikes Act (16 U.S.C 670), Army Regulation 200-3 (Natural Resources – *Lands, Forest, and Wildlife Management*), and the various Integrated Natural Resources Management Plans for Alaska.

SD3.3 USAG-AK Hunting Supplement to Alaska Department of Fish and Game Hunting Regulations

The USAG-AK 200-3 Supplement is a user-friendly version of the USAG-AK 200-3 regulation intended for use by the recreational user of Army lands and its natural and cultural resources. Each installation (Fort Richardson, Fort Wainwright to include Donnelly Training Area) has it own supplement. These

documents address such topics as the procedure for accessing military land to prevent conflict with military training; permits and licenses; off-limit areas; hunting, fishing and trapping; seasons and bag limits specific to the installation; possession and use of firearms; off-road recreational vehicles; and includes maps of the installations. The supplement is available at all installation visitor centers, Conservation Branch offices, and from (MP) Conservation Officers. The documents are reviewed and published annually by the Conservation Branch.

Points of contact are the Natural Resources technicians at each post.

Supplements for Fort Wainwright, including Donnelly Training Area, and Fort Richardson, must be updated on a regular basis as rules and regulations change. Updates can be timed prior to large printings (annually or even biennially depending on need).

Supplements must include information specific to conducting recreational activities on USAG-AK lands, including the following:

1. Phone numbers where more recreational information can be obtained.
2. Information on the Recreation Access Permit.
3. Rules and regulations for access to USAG-AK lands.
4. A description of off-limit areas.
5. State residency rules, including a description of active duty military residency rules.
6. Hunting information to include special Army hunts and different Army rules for various species (such as black bear baiting registration requirements).
7. Trapping.
8. Fishing, to include a list of stocked lakes.
9. Off-road recreational vehicle rules.
10. Maps that include off-limit areas, stocked lakes, and special management units.

Supplements do not need to include general information that can be found in the state hunting, trapping or fishing regulation booklets. Exceptions to this are military-specific information such as the active duty military residency rules.

Once the current supply of supplements runs low, updates will be made and a new version will be printed. 2,000 to 3,000 copies for the Fort Wainwright version seem to be adequate for about one year. These supplements can be handed out when individuals receive their Recreation Access Permit card and at public outreach events.

SD4 Policy

There are a number of installation policies that affect the use and management of natural resources on USAG-AK lands. The installation access policy, land use policy, timber policy, recreational use policy, and data release policy are described below.

SD4.1 Installation Access Policy

SD4.1.1 General

Civilians and military personnel requesting recreational access to USAG-AK's lands and waters must obtain a Recreation Access Permit. This permit provides conditional authorization to enter Army training lands and is good for two calendar years. Permits can be obtained at each installations's Visitor Center or

Natural Resources Office. On Donnelly Training Area, permits can also be obtained by calling the Environmental Office, 873-1614. The requestor must provide the following information:

(1) Full name
(2) Physical Address (place of residence)
(3) Phone Number
(4) Photo Identification

After the Recreation Access Permit permit is obtained and prior to entering USAG-AK lands, all recreational users must log in, using the unique identifier located on the Recreation Access Permit, to the U.S. Army Recreational Tracking System (USARTRAK) to ascertain which training areas are available for recreational use. Individuals are prohibited from entering areas other than those indicated as open on the USARTRAK system. Individuals are also prohibited from entering any of the areas indicated as closed by placard, blockade, verbal warning, red flag or other means of communication. Authorization for access is subject to change based on the current Force Protection Condition levels and mission training requirements.

SD4.1.2 Fort Richardson

All recreational users south of the Glenn Highway must use USARTRAK to log in and to ascertain which training areas are available for recreational use. In addition to logging in to USARTRAK, all recreational users requesting access to Fort Richardson north of the Glenn Highway and who do not possess an authorized Department of Defense Identification card/ Fort Richardson installation pass or are not on the Fort Richardson Installation Access Roster (See Fort Richardson Garrison Commander Policy #25-15 and #24-16) must go to the Fort Richardson Visitor's Center at the main gate to obtain a visitor's pass. Recreational visitors to Fort Richardson may check in to a maximum of two training areas listed as opened to recreation on the USARTRAK system. All recreational visitors on Fort Richardson must log out of the training areas by using the USARTRAK system by 2400 hours on the day of use.

SD4.1.3 Fort Wainwright

All recreational users on Yukon Training Area, Tanana Flats Training Area, Donnelly Training Area and Gerstle River Training Area must use USARTRAK to log in and to ascertain which training areas are available for recreational use. In addition to logging in to USARTRAK, all recreational users requesting access to Fort Wainwright Main Post and who do not possess an authorized DOD Identification card/ Fort Wainwright installation pass holder or who are not on the Fort Wainwright Installation Access Roster must visit the Fort Wainwright Visitor's Center at the main gate to obtain a visitor's pass. Recreational users requesting access to training areas (Tanana Flats Training Area, Yukon Training Area, Donnelly Training Area, Gerstle River Training Area) who do not travel through Main Post, need not obtain a visitor's pass prior to entry of the training areas. Recreational users, after properly logging in to USARTRAK, may enter any open training areas using approved motorized and non-motorized modes of conveyance in strict compliance with all pertinent state, federal and USAG-AK rules and regulations.

Hunting, trapping, and fishing programs on Donnelly Training Area will remain open to the military's personnel, dependents, civilian employees, as well as members of the public who have a current Alaska hunting, trapping, or fishing license. These individuals need only obtain a USAG-AK Recreation Access permit. There are no current restrictions on the number of permits issued to the public.

Hunter access is a significant issue with regard to the impact areas on Donnelly Training Area. These areas are closed to access due to unexploded ordnance and the related safety and liability concerns (AR 385-63). This includes the Oklahoma and Mississippi impact areas. However, there is often illegal access during hunting, fishing, all terrain vehicles and boating activities.

- The public is expected to comply with all rules concerning restricted access along with permanently and temporarily closed portions of the post.
- The public may use unimproved remote landing areas after complying with notification requirements, provided this use does not interfere with military activities or incur federal liabilities.
- Signs will be posted to warn the public of impact area and other closed areas.

Warning/information signs are posted on flagpoles at all significant access points along the Richardson Highway. When an area is in use, a red flag is raised at the access point, warning the public of current off-limit areas.

SD4.1.5 USARTRAK

U.S. Army Garrison Alaska has established the U.S. Army Recreation Tracking (USARTRAK) system to facilitate recreational access onto military lands. All persons (civilian and military) desiring to recreate on Army lands in Alaska must obtain a Recreational Access Permit and must use the USARTRAK system (per USAG-AK access policy effective 15 November 2004). USARTRAK is an automated access system that allows registered users (Recreation Access Permit holders) to telephonically access range opening data and to check in to areas open to recreation.

SD4.1.5.1 USARTRAK Objectives

The main objectives of USARTRAK are to:

- Increase public safety
- Reduce disturbance to military training
- Gather land use data for land management decisions

SD4.1.5.2 Background

The Sikes Act, as amended in November 1997, requires that every installation have an Integrated Natural Resources Management Plan and that each Integrated Natural Resources Management Plan must provide for public access to the military installation that is necessary or appropriate for sustainable use of natural resources by the public to the extent that such use is consistent with the military mission and the needs of fish and wildlife resources, subject to requirements necessary to ensure safety and military security.

In order to provide for and report on these requirements, a simple but reliable system of tracking recreational use by days and type of activity has been designed. The old access system involved getting an hunting, trapping and fishing permit from the post, usually the Military Police, the Morale, Welfare and Recreation office, or the Natural Resources office. This type of permit only allowed for the reporting of numbers of permits issued to users, but not total numbers of user days and type of activities. A call-in system was developed, but it did not meet the full intent of the program. The new system for access to military lands for recreational activities is designed to streamline both the reporting process for USAG-AK and the check-in process for the user.

USAG-AK no longer issues hunting, trapping and fishing permits. Instead, recreational users, including firewood cutters, will be issued a Recreational Access Permit. Current hunting, trapping, and fishing holders will not have to acquire a Recreation Access Permit. The new Recreation Access Permit permits will continue to be valid for all types of recreational access.

As always, recreational activities are permitted in the training areas as long as there are no conflicts with the military mission or training activities. This is for public safety, the safety of the troops, and to maintain the integrity of the military training experience.

SD4.1.5.3 Recreation Access Permit

- Obtain a Recreational Access Permit at the main gate 24 hrs.
- Good for two years from the date of issue.
- Good for recreational access USAG-AK wide (brochures explaining use of USARTRAK for Fort Wainwright/Donnelly Training Area and Fort Richardson are provided at time of Recreation Access Permit registration. Note, if you register on Fort Richardson, you will only be given information for Fort Richardson unless you specifically request brochures for Fort Wainwright/Donnelly Training Area as well).
- Must be carried on person.
- Free.
- Renew Recreation Access Permit every two years.

SD4.1.5.4 Steps involved in using USARTRAK:

When you call the USARTRAK phone line you will be given a series of prompts that will allow you to select the area you want, activity you will be engaged in, and provide you with information about training area closures.

Your post recreation access permit number and one of the local phone numbers is all you need to access this phone system.

The Fairbanks area number is 353-3181.
The Delta Junction number is 873-3181.
The Anchorage area number is 384-3181.

When you call the USARTRAK phone line you will be prompted through the system as follows:

- First you will hear the welcome message.
- You will be asked to enter your Recreation Access Permit number.
- Select the post you wish to enter (press 1, 2, or 3 for Fort Richardson, Fort Wainwright, or Donnelly Training Area).
- Select the activity from the list that most closely identifies the activity you will be engaged in that day. You will then hear the closures for that post for the week.
- You will be asked if you are cutting firewood or Christmas trees. If you select yes, you will be at the end of the check-in system.
- If you are not cutting firewood, you will next be asked to select which specific area you will be entering on that post. You will then be asked which major area of the installation you want to enter. For example, at Fort Wainwright, do you want to enter the Tanana Flats Training Area, the Yukon Training Area or the Fort Wainwright Main Post? The menu will prompt you for the number that corresponds to the area of choice. If you selected Fort Richardson in a previous menu, you will be asked to select two areas of choice.
- Each large training area of an installation is divided into smaller segments; for example, within the Tanana Flats Training Area there is the Wood River corridor, the Tanana River corridor, The Salchaket/Clear Creek corridor, Blair Lakes Area, Clear Creek Landing Strip or other.
- You will be asked to enter the number of consecutive days you will be in that location.
- You are now at the end of the menu and you are checked in to the system.

The USARTRAK phone system allows you to check into the installation and training area of your choice from home or your cell phone. You may check in up to 24 hours in advance. You may also check in from any location. For example, if you are in Fairbanks on Monday you may check into a training area at

Donnelly Training Area for Tuesday using the local phone number. You do not have to use the Donnelly Training Area number to check into Donnelly Training Area. Remember multiple permit numbers can be entered at the beginning for groups, and there is no check-out requirement, except at Fort Richardson.

SD4.2 Land Use Policy

Encroachment may be defined as legal activities and land use on or next to a military installation that are incompatible with long-term military mission sustainability and success. Building residences and subdivisions right alongside an installation boundary often results in conflicts with the public due to noise and dust. USAG-AK is committed to working with surrounding landowners to minimize these types of potential conflicts.

Over the last ten years, USAG-AK has been inundated with numerous requests and proposals from state, federal, and municipal government agencies, businesses, utilities, clubs, organizations, and individuals for authorization or permission to use Army lands on a long-term basis for nonmilitary purposes. Requests often have included commercial or long-term real estate interests involving rights-of-way, easements, land use permits, leases, outgrants, land transfers, exclusive use areas, and special concessions. This has been especially evident on Fort Richardson where some of the more notable of these include:

- A public snowmachine trail and corridor through Fort Richardson connecting Anchorage and Eagle River along the Glenn Highway.
- A new right-of-way for the Alaska Railroad through Fort Richardson from Anchorage to Birchwood.
- A real estate action to allow the Municipality of Anchorage to develop Clunie Lake on Fort Richardson into a float plane base.
- Transfer of approximately 30 acres of Fort Richardson land to the Anchorage School District for a middle school.
- Allow Bartlett High School to establish an official cross-country ski trail on Fort Richardson lands.
- Conduct commercial rafting operations on the Eagle River portion of Fort Richardson.
- Development of a destination resort, RV camping areas, horseback riding trails, Off-road recreational vehicle areas, and associated recreational activities in Fort Richardson's Arctic Valley.
- Use of Fort Richardson's protected waterfowl nesting areas for dog training by the Alaska Retriever Club.
- Siting of a Chugach Electric generation plant on Fort Richardson.
- Use of Fort Richardson lands by Ford Motor Company to test and advertise its vehicles.
- Use of Fort Richardson lands for establishment of an oyster farm adjacent to Eagle River.
- 300 acres of Fort Richardson training lands transferred to the Municipality of Anchorage for a landfill.
- 65 acres of Fort Richardson lands transferred to Cook Inlet Region, Inc.
- 65 acres of Fort Richardson lands transferred to Elmendorf Air Force Base for new hospital site.
- Port of Anchorage city bypass through Fort Richardson.

Present-day Fort Richardson, at roughly 61,000 acres, is a fraction of its original size (161,000 acres). The loss of all these training lands over the years, coupled with the fact that urban development now surrounds much of the installation has and continues to force this Command to greatly limit and constrain much of its training activities. Despite this, Fort Richardson still offers our combat Soldiers a valuable opportunity to train in a remarkable and varied environment. Its rugged beauty is also a key factor in enhancing our Soldiers’ and their families’ quality of life. Unique in both its natural resources and its geographic location next to Alaska's largest city, Fort Richardson rises from sea level to over 5,300 feet within a

distance of only 12 miles. Contained within its borders are all the ecosystems from maritime to alpine, and the diversity of plant and animal life that occur there.

As the populations of Anchorage and its satellite communities continue to grow and develop, it is anticipated that attempts to obtain or use portions of Fort Richardson for nonmilitary purposes will persist and probably increase. The term “military purpose” with regard to land use means programs, activities, and facilities necessary to accomplish the military mission and those support elements crucial to its implementation. Any additional long-term nonmilitary uses will create the potential for adverse impact on training and thereby threaten Fort Richardson's viability as a military installation. Besides the mission, USAG-AK is mandated by both law and common sense, through sound stewardship, to preserve the integrity and health of the environment. Only by doing this can the military be assured of maintaining the realistic backdrops and scenarios crucial to its training.

It is therefore the position of USAG-AK to generally deny requests for nonmilitary uses of Fort Richardson properties if those requests include or involve a requirement for long-term real estate commitments, such as leases, easements, or land transfers, or if they create a potential adverse impact on the military mission or the environment. The only exceptions to this will be when such actions clearly result in tangible benefits to the military training mission or to the environment. These situations will be carefully scrutinized and evaluated by appropriate staff. No longer is “good public relations” alone a justifiable reason to sacrifice limited and crucial training lands. It also is the position of USAG-AK to adopt a policy which favors temporary, non-commercial low impact uses of Fort Richardson by the local community, consistent with training and the military mission, as long as Fort Richardson natural resources will not be impacted adversely. Examples of some of these activities now in effect are:

- Use of the small arms ranges by the Alaska Rifle Club, Alaska State Troopers, Anchorage Police Department, Alaska State Park Rangers.
- Dog mushers, snowmachiners, and ATV riders in specified areas.
- Cross-country skiing.
- Firewood cutting.
- Iditarod sled dog race.
- Alaska Retriever Club dog trials.
- Special Olympics.
- Boating and rafting.
- Hunting and fishing.
- Boy Scouts, Girl Scouts, and Cub Scouts.
- Youth programs such as Campfire.
- Iron Dog Snowmachine Race.
- Wildlife Museum, open to the public.
- Use of Otter Lake and Cottonwood Park by the public.
- Youth Corps and High School JROTC training.

This Integrated Natural Resources Management Plan will serve as the Command's guideline and directive for administering and managing natural resources on Fort Richardson lands and waters. It is implemented by both the USAG-AK Conservation and Integrated Training Area Management programs, primarily through the Public Works Environmental Resources Division and the Directorate of Plans, Training, Security and Mobilization. It will be consulted and used for every decision and action that affects or has a potential to impact Fort Richardson's lands, waters, and other natural resources.

SD4.3 Timber Policy

Army Regulation 200-3, *Natural Resources - Land, Forest, and Wildlife Management* (28 February 1995), Chapter 5, Forest Management, Section 5-2, Timber Management, b. Harvesting actions, (2) Disposal action, (d) states,

"Commercial forest products will not be given away, abandoned, carelessly destroyed, used to offset costs of contracts, or traded for products, supplies, or services. All forest products are to be accounted for and commercial harvests completed prior to the start of any construction that may impact forest resources. When forest products are removed from Army lands by any means other than a commercial timber sale, a dollar amount equal to the fair market value is to be deposited to Budget Clearing Account 21F3875.3960 20-C S99999 for products removed."

USAG-AK policy on forest products use, as stated in the USAG-AK Integrated Natural Resources Management Plan 07-11, is as follows. Timber utilization procedures depend on vegetation rights management authority. The first step in this process is to determine management authority of the vegetation rights. The Environmental Resources Department should be contacted with a map of the proposed area to be cleared. The Environmental Resources Department will consult Geographic Information System overlays depicting vegetation rights management authority. Three vegetation rights land management authority categories exist on USAG-AK lands: withdrawn lands for military use from public domain where vegetation rights are managed by the Bureau of Land Management (BLM), withdrawn lands for military use from public domain where vegetation rights are managed by USAG-AK, and fee simple lands purchased by the Army where vegetation rights are managed by USAG-AK. Under applicable withdrawal legislation for the Tanana Flats Training Area, Yukon Training Area, Donnelly Training Area East and West, and Public Land Orders 2622 and 2676, the United States Department of the Interior, BLM retains vegetation rights. Any vegetation manipulation by USAG-AK is done in cooperation with BLM. BLM and USAG-AK timber management practices and contract stipulations govern timber sales from these lands. The withdrawals for the Main Post training areas of Fort Wainwright and Fort Greely, Dyke Army Range, Charlie and Bravo Batteries, Gerstle River Test Site, Whistler Creek Rock Climbing Area, homestead sites purchased fee simple, and lands withdrawn under Public Land Orders 2768, 3922, 1153, 1503, and 4161 (Fort Richardson PLO) do not indicate any vegetative management responsibilities for BLM and therefore any sale of timber would be processed through the Army's forest management system. On lands the Army has vegetation rights, any sale of timber would be processed through the Army's forest management system. Future timber harvest activities would be for military mission support and harvest levels are not expected to dramatically increase from past levels.

After vegetation rights management authority has been determined, the next step is timber value determination. Environmental Resources Department forestry staff will conduct a site visit and possible timber cruise to determine species composition, size class distribution, and volume. In general, if the site contains birch, spruce, or aspen over 4 inches in diameter at breast height, the timber has value. If the vegetation rights management authority belongs to BLM, Environmental Resources Department forestry staff will consult the designated BLM forestry representative. The BLM forestry representative and Environmental Resources Department forestry staff will agree upon value of the timber and determine utilization procedures. BLM policy is to always utilize timber. If the timber being removed is of significant value and a commercial operator is interested in purchasing the material, a timber sale will be conducted. If more than one commercial operator expresses interest in purchasing the timber, BLM will advertise the sale, accept bids to purchase the timber, and award the timber sale to the highest bidder. If only one operator expresses interest in purchasing the timber, BLM will sell the timber at salvage value. If no commercial operator expresses interest in purchasing the timber, BLM requires the usable timber to be stockpiled in a location where the public has access to it. This timber will then be disposed of through the firewood program. All people collecting the firewood are required to obtain BLM and USAG-AK firewood and Recreational Access Permits. If the vegetation rights management authority belongs to

USAG-AK, Environmental Resources Department forestry staff will determine value of the timber and determine utilization procedures. Army policy requires utilization of timber (AR200-3). If the timber being removed is of significant value and a commercial operator is interested in purchasing the material, a timber sale will be conducted. Timber sales conducted by USAG-AK follow procedures outlined in the Army's Timber Sale Policy Guidance (2002). If more than one commercial operator expresses interest in purchasing the timber, USAG-AK will advertise the sale, accept bids to purchase the timber, and award the timber sale to the highest bidder. If only one operator expresses interest in purchasing the timber, USAG-AK will sell the timber at base value set by the State of Alaska Division of Forestry. If no commercial operator expresses interest in purchasing the timber, the usable material will be stockpiled in a location where the public has access to it. This timber will be disposed of through the firewood program. All people collecting the firewood are required to obtain USAG-AK firewood and Recreational Access Permits.

Areas to be cleared should be brought to the attention of the Environmental Resources Department as soon as possible. Timber sales can take up to one year from the advertising process to the final removal of the timber. If timber sale operators are not interested in working the site to be cleared, the area can be opened to firewood cutters. Firewood cutters generally will not remove all usable material from a site, but the longer they have to work a site the more material will be removed. Opening sites early to timber sale operators and firewood cutters can be used to clear the land and reduce the cost of construction. If adequate time is not available to conduct a timber sale or allow for firewood cutters to work a site, the usable timber should be stockpiled in an area where timber sale contractors or the public have access to the material.

Additional stipulations for timber sales and firewood cutting areas include the following procedures. All forest harvesting actions must be coordinated with the Environmental Resources Department forestry staff prior to action. Public use of forest products requires a permit from the Environmental Resources Department forestry staff prior to removal of timber from the installation. Mechanical clearing techniques must be coordinated with the Environmental Resources Department forestry staff prior to action. Hand clearing techniques should be used to preclude erosion or when conducting harvesting activities in wetlands, when possible. Timber harvest activity is not allowed within 50 feet immediately adjacent to an anadromous stream or high value resident fish water body. Within the next 50 feet, a 50% minimum retention of trees must occur. Permits are required for the vehicular crossing of anadromous and resident fish streams. Trees with a diameter-breast-height of less than 4 inches may be cut without prior approval. Trees with a diameter at breast height of less than 4 inches; slash; and other debris may be distributed into adjacent upland areas, piled for burning, hauled away, or chipped and distributed into adjacent upland areas. Specific disposal methods will be determined by the Environmental Resources Department forestry staff prior to action. If spruce logs are not immediately removed from the site, the following special precaution must be taken. All spruce logs greater than 4 inch diameter at breast height must be scored the length of the log with a chainsaw to a ½ depth so as to cause drying of the phloem to prevent bark and ips beetle infestations in nearby healthy trees. Trees with a diameter at breast height of more than 4 inches should be salvaged for public use up to a 4 inch top. Trees with a diameter at breast height of more than 4 inches should be stacked separately from smaller diameter trees. All stumps should be cut within 6 inches or less of the ground surface. Spruce boughs are only to be collected from trees sized less than 4 inches diameter at breast height for troop training. All large-scale harvest activities must be coordinated with the Environmental Resources Department forestry staff to ensure other miscellaneous harvest requirements are met prior to action.

SD4.4 Off-Road Recreational Vehicle Policy

Off-road recreational vehicles are used in association with many activities in the Alaskan Interior. All-terrain vehicles which are three or four wheel recreation vehicles, snowmachines, dirt bikes, four-wheel-

drive trucks, swamp buggies, and civilian use small unit support vehicles are all considered off-road recreational vehicles. These vehicles are used to access hunting, fishing, and trapping areas, for recreational riding and for other activities.

SD4.4.1 Objectives

Manage off-road recreational vehicle use on USAG-AK lands consistent with protection of natural resources, the needs of the military mission, and the provision of high quality outdoor recreation opportunities.

SD4.4.2 Definitions

Off-road recreational vehicles include snowmachines, dirt bikes, three and four-wheelers, and four-wheel-drive vehicles. Off-road recreational vehicles are used in association with many activities in the Alaskan Interior. All-terrain vehicles, snowmachines, dirt bikes, four-wheel-drive trucks and airboats are all considered off-road recreational vehicles.

Motorized watercraft include all boats with some type of motor attached, which also includes jetboats, riverboats, and airboats. These vehicles are primarily used to access hunting, fishing, and trapping areas, for recreational riding and for other activities.

SD4.4.3 Off-Road Recreational Vehicle Management Areas

All land and water areas will be closed to off-road recreational use by motorized off-road recreational vehicles except those areas and trails that are determined suitable and specifically designated for such under the procedures established in this Integrated Natural Resources Management Plan. In determining suitability of areas and trails for off-road recreational vehicle use, each type of motorized off-road recreational vehicle will be considered separately, taking into account its potential environmental impact, the seasonal nature of its use and opportunities for counter-seasonal use with other recreational uses.

USAG-AK is managed for a number of different types of public recreational use. All areas that are determined open for recreational use may be closed temporarily during periods of military use. All users must daily check in through USARTRAK to determine if areas are open to recreational use. USAG-AK uses the following classification system to describe recreation areas on the installation.

> ***Open Use Area*:** Open to all types of off-road recreational vehicles. Open to all other recreational activities year-round.
>
> > *Frozen* (6+ inches of snowcover): No restrictions for any off-road recreational vehicles when soil is frozen.
> >
> > *Unfrozen summer conditions:* During unfrozen conditions, off-road recreational vehicles over 1,500 lbs (road vehicles, dune buggies, Argos, Small unit support vehicles etc.) must stay on existing roads and trails. No restrictions for off-road recreational vehicles under 1,500 lbs (ATVs, snowmachines, dirt bikes etc.). Motorized watercraft must stay within existing open water channels.
>
> ***Modified Use Area***: Open to all types of off-road recreational vehicles. No restrictions for any off-road recreational vehicles when soil is frozen. All off-road recreational vehicles must stay on existing roads and trails during the summer. Motorized watercraft must stay within existing open water channels. Open to all other recreational activities year-round.

Limited Use Area: Open to all non-motorized recreation (hunting, fishing, trapping, hiking, skiing, and berry picking) year-round but are not open to any type of off-road recreational vehicle at any time. Motorized watercraft must stay within existing open water channels.

Special Use Management Area: An area managed for recreational use under specific rules that apply only to that area (i.e., Tanana Flats Training Area Airboat Special Use Management Area).

Closed Area: Closed to all recreational activities year-round. Closed areas include but are not limited to airfields, tank farm, landfill, small arms ranges, impact areas, ammunition storage point, etc.

USAG-AK Regulation 200-3 (Appendix D), and the Fort Wainwright, Donnelly Training Area, and Fort Richardson Supplements, address areas open and closed to off-road recreational vehicle use on USAG-AK lands. Use of privately owned off-road recreational vehicles on post is allowed on a limited basis. The Fort Greely Resource Management Plan restricts off-road recreational vehicles along the Trans-Alaska Pipeline System work pad used for maintenance along its line without permission of Alyeska Pipeline Service Company.

SE OUTREACH

SE1 Introduction

Outreach includes briefings, presentations, training, educational media, programs and driving tours.

SE2 Briefings, Presentations, and Training

SE2.1 Newcomer Briefings

The Newcomer's Orientation is a day-long briefing designed to minimize the disruption associated with transition, advise new arrivals on Command policy, procedures, and force protection issues and offer education on the realities of living in the Arctic. Soldiers and their families are welcomed by the various commanders, and members of the military and civilian community present on a wide array of topics to include but not limited to: voter registration, recreation opportunities, force protection, fire protection, chaplain services, job and volunteer opportunities, Red Cross services, native cultural awareness, and health issues. This is key training to the force protection program and newly deployed Soldiers undergo this training within 20 days of arrival.

Directorate of Public Works Conservation personnel participate in these orientations, addressing subjects such as nuisance wildlife and outdoor recreation. Troops are briefed as to the type of wildlife they may encounter on post and throughout south-central or interior Alaska. Although they are encouraged to enjoy fishing, hunting and general wildlife viewing, it is understood that many of the troops are new to Alaska and do not necessarily understand the dangers of large animals, specifically bear and moose. These dangers are emphasized during the briefing, and recommendations and techniques are given for avoiding these dangers.

SE2.2 Range Safety Briefing

"The purpose of the monthly range and training area coordination meeting is to enhance unit training. This is accomplished by detecting and eliminating scheduling conflicts and ensuring training needs are met." (Range Control). The primary objective of the Integrated Training Area Management section of the range conference is for Integrated Training Area Management personnel to discuss, with Army and Air Force Soldiers, different seasonal and current issues from the Integrated Training Area Management, Environmental, and Conservation departments that relates to their training and training needs. Approximately five minutes is allocated for this briefing. Integrated Training Area Management personnel shall develop Power Point presentations for each month of the year and gear it towards its particular season and weather conditions. Each month's presentations are altered to include new Integrated Training Area Management, environmental, and conservation issues that may have come up during the previous month. Fort Richardson's and Fort Wainwright monthly training resource scheduling conferences are conducted on the third Monday of each month at 1330.

SE2.3 Training

USAG-AK military land user education is accomplished primarily through the Sustainable Range Awareness component of the Integrated Training Area Management program. Sustainable Range Awareness gets its message out by creating handbooks, brochures, instructional video's and Soldier field cards. Sustainable Range Awareness can also be accomplished by regular Soldier briefings, range briefings or environmental training at individual units. Focus on impacts as a result of training and how to mitigate impacts when developing land use education programs for Soldiers.

SE3 Educational Media

SE3.1 Environmental Newsletter

Success of the USAG-AK conservation program depends on public involvement. The conservation newsletter is an official USAG-AK publication intended to communicate information to the public about trends, events, and policies related to conservation. The newsletter will also inform the public about meetings and it will remind people about the availability of documents on the USAG-AK conservation website. Submission deadlines for subsequent newsletter articles will be included with each issue, which are typically published two times per year. Submission information will also be published on the USAG-AK conservation website. Articles appearing in the newsletter may be reproduced or shared, unless they are copyrighted.

SE3.2 Handbooks, Brochures, Field Cards

Sustainable Range Awareness items should be developed when funding is available. Materials should be developed that educate land users on how their activities impact the environment and how to mitigate those impacts. Soldiers should also be motivated to read the materials. Soldiers are inundated with "informational brochures" that often end up being thrown out. Soldiers should get something out of reading these materials such as training value, geographical information, or recreational information. Consider developing items that fulfill a dual purpose of environmental education and training. Instructional videos are another way to educate land users on impacts associated with military training. Videos should describe the training environment in Alaska, discuss common seasonal hazards and identify areas to avoid. Also Sustainable Range Awareness items can be developed that simply advertise the Integrated Training Area Management program. Some Soldiers may not know what Integrated Training Area Management is and how they can benefit from it. Items such as calendars with the

Integrated Training Area Management logo and pictures of training or aesthetic landscapes can make more Soldiers aware of the Integrated Training Area Management program.

SE3.3 Species Checklists

Purpose – establish protocol for creating and maintaining species checklists.

Points of contact are the Natural Resources technicians and Range and Training Land Assessment Coordinators at each post.

Checklists for use by the public will be generated from these lists. The most popular by far of these types of lists are bird checklists. A bird checklist brochure has been created for Fort Richardson, "Bird Checklist – Anchorage Area Military Reservations." Bird checklist brochures should also be created for Fort Wainwright and Donnelly Training Area using a standard format. Other lists may be created depending on interest from the public.

SE4 Programs

SE4.1 FireWise Program

The FireWise Program was established nationwide to convey information to private home owners on how to protect their property from wildfires. The FireWise Program mainly focuses on the urban/wildland interface, both on Army lands and on adjacent property owners. USAG-AK has adopted the FireWise principles to evaluate and protect range structures and cantonment area buildings. USAG-AK has also implemented the FireWise Program to inform adjacent landowners on how to protect their property from the risk of wildfire. USAG-AK's FireWise Program strives to reduce wildfire starts on adjacent property which then have the potential of spreading onto to Army lands, damaging valuable training areas. USAG-AK also implements an aggressive hazard fuel reduction program to reduce the threat of wildfires starting on Army lands and spreading to adjacent landowners. Adjacent lands ownership is updated annual by going through state and borough land ownership records. The records are added to a Geographic Information System database with attributes relating to owner, contact information, and structures present. Wildfire fuel hazard assessments for structures are performed to stands set by the FireWise Program (Firewise 2002). All vegetation should be actively managed to reduce fire risk within 30 feet of a structure. Trees should be pruned and spaced at least 10 feet apart out to 100 feet from a structure. Standard assessment forms are used to survey structures. The forms were developed by the Bureau of Land Management, Alaska Fire Service and look at vegetation, building material, location and hazardous material storage. Fuel assessments at a landscape scale look at vegetation flammability, weather, historical fire patterns, fire behavior and proximity to values at risk. Areas with continuous black spruce leading to high value locations receive the highest concern.

SE4.2 Green Star Program

The following components have been adopted for the USAG-AK Green Star Program, and continuation of these should be encouraged and supported.
1. The Commanding General has charged all U.S. Army personnel, both military and civilian, to actively participate in protection of the environment/environmental stewardship.
2. Green Star issues are discussed in the quarterly Environmental Quality Control Committee meetings.
3. The Pollution Prevention/Waste Minimization Plan is in place and documents are on file in the Environmental Office, and can be reviewed if requested.
4. Training opportunities and participation are given in the following areas

a) Hazardous Communication
b) 8-hour Hazardous Waste Handlers Course
c) 24-hour Hazardous Waste Subject Matter Expert Course
d) 24-hour Hazardous Waste Operations and Emergency Response (HAZWOPER)

5. Information is distributed via the Pollution Prevention Newsletter and the post weekly newspaper, the *Alaska Post*. This paper reaches approximately 8,000 soldiers and family members.
6. USAG-AK is actively involved in meeting environmental standards set by the Army.
7. Paper consumption has been reduced due to the following
   a) Electronic mail or e-mail throughout post to reduce paper flow.
   b) Staff meetings are encouraged to use view multi-media presentations instead of giving out paper.
8. Printers/copiers are energy saving and shut down when not in use after several minutes.
9. Units only order what they need, no more stockpiles of materials.
10. Purchase recycled/reusable material for the office and or unit.
11. Use of ceramic coffee cups, bowls, plates, and silverware, instead of Styrofoam and/or plastic in encouraged.
12. Florescent light tubes have been changed out to a lower wattage and a more pleasant lighting.
13. The Fort Wainwright Environmental Division participates in the Adopt-a-Highway Program.
    a) Consider implementing this at Fort Richardson if an appropriate section of highway becomes available.
14. Recycle aluminum cans.
    a) Consider implementing additional recycling if and when technologies and feasibilities allow. Revisit the issue every five years.

SE5 Driving Tours

SE5.1 Viewing Platforms

Purpose – establish protocol for maintaining viewing platforms.

Points of contacts are the Natural Resources technicians at each post.

Viewing platforms have been installed at various locations throughout USAG-AK. These are generally wooden platforms with rails and National Parks-style exhibit bases. Some free-standing exhibit bases have also been installed. Interpretive panels were developed and installed in the exhibit bases.

Develop a comprehensive list of platforms and interpretive panels at each post. Annually inspect platforms for needed repairs and submit appropriate work orders. Inspect interpretive panels for bullet holes of other damage and replace. Develop new interpretive panels to exchange with existing panels and possibly begin an exchange rotation of every three to five years.

SE5.2 Educational Kiosks

The positioning of 27 educational kiosks on Fort Wainwright, Fort Richardson and Donnelly Training Areas is instrumental to the Army's goals to provide education, awareness and public outreach opportunities to military members and the community. Kiosks, placed in high traffic areas, are universally a sound way to deliver important area specific information. Educational kiosks will be a public platform to deliver a variety of information covering recreational permits, USARTRAK, range closures and safety issues as well as cultural and natural resources information. The kiosks can also solicit survey information relating to a variety of outdoor recreation and natural resource management issues.

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P. ECOSYSTEM MANAGEMENT PRESCRIPTIONS

P1. Introduction

The objective of these Prescriptions is to provide an operational component to this Integrated Natural Resources Management Plan (INRMP), by taking all of the information that has been captured in previous sections of the plan and integrating the information. The intent of this format is to manage installation natural resources by ecosystem management units and sub-units. U.S. Army Garrison Alaska (USAG-AK) has been broken down into ecosystem management areas that could be represented by maneuver areas, ranges, training areas, watersheds, geographic areas, habitat types, etc. Each ecosystem management unit integrates goals and objectives for natural resources and training.

This ecosystem management appendix is organized by ecosystem management units. For each ecosystem management unit, a detailed description of the environment is followed by a description of each ecological management sub-unit. That description includes military use, natural resources management policy, public access policy, outdoor recreation policy, and subsistence policy applicable to each specific sub-unit. The prescription section lays out goals and objectives for each sub-unit, integrates those objectives, and discusses management tools to be used to accomplish those objectives.

P1.1 USAG-AK Land Management Units

P1.1.1 Military Training Areas

USAG-AK organizes, schedules, and manages training through the use of training area boundaries. Fort Richardson and Fort Wainwright are broken down into a number of smaller training areas.

P1.1.2 Ecological Management Units

Ecological management units in USAG-AK have been created to integrate fish, wildlife, and plant management with military and other land uses. Each ecological management unit will have a management prescription that will define compatible uses, prioritize those uses, define allowable public access, and delineate ecosystem management objectives. Prioritizing land uses for each management unit guides conflict resolution.

Ecological management units follow roughly the boundaries of the ecodistricts cited in the ecological land classification for Fort Wainwright and Fort Richardson (ABR 1998). Ecological management sub-units closely follow training area boundaries to allow more effective management, since the primary land use, military training, is scheduled by training area.

Ecosystem management units include Fort Wainwright Main Post, Tanana Flats Training Area, Yukon Training Area, Donnelly Training Area, Gerstle River Training Area, Black Rapids and Whistler Creek Training Area, and Fort Richardson Training Area. Although not specifically broken out separately in this appendix, this plan covers all Army lands in Alaska, to include but not limited to: Seward Recreation Camp, Eklutna Mountain Training Site, Eklutna Dispersal Site, Davis Range Buffer Site, Knik Glacier Training Site, Gulkana Glacier Training Site, Gakona Convoy Rest Site, Haines Terminal, Tok Terminal and Haines-Fairbanks Pipeline.

P1.2 Environment

Physical resources, biological resources, and cultural resources are described in detail below for each ecological management unit.

P2. Description and Policy

P2.1 Military Use

Military land use can be separated into two broad groups: urban areas and training areas. Urban areas include most of the developed areas on an installation. Training areas also can be separated into two broad categories – maneuver training and weapons training. Maneuver training is conducted primarily in training areas. A training area is space for ground and air combat forces to practice movements and tactics as specified in the unit's Army Training and Evaluation Program. Different unit types may work in support of one another (combined arms), or the unit may operate on its own to practice a specific set of Army Training and Evaluation Program tasks. Included in these areas are bivouac sites, base camps, drop zones, artillery and mortar firing points, and other miscellaneous training areas. Each training area is managed and scheduled by Range Control. Weapons training also has land-based requirements. Weapons training occurs primarily on firing ranges, and munitions from firing ranges land in surface danger zones or impact areas. Descriptions for each military land use category are listed in Table P-1.

Table P-1. Military Land Use.

General Land Use Type	Primary Military Land Use Category	Secondary Military Land Use Category	Description
Urban Areas	Cantonment Area		The area where most of the buildings are located, including buildings for office use, indoor training facilities and housing for Soldiers and their families.
	Recreation Areas		Areas are designated as recreation areas when recreation use is the primary land use. Examples include Glass Park Recreation Area and the Chena Bend Golf Course.
	Ammunition Storage		Ammunition storage areas are off-limits areas where ammunition is stored. These areas are typically fenced off and are not compatible with other land uses.
Training Areas	Weapons Training	Firing Ranges	Ranges are semi-permanent or permanent facilities for weapons firing, demolition, assault courses, or other specific training, usually with associated buildings or berms. This includes firing ranges, assault courses, urban assault areas, etc. Firing ranges are areas, which are controlled and restricted for firing live ammunition from direct fire or line-of-sight weapons systems at targets within a controlled area. Typically, a range has left and right boundaries, which extend from the firing line forward to just past the last target array. Training ranges are normally reserved and equipped for practice and qualification in weapons delivery and/or shooting at targets. Further, training ranges constitute a functional complex that normally includes a Range Control tower with associated firing points, lanes or pits, a cleared or graded area, target system emplacements, and a firing flag and flagpole, in addition to equipment-in-place such as target control systems, target systems, targets and fixed PA system components. A range could include an area for back blast safety zones, which can have a secondary use as non-dudded impact area or maneuver area.

General Land Use Type	Primary Military Land Use Category	Secondary Military Land Use Category	Description
		Non-Dudded Impact Areas	A surface danger zone or a non-dudded impact area is an area that has designated boundaries within which ordnance that does not produce duds will impact. This area is composed mostly of the safety fans for small arms ranges. The primary function of the impact area is to contain weapons effects as much as possible using earthen berms or natural terrain features. These impact areas may be used for maneuver, at the cost of curtailing use of weapons ranges.
		Dudded Impact Areas	A dudded or high intensity impact area is an area having designated boundaries within which all potential dud-producing ordnance will detonate or impact. Vehicle bodies are sometimes placed in the area to act as targets for artillery direct and indirect fire. The primary function of the impact area is to contain weapons effects as much as possible using earthen berms or natural terrain features. Impact areas containing potential unexploded ordnance may not be used for maneuver.
	Maneuver Training Areas	Maneuver Areas	Maneuver areas generally are open to semi-open areas where vehicles can move without running into obstacles such as trees, range buildings, streams, wetlands, lakes, etc. Military activities that occur in maneuver areas include conducting offensive operations, conducting tactical movement, movement to contact, relocating a unit to a new site, defending assigned area, relocating/establishing new area of operations, trail construction, mobility and counter mobility operations, reducing obstacles with equipment, and constructing obstacles with equipment.
		Bivouac Areas	Bivouac areas are areas where units stop together for a period of time. Most often, bivouac areas are semi-open to semi-closed areas where the units “camp out.” Activities conducted in bivouac areas are assembly area operations, combat service support operations, and unit security and defense operations.
		Foot Use Areas	Foot use areas are areas that show little or no impacts from military use. Units are on foot and are conducting movement to contact and land navigation.
		Drop Zones	Drop zones or landing zones are cleared areas used for dropping troops and equipment that are maintained by mowing and hydro axing. These areas should have vegetation, but are probably highly disturbed. Military activities include airborne assault, air assault in support of combined arms, aeromedical evacuation, and landing zones for rotary wing aircraft.
		Firing Points	Firing points are localized areas from which either artillery or mortars are fired. These areas are often open areas with high vegetation disturbance. Firing points are sometimes also designated by survey markers.
		Airstrips	Airstrips and assault strips are semi-permanent or permanent facilities for aircraft landing and taking off that are not paved or part of an urban area.
		Road Corridors	Road corridors are defined as semi-permanent or permanent access ways (including ditches and the open right-of-way on each side of the road), which are improved, semi-improved or receive some type of maintenance.

General Land Use Type	Primary Military Land Use Category	Secondary Military Land Use Category	Description
		Rights-of-Way	Rights-of-way are any areas used for utility or pipelines (electric, gas, or communication). Areas bordering either side of improved roads are part of the road corridor and are not considered a separate right-of-way polygon in this case.
		Excavations	Excavations are gravel pits or military engineer training areas and similar types of areas that show signs of digging, either manual or mechanical.

P2.2 Access

Public access onto USAG-AK lands is allowed (subject to safety restrictions and military security) when access does not impair the military mission, as determined by the installation commander. Access is controlled through the USARTRAK call-in system. USARTRAK permits users to check in to certain areas if those areas are not closed for military training in compliance with USAG-AK regulations. The amount of permanent limitations and restrictions on public access in any given area within USAG-AK lands depends on the type of military land use. Military land use can be broken down into four general categories that affect access.

P2.2.1 Training Areas and Non-firing Facilities

Public access into training areas is allowed (subject to safety restrictions and military security) when access does not impair the military mission, as determined by the installation commander. Compatible uses generally include natural resource management, habitat improvement, mineral or vegetative resource extraction, hunting, fishing, trapping, bird watching, hiking, skiing, sledding, dog mushing, and off-road recreational vehicle use. In general, activities that are not compatible with training areas include any permanent non-military structures, easements, or leases.

P2.2.2 Firing Ranges and Surface Danger Zones

Public access into firing ranges and surface danger zones is normally not allowed due to conflicts with the military mission. However, there are times during the year when public use does not conflict with military training and public access is allowed into these areas. Compatible uses generally include natural resource monitoring, range maintenance, fire prevention and suppression, hunting, fishing, and trapping. In general, activities that are not compatible with firing ranges and surface danger zones include any permanent non-military structures, easements, or leases.

P2.2.3 High Hazard Impact Areas

Public access into high hazard impact areas is prohibited because of the hazard of unexploded ordnance. Compatible uses include remote monitoring of natural resources and military impacts, and prescribed burning to reduce fire hazards and improve habitat. Activities that are not compatible with dudded impact areas include any ground-based natural resources management, any digging whatsoever, mineral extraction, commercial timber sales, hunting, fishing, trapping, bird watching, off-road recreational vehicles of any kind, dog mushing, airboats, camping, new construction, easements, and leases.

P2.2.4 Urban Areas

Public access into urban areas is allowed subject to safety restrictions and military security, when access does not impair the military mission, as determined by the installation commander. Compatible uses generally include natural resource management, habitat improvement, mineral or vegetative resource extraction, bird watching, fishing, hiking, skiing, and sledding. In general, activities that are not compatible with urban areas are hunting and trapping.

P2.3 Natural Resources Management

Natural resources management categories are shown in Table P-2 and described in detail in the following sub-sections.

Table P-2. Ecosystem Management Prescription Categories

Natural Resources Management Priorities	Fire Suppression Categories	Vegetation Management	Hunting, Trapping, Fishing	Recreational Use Management
• Intensive • Full • Modified • Limited	• Critical • Full • Modified • Limited	• Army • BLM	• Open • Closed	• Open • Modified • Limited • Closed

P2.3.1 Natural Resources Management Priorities

Each ecological management unit will be managed under one or more natural resource management levels described below:

Intensive Management. Intensive management areas are sub-units that are highly populated, receive high levels of use and are easily accessible by road. All forms of surveys, monitoring, and active management of land, forest, fish and wildlife, and recreation resources may be conducted.

Full Management. Full management areas are sub-units that receive use and are accessible by road. All forms of surveys, monitoring, and active management of land, forest, fish and wildlife, and recreation resources may be conducted with exception of intensive urban area management options.

Modified Management. Modified management areas are sub-units that receive use, are not accessible by road, but are open to public access. All forms of surveys, monitoring, and active management of land, forest, fish and wildlife, and recreation resources may be conducted, but may not be practical.

Limited Management. Limited management areas are sub-units where public access is prohibited. Methods of ecosystem management will concentrate on remote monitoring and passive means of conducting management.

P2.3.2 Fire Suppression Categories

Fire suppression priorities are grouped into four categories: Critical, Full, Modified, and Limited. Summaries of each category (from Anonymous 1982) are presented below.

Critical Management Option. Areas receive maximum detection coverage and are highest priorities for attack response. Immediate and aggressive initial attack is provided. Land owners/managers are notified of the situation as soon as possible. Critical management areas receive priority over adjacent lands and resources in the event of escaped fires.

Full Management Option. Areas receive maximum detection coverage and receive immediate and aggressive initial attack responses. If the initial attack response is successful or the fire is otherwise controlled within the first burning period, special agency notification is not required. When fires escape initial attack and require additional suppression, affected land owners/managers are notified to develop further fire strategy.

Modified Management Option. This option provides a management level between Full and Limited. The intent is to provide a relatively high degree of protection during periods of increased fire danger, but a lower level of protection when risks of fires are diminished. Modified areas receive maximum detection coverage. Initial attack action, or non-action, is based on a standardized evaluation date determined by the Alaska Interagency Wildland Fire Coordination Group. Unmanned fires are monitored.

Limited Management Option. This option recognizes areas where natural fire is important or the values at risk do not warrant the expense of suppression. Limited management areas receive routine detection effort. Attack response is based on needs to keep the fire within Limited management areas and to protect individual Critical management sites within Limited management areas. Land owners/managers are immediately notified of fires detected. Unmanned fires are monitored.

There are two other special categories on Army lands in Alaska. Unplanned areas are those lands that the land manager/owner has opted out of the Alaska Interagency Wildland Fire Management Plan. These lands are usually treated as Full. For suppression direction, the land manager needs to be contacted. Restricted or Hot Zone is a category used for impact areas and other places where no on-the-ground fire fighting occurs. Fires can still be suppressed in Restricted Areas, but suppression is through back burning or aerial-dropped retardant.

P2.3.3 Forestry and Vegetation Management

Timber utilization procedures depend on vegetation rights management authority. Three vegetation rights land management authority categories exist on USAG-AK lands: withdrawn lands for military use from public domain where vegetation rights are managed by the Bureau of Land Management, withdrawn lands for military use from public domain where vegetation rights are managed by USAG-AK, and fee simple lands purchased by the Army where vegetation rights are managed by USAG-AK. Under applicable withdrawal legislation for the Tanana Flats Training Area, Yukon Training Area, Donnelly Training Area East and West, and through Public Land Orders 2622 and 2676, the United States Department of the Interior, Bureau of Land Management retains vegetation rights. Any vegetation manipulation by USAG-AK is done in cooperation with Bureau of Land Management (BLM). BLM and USAG-AK timber management practices and contract stipulations govern timber sales from these lands. The withdrawals for the Main Post training areas of Fort Wainwright and Fort Greely, Dyke Army Range, Charlie and Bravo Batteries, Gerstle River Test Site, Whistler Creek Rock Climbing Area, homestead sites purchased fee simple, and lands withdrawn under Public Land Orders 2768, 3922, 1153, 1503, and 4161 (Fort Richardson Public Land Order) do not indicate any vegetative management responsibilities for BLM and therefore any sale of timber would be processed through the Army's forest management system. On lands the Army has vegetation rights, any sale of timber would be processed through the Army's forest management system. Future timber harvest activities would be for military mission support and harvest levels are not expected to dramatically increase from past levels.

P2.3.4 Outdoor Recreation Management

Hunting, Trapping, and Fishing Areas

In each ecosystem management unit, areas are either open or closed to hunting, trapping, or fishing depending on season.

Off-Road Recreational Vehicle Management Areas

USAG-AK Regulation 190-13 (Appendix D), and the Fort Wainwright, Donnelly Training Area, and Fort Richardson Supplements, address areas open and closed to off-road recreational vehicle use on USAG-AK lands. Use of privately owned off-road recreational vehicles on post is allowed on a limited basis. All land and water areas will be closed to off-road recreational use by motorized off-road recreational vehicles except those areas and trails which are determined suitable and specifically designated for such under the procedures established in this Integrated Natural Resources Management Plan. All areas that are determined open for recreational use may be closed temporarily during periods of military use. All users must daily check in through USARTRAK to determine if areas are open to recreational use. USAG-AK uses the following classification system to describe recreation areas on the installation.

> ***Open Use Area*:** Open to all types of off-road recreational vehicles. Open to all other recreational activities year-round.
>
> > *Frozen* (6+ inches of snow cover)**:** No restrictions for any off-road recreational vehicles when soil is frozen.
> >
> > *Unfrozen summer conditions:* During unfrozen conditions, off-road recreational vehicles over 1500 lbs (road vehicles, dune buggies, Argos, small unit support vehicles etc.) must stay on existing roads and trails. No restrictions for off-road recreational vehicles under 1500 lbs (ATVs, snowmachines, dirt bikes etc.). Motorized watercraft must stay within existing open water channels.
>
> ***Modified Use Area***: Open to all types of off-road recreational vehicles. No restrictions for any off-road recreational vehicles when soil is frozen. All off-road recreational vehicles must stay on existing roads and trails during the summer. Motorized watercraft must stay within existing open water channels. Open to all other recreational activities year-round.
>
> ***Limited Use Area***: Open to all non-motorized recreation (hunting, fishing, trapping, hiking, skiing, and berry picking) year-round but are not open to any type of off-road recreational vehicle at any time. Motorized watercraft must stay within existing open water channels.
>
> ***Special Use Management Area***: An area managed for recreational use under specific rules that apply only to that area.
>
> ***Closed Area***: Closed to all recreational activities year-round. Airfields, tank farm, landfill, small arms ranges, impact areas, ammunition storage point.

The Fort Greely Resource Management Plan restricts off-road recreational vehicles along the Trans-Alaska Pipeline System work pad used for maintenance along its line without permission of Alyeska Pipeline Service Company.

P2.3.5 Subsistence

There are no federally designated or state recognized subsistence areas on USAG-AK lands. However, it is acknowledged that either federal or state subsistence users may conduct subsistence activities on USAG-AK lands even though no federal or state subsistence priority exists for these users. All recreation and subsistence users must comply with existing state, federal, and USAG-AK regulations for access and use on USAG-AK lands.

P3. Prescriptions

The **Prescriptions** are the specific objectives and projects that are to be carried out as part of the management plan. The Prescriptions are intended to be the functional part of the Integrated Natural Resources Management Plan that will be pulled off the shelf to be used.

Each ecosystem management unit section below includes a brief description of baseline data or current condition, management goals and objectives, projected use (to include mission), and a desired future condition to support training and/or natural resource objectives. Descriptions are supported with Geographic Information System mapping for resources and training use. Each ecosystem management unit section also identifies off-post areas as appropriate. Off-site areas are also evaluated for desired future conditions, type of management preferred to support training or installation sustainability, and whether there may be opportunities for purchase or to establish buffers.

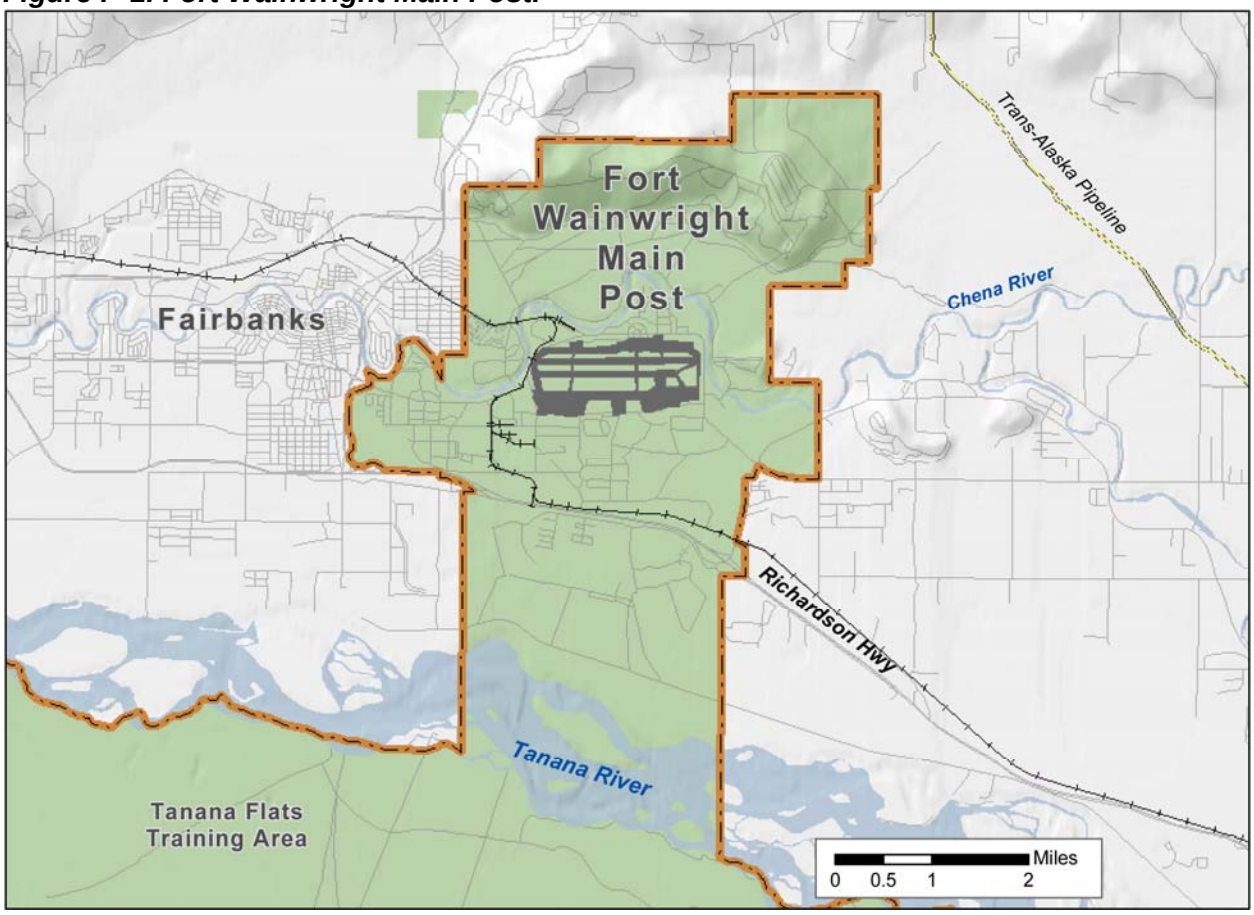
Each section then describes the “tools” used to achieve the goals and objectives and desired future condition for each ecosystem management unit. Tools are the various programs on the installations that can be used to achieve the desired results. These include: forestry, fish and wildlife, integrated training area management, sustainable range management, pest management, fire management, outdoor recreation, etc. For each program or tool that is applicable for a given ecosystem management unit area, specific projects to be accomplished are identified with specific timeframes. Each project would identify specific prescriptions, strategies, techniques, or measurable standards that would contribute to achieving the objectives for the functional area.

PA. FORT WAINWRIGHT MAIN POST ECOLOGICAL MANAGEMENT UNIT

PA1. Location

Fort Wainwright is located in central Alaska, north of the Alaska Range in the Tanana River Valley. The post lies 120 miles south of the Arctic Circle near the cities of Fairbanks and North Pole in interior Alaska in the Fairbanks North Star Borough. The installation ecological management unit consists of the Main Post, Tanana Flats Training Area, Yukon Training Area (Yukon Training Area) and Dyke Range. Fort Wainwright is the fourth largest Army training area in the United States. Figure P-1 shows the location of Fort Wainwright Main Post.

Figure P-1. Fort Wainwright Main Post.



The Main Post is two miles east of central Fairbanks on the Chena and Tanana rivers. It contains the cantonment area, a small arms range complex, and a close-in range complex. The Main Post occupies approximately 13,000 acres.

PA2. Environment

PA2.1 Facilities

PA2.1.1 Cantonment Facilities

Fort Wainwright has 13,500 acres of built-up area, including the small arms complex. The Main Post has 1,365 structures with a total of 6,755,225 square feet.

PA2.1.2 Range Facilities

United States Army Alaska Regulation 350-2 lists the Fort Wainwright small arms and crew-served ranges. The post has 14 firing ranges.

PA2.1.3 Transportation Facilities

Fairbanks is a transportation center for much of central, northern, and northwestern Alaska. There are 841 miles of paved highways and over 1,000 miles of unpaved highways in and around Fairbanks. The George Parks, Steese, and Richardson highways bisect the area. The Parks Highway links Fort Richardson to Fort Wainwright, and the Richardson Highway links Fort Greely to Fort Wainwright. The Richardson Highway also connects Alaska with the Canadian road system via the Alaska Highway.

The Alaska Railroad provides rail service to Main Post Fort Wainwright. Alaska Railroad's main line passes through the Main Post, with spur tracks serving the central heating and power plant and warehouse circle. The track also connects with the Fairbanks industrial spur. The Alaska Railroad provides seasonal passenger and year-round freight and vehicle service between Anchorage and Fairbanks. Most northbound freight arrives by sea at the port of Anchorage for transfer to the railroad. The port of Anchorage has intermodal capability.

Wainwright Army Airfield and Eielson Air Force Base, about 17 miles south of Fort Wainwright, can support any type of military aircraft including the C-5 Galaxy. In addition, Allen Army Airfield at Fort Greely can support C-5 aircraft in the winter and C-17 Globemaster III aircraft at all other times.

Fairbanks International Airport, five miles west of Fort Wainwright, is the nearest commercial airport. It is one of two international airports in Alaska and is served by several U.S. and international passenger and cargo airlines.

PA2.1.4 Water Supply

As of February 1996, Fort Wainwright had nine main drinking wells, two of which were active (Buildings 3559-1A and 3559-2B). In addition, there are drinking water wells for individual buildings. Water use on Fort Wainwright varies from 1.5 million gallons per day in winter to 2.0-2.5 million gallons per day in summer.

PA2.2 Physical Resources

PA2.2.1 Topography

Fort Wainwright lies north of the Alaska Range, within the drainage of the Tanana River. The Main Post lies within the Tanana-Kuskokwim lowland. This depression was subsiding as the Alaska Range was rising to the south, and filling with sediments from those mountains. The area is bounded by uplands to the north, the Alaska Range to the south, and consists of alluvial fans extending northward from the mountains. The Tanana River flows along the northern edge of the lowland. The terrain is generally flat lowland, ranging from 128 to 512 feet above sea level (Nakata Planning Group 1987). Elevation gradients

range from 40 to 50 feet/mile along upper portions of fans, to 6 to 7 feet/mile in the Tanana Flats (Racine et al. 1990).

PA2.2.2 Geology

Central Alaska has not been glaciated, but during glacial advances, glaciers surrounded the area. Climatic fluctuations during the Quaternary Period caused glacial expansion and recession (Racine and Walters 1991). Rivers flowing from glaciers deposited several hundred feet of silt, sand, and gravel in the Tanana and Yukon valleys. Most of the area is covered by a layer of loess ranging from several inches to more than 128 feet thick. Gravel deposits along the Tanana River are up to 154 feet thick and are a significant source of groundwater (Nakata Planning Group 1987).

PA2.2.3 Soils

A soil survey exists for the Main Post area of Fort Wainwright, but its accuracy and detail is inadequate for the needs of the installation. Most of the Main Post area is Chena alluvium, an unconsolidated silt-gravel mixture. Discontinuous permafrost lies just under the surface in some areas. The unconsolidated silt-gravel mixture freezes perennially. It has a high bearing strength when frozen, but is subject to sliding and is difficult to compact when thawed. Northernmost portions of the post are in the foothills of the Yukon-Tanana Upland and consist of bedrock covered by muck and loess. Muck inhibits drainage, largely due to the presence of impermeable permafrost below the surface, and has very low bearing strength when thawed. Swale deposits, made up of poorly stratified silt, sand, and organic matter, are scattered along the Richardson Highway and in parts of South Post. These deposits have high ice content and freeze perennially (Nakata Planning Group 1987).

PA 2.2.4 Water Resources

PA 2.2.4.1 Surface Water

Fort Wainwright's surface water resources are diverse and include numerous rivers, streams, ponds, and lakes. The Tanana and Chena rivers drain Main Post. The volume of flow fluctuates dramatically by season. During the long period of freeze, usually from October to May, flow is limited to seepage of groundwater from aquifers into streams. Many small streams freeze solid (zero discharge) during winter. Snowmelt typically begins in March or April and reaches its peak in June. Flow is greatest during June and July. By the end of July, most snow has melted, and a steady flow during August and September is sustained by rainfall. The Chena River is non glacier-fed and reaches peak flow before the Tanana River, which is fed by meltwater from glaciers and snowfields in the Alaska Range (Nakata Planning Group 1987).

The Chena River, from the Chena Slough to the confluence with the Tanana River, has been classified by the state of Alaska as Class A (suitable for agriculture, aquaculture, and industrial), Class B (suitable for water recreation), and Class C (suitable for growth and propagation of fish, shellfish, other aquatic life, and wildlife). The pH of the Chena River is slightly above neutral during winter and slightly below neutral in summer. Nitrogen concentration is high in relation to phosphate, which may be the limiting inorganic nutrient for phytoplankton production. Only naturally occurring iron concentrations were higher than the secondary state standards. The high iron concentration in the lower portion of the Chena River may be the result of surface water and groundwater discharge from swampy, muskeg areas in this region. Sediment loads are generally low. Non glacier-fed streams generally carry less than 300 mg/l during high flow and as little as 10 mg/l during low flow periods (Bureau of Land Management and U.S. Army 1994).

PA2.2.4.2 Groundwater

Groundwater is one of Fort Wainwright's most valuable natural resources. With the exception of naturally occurring metals, groundwater quality is good in the Fort Wainwright area. Much of Main Post is underlain by an alluvial aquifer. Groundwater in the aquifer is recharged by the Tanana River, while the Chena River and direct infiltration of precipitation contribute small amounts. Groundwater potential is best along the alluvium of the Tanana River, where wells are capable of yielding 3,000 gallons per minute (gpm) at less than 200 feet in depth. The lowest potential is in the rolling hills of the Yukon Training Area, where wells produce around 50 gpm at the same depth (Nakata Planning Group 1987).

Groundwater in the Fort Wainwright area tends to have relatively high, naturally occurring levels of metals, especially iron and arsenic. Elevated arsenic levels are prevalent in the upland areas. These are not related to human-caused pollution (Harding Lawson Associates 1996).

Army-related industrial activity in the Main Post may have caused groundwater pollution, generally associated with underground storage tanks, facilities where chemicals were stored, and places where chemicals were dumped during the early history of the post. These areas are being intensively monitored. Pollution is generally localized, and there is no indication of deep groundwater pollution. The recent trend has been toward improvement as Army restoration projects mitigate damage to groundwater quality. Practices that have led to this contamination have been discontinued; for example, underground storage tanks have been removed. All petroleum, oils, and lubricants are now stored in aboveground tanks surrounded by containment berms.

Due to past contamination of localized areas, primarily within the Main Post area, Fort Wainwright is classified as a Comprehensive Environmental Response, Compensation, and Liability "Superfund" site. Remediation is ongoing. Groundwater management consists of restoration projects associated with individual sources of pollution, generally associated with the "Superfund" designation. These projects are not classified as natural resources management and are not included within this Integrated Natural Resources Management Plan.

PA2.2.5 Climate

Fort Wainwright has the northern continental climate of the Alaskan Interior, which is characterized by short, moderate summers; long, cold winters; and little precipitation or humidity. Weather is influenced by mountain ranges on three sides, which form an effective barrier to the flow of warm, moist, maritime air during most of the year. Surrounding uplands also cause settling of cold, Arctic air into Tanana Valley lowlands. Average monthly temperatures in Fairbanks range from –11.5^{o}F in January to 61.5^{o}F in July, with an average annual temperature of 26.3^{o}F. The record low temperature is –66°F, and the record high is 98°F. The average frost-free period is 95-100 days.

Prevailing winds are from the southwest in June and July, and from the north and northeast in winter. Average wind velocity is 5.3 miles per hour (mph). The greatest average wind speed is in spring, with a high of 40 mph recorded in Fairbanks. Winds are 5 mph or less 60% of the time. Thunderstorms are infrequent, occurring only during late spring and early summer. Average annual precipitation is 10.4 inches, most of which falls as rain during summer and early fall. Average monthly precipitation ranges from a low of 0.29 inches in April to a high of 1.86 inches in July. Average annual snowfall is 67 inches, with a record high of 168 inches during the winter of 1970-71. Average annual relative humidity is 55%, with lowest levels during spring and early summer (38% during mid-afternoon in May). Heavy fog is relatively common during December and January, with four or five foggy days each month. Ice fog can be expected any time temperatures drop below -30°F, but is normally restricted to areas near human settlements where moisture is emitted from burning fuels (Bonito 1980).

PA2.3 Biological Resources

PA2.3.1 Biodiversity

Most of the land was relatively undisturbed when it was withdrawn for military use. Because there are little or no data on most species prior to the last 10 years or so, it is unknown how the military presence has affected biodiversity on Fort Wainwright. Changes in ecosystems have been localized and may have affected species abundance for short periods, but probably have not affected overall species richness.

There is no evidence that Army use has affected any plant or animal species beyond specific sites of construction or military activity. Greatest losses of habitat are associated with the Main Post due to construction and associated urban development and use.

Effects of noise on wildlife from military activities on Main Post are unknown.

PA2.3.2 Flora

Fort Wainwright encompasses a large amount of land with a wide array of physiographic features. Vegetation patterns are influenced by climate, soil, topography (slope, aspect, and elevation), depth to water table, permafrost, and fire. Native vegetation was removed from much of the Main Post during original construction of Ladd Field in the 1940s. Due to landscaping and other human activities, vegetation of the Main Post does not reflect natural vegetation patterns of the area (Nakata Planning Group 1987).

Fort Wainwright has four vegetation types: moist tundra, treeless bogs, open, low-growing spruce forests, and closed spruce-hardwood forests. The white spruce-paper birch forest of interior Alaska is often called the boreal forest or taiga. Vegetation types of interior Alaska form a mosaic and reflect fire history, slope and aspect, and presence or absence of permafrost (Viereck and Little 1972).

PA2.3.2.1 Vegetative Profile

A typical vegetation profile from lowland, up a south slope, and down the north slope, would include the following: water, barren, high brush, deciduous forest, white spruce forest, moist tundra, black spruce forest, and mixed forest (Bonito. 1980). This profile does not precisely match Viereck and Little's (1972) vegetation types, which were mapped on a statewide scale. Wetland occurs at various altitudes and sometimes only during early successional stages. Localized conditions often result in various combinations of vegetation.

- **Barren Land:** Barren ecosystems on Main Post are recently deposited gravel bars in rivers.

- **High Brush:** The high brush ecosystem exists as a transitional zone, or ecotone, between forests and barren areas or tundra. It normally is a narrow vegetation band along floodplains or just above tree line. The size of the transitional zone varies dramatically, and in places where there is a well-defined tree line, it may be quite small. The high brush area, however small, is important ecologically. It sustains small to medium-sized woody plants and shrubs (no higher than 20 feet), including alder (*Alnus* sp.), willows (*Salix* sp.), cottonwood (*Populus* sp.), birch (*Betula* sp.), mountain ash (*Sorbus* sp.), and prostrate white spruce (*Picea glauca*). Along floodplains, high brush forms a thick, almost impenetrable barrier. There is little or no ground cover. In subalpine settings, stands may be thinner and more persistent. Ground vegetation is grasses, mosses, small shrubs and forbs, and lichens that often form thick layers. A mixture of wildlife from the alpine and forested communities uses the area. The high brush ecosystem is particularly important for moose forage (Bonito 1980).

- **Forests:** Forests are dominant, diverse ecosystems on Main Post. Vegetation ranges from pure stands of spruce or hardwoods to spruce/hardwood mixtures. Black spruce (*Picea mariana*) stands are found where drainage is poor, such as flat valley bottoms, lakesides, and muskegs. White spruce (*P. glauca*) stands are rare due to anemic soils and frequent wildfires. Pure stands of paper birch (*Betula papyrifera* var. *humilis*) and quaking aspen (*Populus tremuloides*) are commonly found in well-drained uplands and ridge tops. Most forests are heterogeneous mixtures of spruce (white and black) and hardwoods. Predominant hardwoods are birch, quaking aspen, and balsam poplar (*P. balsamifera*). Higher, well-drained ridges tend toward stands with a white spruce/birch mixture in early stages leading to pure spruce at the climax stage. In other areas, aspen forms a canopy over an understory of white spruce. Bottomland white spruce/balsam poplar forest occurs on level floodplains, low river terraces, and south slopes. White spruce is dominant and reaches a height of 110 feet. Stands may persist for 50 to 200 years before being replaced by black spruce. Moss gradually accumulates as the forest ages. The deep mat insulates the permafrost below and prevents summer thaw, giving rise to wetter conditions that favor black spruce. Lowland black spruce/hardwood is the most common forest type in interior Alaska. On colder, northern aspects, black spruce may occur up to 2,500 feet (Bonito 1980).

Shrub wetland, also known as bogs, muskeg, and low brush, are associated with slightly higher relief on the edges of marshes, and in poorly-drained basins and depressions with cold, waterlogged soils. The surface consists primarily of a thick layer of peat over a mottled, gray silt or silt loam. The water table, if not exposed, is found only a few inches down. During periods of heavy precipitation, bogs may form temporary lakes. Depth to ice-rich permafrost is often less than 30 inches. Ground cover is characterized by dense accumulations of mosses, lichens, sedges, rushes, liverworts, mushrooms, and other fungi. Stunted black spruce occasionally appears. Along margins of bogs and in drier areas, grasses, small shrubs, berries, and woody plants, such as willow and bog birch (*Betula glauca*), proliferate (Bonito 1980).

PA2.3.2.2 Floristics Inventory

During 1995-1996, the Cold Regions Research and Engineering Laboratory conducted a floristic inventory for USAG-AK at Fort Wainwright (Tande et al. 1996). The inventory focused on vascular plants, so cryptogams (i.e., mosses and lichens) were not identified. The inventory found 491 taxa (including subspecies and varieties), representing 227 genera in 72 families. This is about 26% of Alaska's vascular flora. At least 10 taxa collected represented extensions of known ranges (Tande et al. 1996). Plants were collected from the Main Post area.

PA2.3.2.3 Threatened or Endangered, and Species of Concern Plants

Only two plant species on the federal endangered species are known to occur in Alaska. Neither species' current or historic ranges include Fort Wainwright, and a report released in 1996 indicated that there are no federally listed endangered or threatened plant species on Fort Wainwright or Main Post (Tande et al. 1996).

PA2.3.2.4 Ecological Land Classification

An ecological land classification was done for Fort Wainwright lands during 1994, 1995, and 1998. This report included mapping by geomorphology, permafrost, vegetation, ecotypes, ecosubdistricts, and ecodistricts (Jorgenson et al. 1998). The ecological land classification is a hierarchical means to classify land according to various ecological scales. Ecotypes are created by combining associations of vegetation types and geomorphological classes. Ecotypes delineate areas with homogeneous topography, terrain, soil, surface form, hydrology, and vegetation. Ecosections are areas with relatively uniform geomorphic features that have recurring patterns of soils and vegetation. Several vegetation classes may be included in an ecosection, but they are usually related because they occur as different stages in a successional

sequence. Ecodistricts are broader areas with similar geology, geomorphology, and hydrology, and are similar to physiographic units.

The Main Post area lies primarily in the Tanana River Floodplain ecodistrict. There are three ecosubdistricts of the Tanana Floodplain ecodistrict that make up Main Post. The Chena Floodplain ecosubdistrict is a meandering stretch of the lower Chena River that includes riverbed deposits and active and inactive floodplain cover deposits linked by surface and groundwater movement. The lower perennial river has clear water. Permafrost is absent. Vegetation includes partially vegetated river barrens, riverine willow and alder tall scrub, balsam poplar and white spruce forests, and wet sedge meadows. Forest productivity is high.

The Fairbanks Lowlands ecosubdistrict is a flat area adjacent to the Tanana River that is dominated by abandoned floodplain cover deposits and occasional organic bogs. Permafrost is nearly continuous, it is absent in occasional collapse-scar bogs, which are the result of permafrost degradation. Common vegetation includes black spruce, tamarack, birch forests and shrub birch-ericaceous shrub.

The third portion of the Main Post ecological management unit is the Little Chena Uplands, which includes the Birch Hill area of Fort Wainwright. The Little Chena Uplands are part of the Steese-White Mountain ecodistrict. These well-drained, upland areas have a loess cap over weathered bedrock. Permafrost is present on northern and lower slopes and absent on southern slopes. In permafrost free areas, groundwater is found only at great depths, whereas in permafrost areas, soils may be saturated for portions of the growing season. White spruce-birch-aspen forests on southern slopes, black spruce forests on northern slopes, and riverine willows in small drainages are common.

PA2.3.2.5 Wetland

Wetland on Fort Wainwright consists of freshwater marshes and shrub wetland. Some wetland may qualify as jurisdictional wetland as defined in Section 404 of the Clean Water Act. Jurisdictional wetlands are determined by the Army Corps of Engineers on the basis of soils, vegetation, and hydrology. Fort Wainwright has two wetland surveys completed: the National Wetlands Inventory and the Waterways Experiment Station inventory.

The National Wetlands Inventory for Main Post was completed in 1992. The U.S. Army Engineer Waterways Experiment Station completed a wetland delineation of Main Post in 1998. The study included a review of existing information, a wetland identification, a Geographic Information System base map, a wetland characterization, and a final report. Wetlands were divided into five groups, which do not clearly delineate all areas as either wetland or upland. It is necessary to conduct on-site investigations before making management decisions involving Section 404 of the Clean Water Act.

PA2.3.2.6 Forest Resources

Upland forests include birch and aspen forests, mixed hardwood-white spruce, and white spruce forests on relatively well-drained, warm sites. Approximately 70% of the forested lands on Fort Wainwright are upland forests. Under natural conditions fire is common. Fire cycles are estimated to be 100-150 years. Fires occur in a wide range of sizes, often creating openings of hundreds to many thousands of acres. A variety of other disturbances can also occur, including storm breakage or windthrow, and insect and disease outbreaks. Hardwood stands are usually the first forest cover following fire, with spruce developing more slowly until mixed stands occur. Stands dominated by white spruce are the oldest and least common upland forest type, generally growing only where no severe natural disturbance has occurred for 100 years or more. For the last several decades, wildland fire has been actively suppressed on Fort Wainwright, which has helped decrease the natural disturbance level in upland areas. The high level of human-caused disturbance in the early 1900s and fire suppression since the 1950s have resulted in a distribution of age classes that is heavy in the 60 to 120-years category with fewer younger stands. It

is important to maintain younger stands for timber recruitment and wildlife habitat. Older forests are more susceptible to severe wildland fire and to insect and disease damage. More species and age diversity will result from the careful application of fire management techniques and harvest activities. In areas where private property and military infrastructure are not threatened, wildland fires will be allowed to burn.

Lowland forests include balsam poplar, mixed balsam poplar-spruce, and white spruce stands. Mixed birch-spruce stands also occur, especially on older lowland sites. Approximately 30% of the forested land on Fort Wainwright is lowland forests. Lowland sites are subject to a variety of natural disturbances – erosion, flooding, and ice damage near active river channels; fire; insects and disease; windthrow; and themokarsting. From about 1900 to 1940, extensive harvesting occurred in lowland sites, especially along the Tanana River. Mining also disturbed lowland forests. These disturbances were typically smaller scale than the large upland fires, and they created a complex mosaic of stand types and ages. Hardwoods are usually the first forest cover to develop, followed by mixed hardwood-spruce stands, and finally white spruce. As in the uplands, white spruce is the oldest and least common forest type, developing only in the absence of major disturbance for extended periods. Overall, disturbance is less common in lowlands than uplands, as evidenced by the presence of older stands and a greater range of stand ages, including stands greater than 180 years old. Because fire is only one of the many disturbances in the lowland, fire suppression has had less effect on overall disturbance of lowland forests than on uplands.

A forest inventory is an integral part in establishing a plan for managing forest resources. The Fort Wainwright cantonment area was inventoried by the Directorate of Public Works, Environmental Forestry Staff during the 2000 field season.

Stand Delineation and Inventory

Stand timber types were delineated using color infrared aerial photographs taken in 1995. Stand timber typing was confirmed on the ground during stand inventory. The variable plot radius sampling method was used for tree data collection.

Land Classification

The project area covers a total of 15,558 acres of forest and non-forest land (Table PA-1). Forest lands in the project area occupy 39% of the land area or 6,067 acres. Non-forest land amounts to 61 % of the total project land area or 9,491 acres. The forested lands contain 4,257 acres of commercial forest land. Commercial forest lands are those lands containing sawtimber and poletimber size classes.

Table PA-1. Fort Wainwright Main Post Forest Land Classification.

Forest Category	Commercial Forest Category	Forested Land Acreage	Total Acreage
Forested Lands	Commercial Forest	4,257	6,067
	Non-Commercial Forest Lands	1,810	
Non-Forested Lands		0	9,491
Total		6,067	15,558

Forest Volume by Timber Type

Cubic volume includes all species in all size classes found in the type (Table PA-2). For example, the white spruce sawtimber type reports a volume of about 21,102 cubic feet, all of this volume is in the white spruce sawtimber type.

A total of 4,257 acres of sawtimber and poletimber types comprise the volume estimates in this study. The project area contained a total forest land area of 6,067 acres that includes reproduction and dwarf types.

Sawtimber types occupy 8.0% (482 acres) of the forest land area and contain approximately 751,010 cubic feet. White spruce sawtimber types contain about 21,102 cubic feet. The birch-aspen sawtimber type contains 405,429 cubic feet, the highest in its class.

Poletimber types occupy 60.6% (3,775 acres) of the forest land area and contain approximately 3,273,946 cubic feet. White spruce poletimber types contain about 92,663 cubic feet. The birch poletimber types contain the majority of the forest land volume and total 675,713 cubic feet.

Reproduction and dwarf types together occupy 31.4% (1,810 acres) of the forest land area. These types were not sampled and do not contribute to the volume estimates. Dwarf black spruces comprise the majority of the forest land acreage 13.4% (830 acres).

Each timber type has also been broken down into average trees per acre. White spruce sawtimber contains an average of about 368 stems per acre. White spruce poletimber contains an average of about 475 stems per acre. The black spruce-aspen timber type contains 920 stems per acre, the highest density among the poletimber. The birch reproductive size class has an average of 1,894 stems per acre, the highest density out of all size classes. The dwarf black spruce size class has an average of 821 stems per acre.

Table PA-2. Fort Wainwright Main Post Forest Timber Type.

Forest Timber Type	Acres	Percent Forested Acres	Cubic Feet per Acre	Total Cubic Feet	Percent Volume Cubic Feet	Average Stems Acre
Sawtimber						
White Spruce	10	0.2	2,110	21,102	0.5	368
Balsam Poplar	12	0.2	1,194	14,331	0.4	333
Birch-Aspen	244	4.0	1,662	405,429	10.1	307
White Spruce-Birch	139	2.3	1,506	209,269	5.2	227
White Spruce-Balsam Poplar	77	1.3	1,310	100,879	2.5	269
Subtotal:	**482**	**8.0**		**751,010**	**18.7**	
Poletimber						
Black Spruce	318	5.1	452	143,634	3.6	689
White Spruce	84	1.4	1,103	92,663	2.3	475
Black and White Spruce	69	1.1	860	59,344	1.5	848
Black Spruce-Larch	184	2.9	64	11,770	0.3	79
Balsam Poplar	217	3.5	583	126,526	3.1	474
Birch	591	9.5	1,143	675,713	16.8	410
Aspen	529	8.5	1,082	572,344	14.2	670
Birch-Aspen	399	6.4	1,057	421,796	10.5	570
Black Spruce-Birch	325	5.3	570	185,184	4.6	361
White Spruce-Birch	486	7.8	990	481,128	11.9	515
Black and White Spruce-Birch	264	4.3	754	198,994	4.9	469
Black Spruce-Aspen	49	0.7	562	27,515	0.7	920
White Spruce-Aspen	52	0.8	1,476	76,769	1.9	636
White Spruce-Birch-Aspen	48	0.7	999	47,958	1.2	515
White Spruce-Balsam Poplar	137	2.2	1,034	141,679	3.5	425

Forest Timber Type	Acres	Percent Forested Acres	Cubic Feet per Acre	Total Cubic Feet	Percent Volume Cubic Feet	Average Stems Acre
Black and White Spruce-Aspen	23	0.4	475	10,929	0.3	304
Subtotal:	**3,775**	**60.6**		**3,273,946**	**81.3**	
Reproduction						
Black Spruce	110	1.8				775
White Spruce	3	*0.0				546
Black Spruce-Larch	88	1.4				428
Black and White Spruce	78	1.3				587
Balsam Poplar	246	4.0				1,072
Aspen	24	0.4				1,255
Birch	5	*0.0				1,894
Birch-Aspen	35	0.6				600
Black Spruce-Birch	229	3.7				184
Subtotal:	**818**	**13.2**				
Dwarf						
Black Spruce	830	13.4				821
Black Spruce-Larch	295	4.8				324
Subtotal:	**992**	**18.2**				
TOTAL:	**6,083**	**100.0**		**4,024,956**	**100.0**	

*** Less than 0.1%**

Estimated Annual Harvest

An estimate of the annual allowable harvest is a guide for future harvest activities. Calculations are based on the simple area cut method. This method divides the total productive forest area by the rotation age. The result of this method gives the acreage that can be harvested in a year. The acreage is multiplied by the weighted average volume per acre to determine the annual harvest. The calculations of harvest level are based on the following assumptions:

- The most accessible stands would probably be cut first, leaving the remote stands. Remote stands would be more costly to access, but are still considered in the calculations of estimated harvest levels.
- Growth and age information, field observations and previous timber sale data suggest that white spruce sawtimber products, houselogs and poles can be produced by age 120 years and that hardwood sawtimber products and fuelwood can be produced by age 80. Beyond that age, tree growth begins to decline and mortality increases, especially in the hardwoods.
- Natural regeneration of white spruce and hardwoods depends on two main factors: seed source and type of seedbed. Under normal seed production conditions, it is estimated that natural regeneration will occur within 5 to 10 years following harvest.
- The mixed timber types will be managed for the white spruce component and will use the white spruce rotation age. Pure hardwood timber types will be managed for the hardwood component and will use the hardwood rotation age.

Identification of Sustained Yield Timber Base
The sustained yield timber base is defined as forest land where periodic harvests from the resource can be regulated to be continued for a long period of time if not indefinitely. Estimated annual harvest amounts may fluctuate at variable levels because of market conditions, risks to resources (such as beetle infestation or fire), resources access, or other factors that may encourage or discourage harvest levels. Based on these fluctuations, timber harvest may be concentrated into periods of time separated by years without harvest.

Generally, only productive timberland, where the land manager allows timber harvest, is included in the sustained yield timber base. Management of the sustained yield timber base should be conducted in a manner where the basic productivity of the resource is not negatively affected. Through observation of Fort Wainwright cantonment lands during the field work, it has been determined that timber types containing poor stocking levels or black spruce generally occur on relatively unproductive sites. Based on this knowledge, timberland that comprises timber types within poorly stocked strata of black spruce is considered not feasible for timber management and is excluded from the sustained yield base. In addition, strata containing recently burned timber types are excluded form the sustained yield acreage. Sawtimber white spruce stands contained varying amounts of root disease and bole rot, which could reduce merchantable volumes for these stands.

The following white spruce and hardwood harvest acreage shown in Table PA-3 represent saw, pole, and reproduction timber types; the majority is in the poletimber type.

Table PA-3. Fort Wainwright Main Post Estimated Annual Harvest.

Harvest Timber Type	Potential Harvest Land	Rotation Age	Regeneration Time	Total Rotation Length	Estimated Annual Harvest
White Spruce	1,470 acres	120 years	10 years	130 years	11 acres per year
Hardwoods	2,290 acres	80 years	10 years	90 years	25 acres per year

PA2.3.3 Fauna

Most vertebrate species indigenous to central Alaska can be found on Fort Wainwright Main Post. Game species found on Fort Wainwright are managed by the Alaska Department of Fish and Game. The Alaska Department of Fish and Game monitors these species to determine population status, reproductive success, harvest and home ranges. Black (*Ursus americanus*) and grizzly (*Ursus arctos*) bears are found on Main Post. Moose are also present on Main Post. A federally listed threatened species in the lower 48, the bald eagle (*Haliaeetus leucocephalus*), is locally common. The Chena and Salcha rivers are important spawning areas for chum salmon (*Oncorhynchus keta*), arctic grayling (*Thymallus arcticus*) and king salmon (*Oncorhynchus tshawytsha*). All of these species inhabit the Tanana River seasonally. Fewer species are found in the Tanana River, due to its higher silt load (Nakata Planning Group 1987). River Road Pond (formerly Sage Hill Pond), Monterey Pond, Weigh Station 1, Weigh Station 2, and Manchu Lake are stocked with fish by the Alaska Department of Fish and Game. Wood frogs (*Rana sylvestris*) are the only amphibians on Fort Wainwright Main Post. There are no reptiles. No federally listed threatened or endangered animals are resident on Fort Wainwright.

PA2.3.4 Special Interest Management Areas

Fort Wainwright has several areas with special natural features. They harbor sensitive or unique wildlife species or represent unique plant communities. Sage Hill overlooks a wetland (Sage Hill pond) in the Main Post area. This is a Watchable Wildlife area with a planned viewing platform and signage. In

addition, south facing bluffs in this area have ecological significance due to the unique steppe vegetation communities found here. This scenic site has been damaged by gravel removal. No further gravel removal will be allowed.

PA2.4 Cultural Resources

The Fort Wainwright area has probably supported human populations for 10,000 to 12,000 years. Interior Alaska contains the oldest verifiable prehistoric remains in the state since the Interior was ice-free during the Wisconsin glaciation.

The Athabaskan original homeland was in the Tanana Valley. The Tanana Indians, a branch of the Northern Athabaskans, lived there. The Tanana were a highly mobile group at the time of European contact, moving to fish camps in summer, and various hunting and trapping camps during other seasons.

All Main Post buildings have been inventoried. One National Historic Landmark, Ladd Field (now called Ladd Army Airfield), has been formally designated as eligible for inclusion in the National Register. In addition, one Cold War Historic District has also been designated as eligible for inclusion in the National Register.

PA3. Main Post Management Prescriptions

PA3.1 Prescriptions and Policy

The Main Post ecological management unit is composed of two primary land use types: urban areas and light training areas. Urban areas include the cantonment area, landfill, Ladd Army Airfield, and recreation areas such as the ski hill. Training areas are the other primary use type. There are 12 local training areas.

PA3.1.1 Military Use

The Main Post Local Training Areas sub-unit is suitable for small unit training, road marches, bivouacs, and small arms firing at the range complex. The recommended time for military activities in low areas for mechanized vehicles is between freeze-up and spring break-up. Main Post local training areas are capable of supporting small unit training year-round except for wetlands and other lowlands where military activities involving vehicles is limited to winter.

The Urban Areas sub-unit can support small unit training, classroom training, individual training, non-fire range facilities, housing, and office facilities.

PA3.1.2 Access

Public access in the Main Post is allowed for recreation subject to safety restrictions and military security, when access does not impair the military mission, as determined by the installation commander.

PA3.1.3 Natural Resources Management

USAG-AK manages the local training areas and urban areas as "*intensive*" management areas. Intensive management areas are sub-units that are highly populated, receive high levels of use and are easily accessible by road. All forms of surveys, monitoring, and active management of land, forest, fish and wildlife, and recreation resources may be conducted. The airfield and small arms complex are managed as "*limited.*" Fire protection category for Main Post is "*critical*," except for the small arms complex, which

is "*limited.*" "*Critical*" areas receive maximum detection coverage and are highest priorities for attack response. Immediate and aggressive initial attack is provided. Critical management areas receive priority over adjacent lands and resources in the event of escaped fires. Local training areas and urban areas are "*closed"* to hunting and trapping, except along the Chena River with an approved Alaska Department of Fish and Game permit. Local training areas and urban areas are open to fishing, while the airfield and small arms complex are "*closed*" to fishing. Recreational use category is "*modified*" in the local training areas, except for a special use management area, which is "*open*" to all terrain vehicles. Recreational use category is "*limited*" for urban areas and is "*closed*" for the airfield and small arms complex.

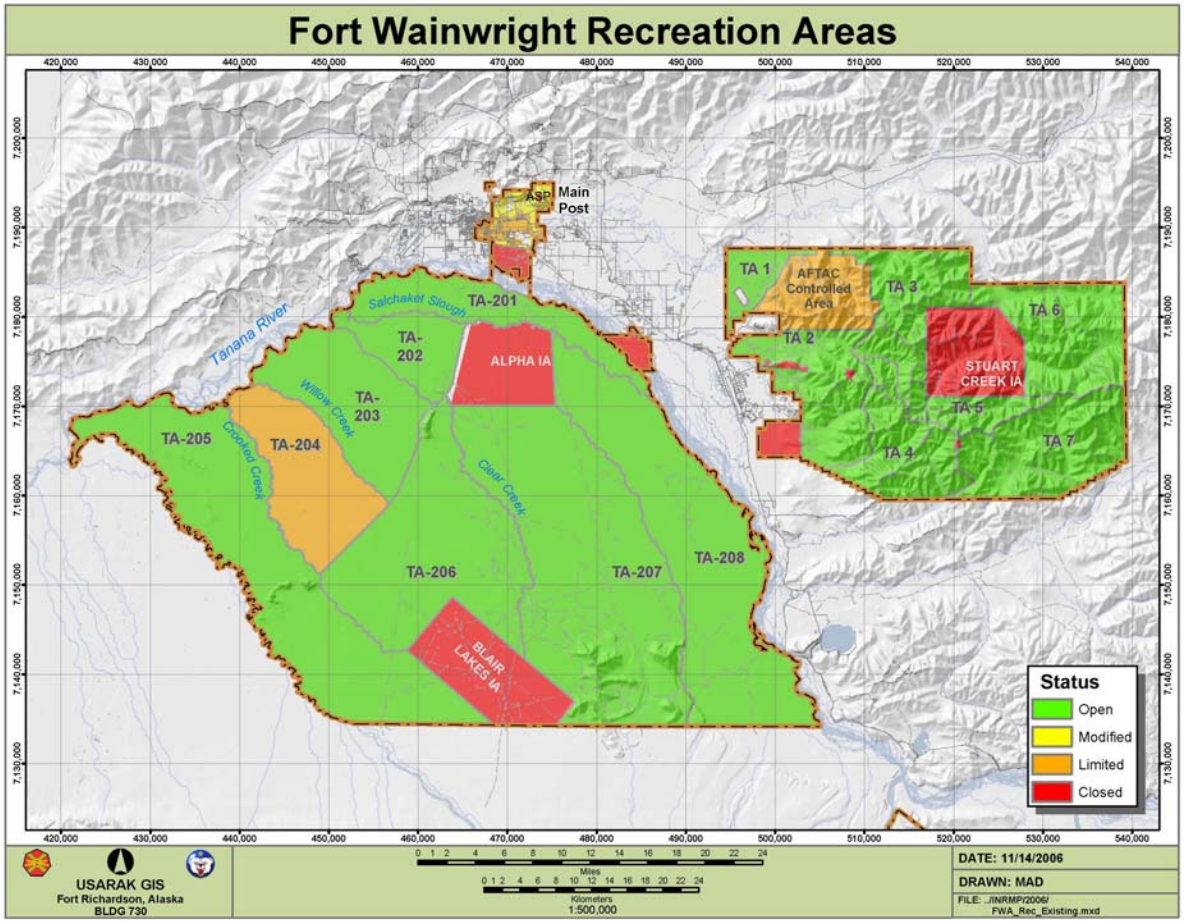
Table PA-4. Fort Wainwright Main Post Ecosystem Management Prescriptions.

Ecosystem Management Sub-unit	Natural Resource Management Priorities	Fire Suppression Categories	Vegetation Management	Hunting and Trapping	Fishing	Recreational Use Management
Local Training Areas	Intensive	Critical	Army	Closed*	Open	Modified**
Urban Areas	Intensive	Critical	Army	Closed*	Open	Limited
Airfield	Limited	Critical	Army	Closed	Closed	Closed
Small Arms Complex	Limited	Limited	Army	Closed	Closed	Closed

* Trapping open along the Chena River with Alaska Department of Fish and Game permit
**Except for ATV special use management area, which is open for ATVs.

Figure P-2 shows recreation use areas on Fort Wainwright Main Post.

Figure P-2. Fort Wainwright Main Post Recreation Use Areas.



Fort Wainwright Main Post is not an approved federal or state subsistence area. There is no subsistence preference for any subsistence user, but any subsistence user may conduct approved subsistence activities after acquiring any required state licenses, USAG-AK recreation access permit, and checking in with USARTRAK.

USAG-AK will comply with all laws, regulations, and executive orders pertaining to natural resources management on Fort Wainwright Main Post. USAG-AK will complete ongoing projects and conduct full implementation of ecosystem management projects. USAG-AK will conserve physical resources by conducting integrated training area management, watershed management, and minerals management. USAG-AK will conserve biological resources by conducting wetland management, forest management, fish and wildlife management, endangered species management, pest management, and urban area management. USAG-AK will integrate social (human) resources into ecosystem management by conducting education, awareness and public outreach, conservation enforcement, outdoor recreation management, and cultural resources management. USAG-AK will support ecosystem management decision-making through implementation of the National Environmental Policy Act, Geographic Information System, and other decision support systems, and integration with other land management programs such as the Sustainable Range Program and the Sustainment, Restoration and Modernization Program.

PA3.2 Projects

Table PA-5 lists ecosystem management projects for Fort Wainwright Main Post during 2007 through 2011.

Table PA-5. Fort Wainwright Main Post Ecosystem Management Projects.

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Erosion Control and Streambank Stabilization	FWA TARP FY07	x	x	x	x	x
High	Forest Inventory / Monitoring	Forest Stand Mapping	x	x	x	x	x
High	Forest Land Improvement	Small Arms Range AK 316 2824 JW AA44	x	x	x	x	x
High	Inventory and Monitoring	PMO Game Warden Coordination	x	x	x	x	x
High	Inventory/Monitoring	Breeding Bird Surveys	x	x	x	x	x
High	Inventory/Monitoring	Fisheries Planning Level Surveys	x	x	x	x	x
High	Inventory/Monitoring	Moose Population Surveys; 20A/B	x	x	x	x	x
High	Inventory/Monitoring	Rusty Blackbird Surveys					
High	Inventory/Monitoring	Trumpeter Swan Brood Surveys	x	x	x	x	x
High	Management	Erect signs designating boundaries of Special Interest Areas	x	x	x	x	x
High	Outreach	Annual Review and Input to ADFG Fishing Regulations	x	x	x	x	x
High	Outreach	Fairbanks Newsminer Hunting Edition	x	x	x	x	x
High	Outreach	Implement FireWise program for private landowners adjacent to military lands.	x	x	x	x	x
High	Outreach	Newcomers Briefings	x	x	x	x	x
High	Outreach	Range Control Coordination	x	x	x	x	x
High	Outreach	Recreation Access Permits	x	x	x	x	x
High	Outreach	Recreation User Group Meetings	x	x	x	x	x
High	Outreach	Update Information Kiosks	x	x	x	x	x
High	Outreach	USARTRAK Brochure	x	x	x	x	x
High	Outreach	Outdoor Recreation Supplement	x	x	x	x	x
High	Outreach	Public Room Updates	x	x	x	x	x
High	Population Management	Mew Gull Monitor/Depredation Permits	x	x	x	x	x
High	Recreational Activities	Off Road Vehicle Management	x	x	x	x	x
High	Suppression	Conduct fire suppression activities as necessary.	x	x	x	x	x
High	Survey and Monitoring	Conduct T&E Species Survey	x	x	x	x	x
High	Trespass Structure Abatement	Trespass Cabin and Camps Removal	x	x	x	x	x
High	Vegetation Management	Small Arms Complex Firebreak		x	x		
High	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	x	x	x	x	x
High	Wildland Fire Management	Develop program of providing assistance to training military units	x	x	x	x	x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
		during periods of high fire danger.					
High	Wildland Fire Monitoring	Collect fuel-loading information as part of the forest inventory.	x	x	x	x	x
High	Wildland Fire Monitoring	Delineate and maintain Geographic Information System data layers showing historical fires.	x	x	x	x	x
High	Wildland Fire Monitoring	Map all known cultural features on suppression maps and develop fire management recommendations for these features.		x			
High	Wildland Fire Monitoring	Map all known natural resources features and areas of concern from wildland fire suppression and management activities on suppression maps. Develop management strategies to avoid conflicts with these natural resource features and areas of concern.			x		
High	Wildland Fire Monitoring	Map all known non-sensitive structures on USAG-AK.				x	
High	Wildland Fire Monitoring	Map all military structures on suppression maps. Assess fire suppression options and recommendations for these structures.		x			
High	Wildland Fire Monitoring	Map past areas where ordnance has been used and develop pre-suppression plans on how to deal with wildland fire suppression in these areas.	x	x	x	x	x
High	Wildland Fire Monitoring	Research causes of fire ignitions on USAG-AK to identify areas of high fire occurrence				x	
High	Wildland Fire Monitoring	Research weather patterns influencing fire behavior and historical weather analysis for each land unit of USAG-AK.	x				
High	Wildland Fire Monitoring	Update fire history map of USAG-AK.			x		
High	Wildland Fire Monitoring	Update fire maps with military special use areas and fire management options for these areas.	x				
High	Wildland Fire Monitoring	Update fuels map of USAG-AK.			x		
High	Wildland Fire Planning	Develop Geographic Information System for military fire management office and for use on incidents with current data, maps, photos, suppression options, and restrictions.	x	x	x	x	x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Wildland Fire Planning	Develop plans and fuel treatment projects to reduce the threat of fires starting on military lands and impact areas and burning onto adjacent lands of high resource value.		x			
High	Wildland Fire Planning	Develop plans for proposed prescribed fires on USAG-AK.	x	x	x	x	x
High	Wildland Fire Planning	Develop standard operation procedures for each area unit of USAG-AK to assist firefighters and Incident Commanders in establishing priorities, making decisions, dealing with ordnance issues.	x	x	x	x	x
High	Wildland Fire Planning	Identify and assess fuel management strategies for urban/wildland interface areas.	x	x	x	x	x
High	Wildland Fire Pre-Suppression	Identify and use fuel reduction treatments to reduce the threat of wildland fire at the urban/wildland interface, military structures, selected training areas, and cultural resources.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop and disseminate procedures for detection and reporting of fires.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop more effective means of calculating fire weather indices for localized training areas and implement a program of relaying fire danger ratings to training units.	x	x	x	x	x
Med	Erosion Control and Streambank Stabilization	NBC Parking Upgrade					x
Med	Habitat Management	Duck Boxes	x	x	x	x	x
Med	Habitat Management	Moose Habitat Enhancement					
Med	Habitat Management	Moose Habitat Evaluation					
Med	Inventory/Monitoring	BBS Route Vegetation Survey					
Med	Inventory/Monitoring	Cliff Swallow Monitor	x	x	x	x	x
Med	Inventory/Monitoring	Fauna Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Flora Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Monitor Habitat Work					
Med	Inventory/Monitoring	Moose Habitat Mapping					
Med	Inventory/Monitoring	Owl Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Raptor Surveys					
Med	Inventory/Monitoring	Ruffed Grouse Drumming Counts	x	x	x	x	x
Med	Inventory/Monitoring	Small Mammal Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Soils Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Solitary Sandpiper Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Planning Level Survey	x	x	x	x	x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
Med	Inventory/Monitoring	Threatened & Endangered Species					
Med	Inventory/Monitoring	Topography Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Trumpeter Swan Habitat Mapping					
Med	Inventory/Monitoring	Vegetation Communities Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Whimbrel Colony Monitor	x	x	x	x	x
Med	Inventory/Monitoring	Wild Ponds/Lakes Survey	x	x	x	x	x
Med	Inventory/Monitoring	Wood Frog Breeding Surveys	x	x	x	x	x
Med	Outreach	FWA Post TV Notices	x	x	x	x	x
Med	Outreach	PAO Radio Spots	x	x	x	x	x
Med	Outreach	Recreation Outreach at Public Events	x	x	x	x	x
Med	Outreach	Write Fairbanks Newsminer AK Post Stories	x	x	x	x	x
Med	Outreach	Fort Wainwright Eielson Air Force Base Stocked Lake Brochure	x				
Med	Population Management	Nuisance/Injured Wildlife Issues	x	x	x	x	x
Med	Project Management	River Road Pond		x			
Med	Wildland Fire Planning	Develop pre-suppression plans for each of the area units of USAG-AK.		x			
Med	Forest Inventory / Monitoring	Continuous Forest Inventory	x	x	x	x	x
Low	Erosion Control and Streambank Stabilization	MPMG Firing Positions Upgrade					x
Low	Forest Land Improvement	Personal use firewood and house log areas	x	x	x	x	x
Low	Habitat Management	Osprey Nesting Poles					
Low	Habitat Management	Owl Boxes	x	x	x	x	x
Low	Habitat Management	Swallow Boxes					
Low	Inventory/Monitoring	Animal Displays					
Low	Inventory/Monitoring	Bat Surveys					
Low	Inventory/Monitoring	Waterbird Surveys	x	x	x	x	x
Low	Outreach	Becoming an Outdoor Woman	x	x	x	x	x
Low	Outreach	Interpretive Panels			x		
Low	Outreach	Recreation Surveys	x	x	x	x	x
Low	Outreach	Viewing Platform Material Update			x		
Low	Outreach	Chena River Canoe Trail	x				
Low	Outreach	Kids Fishing Day	x	x	x	x	x
Low	Project Management	Stocked Lakes	x	x	x	x	x
Low	Project Management	Badger Pit Park Plan Input	x	x			
Low	Project Management	Chena River Boat Launch/Park		x			
Low	Public Outreach	Wildlife Information					

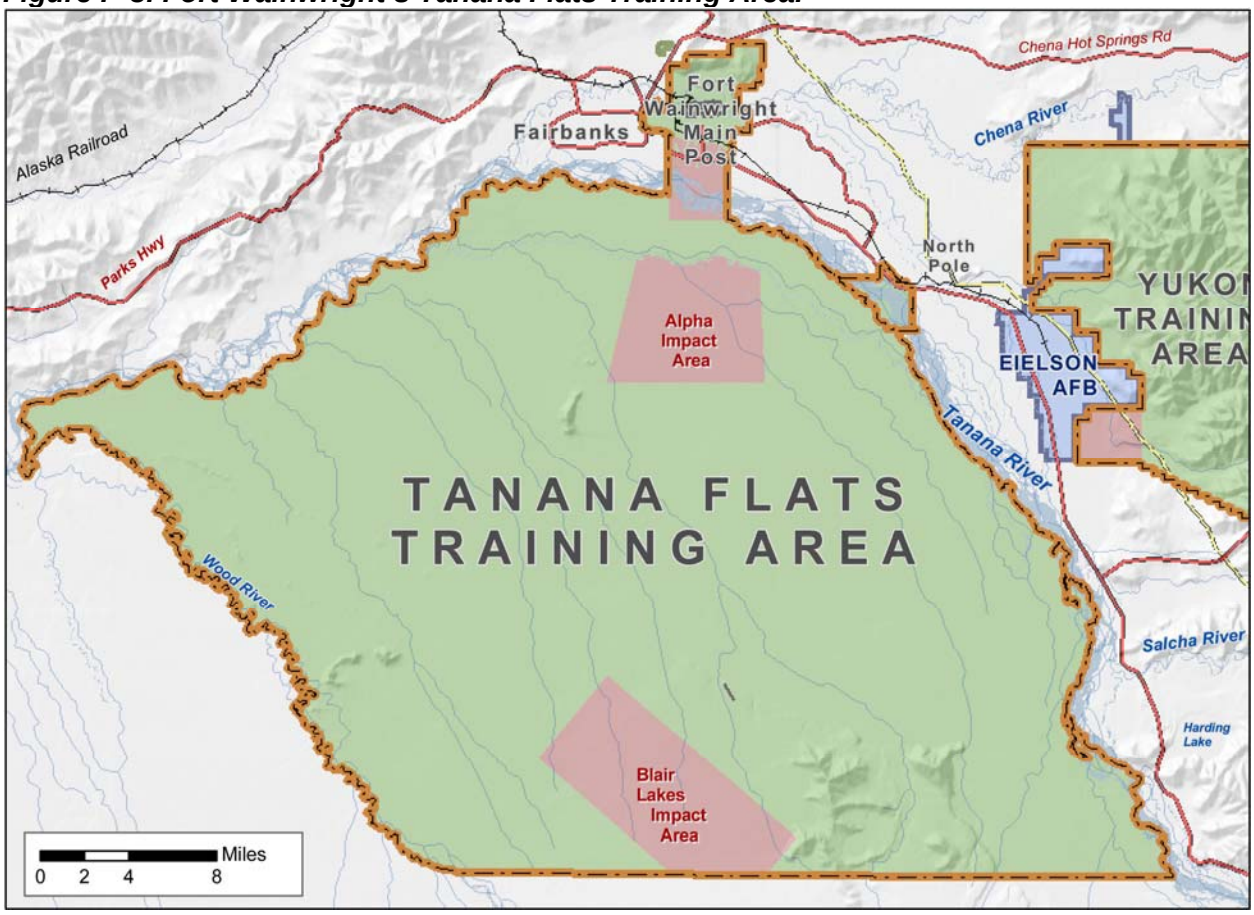
Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
		/Brochures/Presentations					

PB. FORT WAINWRIGHT TANANA FLATS TRAINING AREA ECOLOGICAL MANAGEMENT UNIT

PB1. Location

Tanana Flats Training Area is located in central Alaska, north of the Alaska Range in the Tanana River Valley. The training area lies 120 miles south of the Arctic Circle near the cities of Fairbanks and North Pole in interior Alaska in the Fairbanks North Star Borough. The Tanana Flats Training Area ecological management unit is located south of the Tanana River from Fort Wainwright. This area contains approximately 630,000 acres of land and is bordered on the north and east by the Tanana River, on the west by the Wood River, and on the south by the 34 grid line. Tanana Flats Training Area ecological management unit consists of Tanana Flats Training Area, Alpha and Blair Lakes Impact Area, and Dyke Range. Figure P-3 shows the location of Tanana Flats Training Area.

Figure P-3. Fort Wainwright's Tanana Flats Training Area.



PB2. Environment

PB2.1 Facilities

PB2.1.1 Ranges

The Air Force has a bombing/gunnery range west of Blair Lakes that is off-limits. In winter, this unit has several areas used as Drop Zones: Clear Creek, Larry and the lakes themselves. A hasty airstrip for C-130s is located in the southern portion, as well as an airstrip adjacent to Blair Lakes. Clear Creek Strip requires engineer work before it can be used by large airplanes. The airstrips at Blair Lakes and Clear Creek are used by recreational aircraft and are in poor condition. Clear Creek Assault Strip is large enough to support airborne and battalion-sized operations. Alpha Impact Area is located in the northern portion containing an impact area for indirect fire weapons and small arms firing from north of the Tanana River. Surveyed firing points are located near Range Control. There are also three surveyed artillery firing points in the Tanana Flats Training Area for use with the Alpha Impact Area.

PB2.1.2 Transportation System

Tanana Flats Training Area is not accessible by any roads or railroads. During the summer months, access can only be accomplished by boat or by air at the clear creek Assault Strip. During the winter months, an ice bridge is constructed across the Tanana River and allows vehicle access.

PB2.2 Physical Resources

PB2.2.1 Topography

The Tanana Flats Training Area lies within the Tanana-Kuskokwim lowland north of the Alaska Range, within the drainage of the Tanana River. This depression was subsiding as the Alaska Range was rising to the south, and filling with sediments from those mountains. The area is bounded by uplands to the north, the Alaska Range to the south, and consists of alluvial fans extending northward from the mountains. The Tanana River flows along the northern edge of the lowland. The terrain is generally flat lowland, ranging from 128 to 512 feet above sea level (Nakata Planning Group 1987). Elevation gradients range from 40 to 50 feet/mile along upper portions of fans, to 6 to 7 feet/mile in the Tanana Flats (Racine et al. 1990).

PB2.2.2 Geology

Central Alaska has not been glaciated, but during glacial advances, glaciers surrounded the area. Climatic fluctuations during the Quaternary Period caused glacial expansion and recession (Racine and Walters 1991). Rivers flowing from glaciers deposited several hundred feet of silt, sand, and gravel in the Tanana and Yukon valleys. Most of the area is covered by a layer of loess ranging from several inches to more than 128 feet thick. Gravel deposits along the Tanana River are up to 154 feet thick and are a significant source of groundwater (Nakata Planning Group 1987).

PB2.2.2.1 Seismicity

Earthquakes to the west of the training area are associated with the Fairbanks seismic zone, another northeast-trending band of activity. An average of five or six earthquakes a year are actually felt in this zone, and swarms of micro-earthquakes occur (Page et al. 1991). In 1967, a series of three earthquakes of about magnitude 6 had epicenters to the west of Tanana Flats Training Area. Two other moderate (magnitude 4.0-4.6) quakes occurred in this zone in 1997 (U.S. Geological Survey National Earthquake Information Center 1998; Alaska Earthquake Information Center 1998).

PB2.2.2.2 Petroleum and Minerals

Mineral resources management on Tanana Flats Training Area is the responsibility of the Bureau of Land Management. Measures to safeguard resource values outlined in 43 CFR 3100, 43 CFR 3600, and 43 CFR 3809 apply to mineral development on withdrawn lands. Under terms of the Defense Appropriations Act of 2000, should withdrawn lands be opened to mineral location, mineral patents could convey title to locatable minerals only. These patents would also carry the right to use as much of the surface as

necessary for mining under guidelines established by the Secretary of the Interior by regulation (Bureau of Land Management and U.S. Army 1994).

PB2.2.3 Soils

Tanana Flats Training Area comprises different units of unconsolidated material, distributed in broad basins and elongated meander scars. Deposits grade from coarse gravel at heads of fans nearest the Alaska Range, to sand and silt at the bases of fans in the northern part of the basin. Coarse sediments on upper fans are well drained, but fine-grained sediments of lower fans are poorly drained. Frozen ground is within 20 inches of the surface in places and nearly 128 feet thick. Permafrost is absent beneath rivers and lakes, but is common wherever surface water or circulating groundwater is absent (Racine et al. 1990).

PB2.2.4 Water Resources

PB2.2.4.1 Surface Water

Tanana Flats Training Area is drained by several streams: Wood River, Crooked Creek, Willow Creek, Clear Creek, McDonald Creek, and Bear Creek among them, which all drain into the Tanana River directly, or by way of Salchaket Slough. Lakes and ponds are numerous on Tanana Flats Training Area, and many freeze solid during the winter. Only a few are stocked by the Alaska Department of Fish and Game. Blair Lakes are the largest lakes on Tanana Flats Training Area.

The volume of flow fluctuates dramatically by season. During the long period of freeze, usually from October to May, flow is limited to seepage of groundwater from aquifers into streams. Many small streams freeze solid (zero discharge) during winter. Snowmelt typically begins in March or April and reaches its peak in June. Flow is greatest during June and July. By the end of July, most snow has melted, and a steady flow during August and September is sustained by rainfall (Nakata Planning Group 1987).

PB2.2.4.2 Groundwater

Groundwater is one of Tanana Flats Training Area's most valuable natural resources. With the exception of naturally occurring metals, groundwater quality is good in the Tanana Flats Training Area. Much of Tanana Flats Training Area is underlain by an alluvial aquifer. Groundwater potential is best along the alluvium of the Tanana River, where wells are capable of yielding 3,000 gallons per minute (gpm) at less than 200 feet in depth. Groundwater in the Tanana Flats Training Area tends to have relatively high, naturally occurring levels of metals, especially iron and arsenic. Elevated arsenic levels are prevalent in the upland areas. These are not related to human-caused pollution (Harding Lawson Associates 1996).

PB2.2.5 Climate

Tanana Flats Training Area has the northern continental climate of the Alaskan Interior, which is characterized by short, moderate summers; long, cold winters; and little precipitation or humidity. Weather is influenced by mountain ranges on three sides, which form an effective barrier to the flow of warm, moist, maritime air during most of the year. Surrounding uplands also cause settling of cold, Arctic air into Tanana Valley lowlands.

Average monthly temperatures in Tanana Flats Training Area range from –11.5^{o}F in January to 61.5^{o}F in July, with an average annual temperature of 26.3^{o}F. The record low temperature is –66°F, and the record high is 98°F. The average frost-free period is 95-100 days.

Prevailing winds are from the southwest in June and July, and from the north and northeast in winter. Average wind velocity is 5.3 miles per hour (mph). The greatest average wind speed is in spring, with a

high of 40 mph recorded in Fairbanks. Winds are 5 mph or less 60% of the time. Thunderstorms are infrequent, occurring only during late spring and early summer.

Average annual precipitation is 10.4 inches, most of which falls as rain during summer and early fall. Average monthly precipitation ranges from a low of 0.29 inches in April to a high of 1.86 inches in July. Average annual snowfall is 67 inches, with a record high of 168 inches during the winter of 1970-71. Average annual relative humidity is 55%, with lowest levels during spring and early summer (38% during mid-afternoon in May). Heavy fog is relatively common during December and January, with four or five foggy days each month. Ice fog can be expected any time temperatures drop below -30°F, but it is normally restricted to areas near human settlements where moisture is emitted from burning fuels (Bonito 1980).

PB2.3 Biological Resources

PB2.3.1 Flora

Tanana Flats Training Area encompasses a large amount of land with a wide array of physiographic features. Vegetation patterns are influenced by climate, soil, topography (slope, aspect, and elevation), depth to water table, permafrost, and fire. Tanana Flats Training Area has three vegetation types: treeless bogs, open, low-growing spruce forests, and closed spruce-hardwood forests. The white spruce-paper birch forest of interior Alaska is often called the boreal forest or taiga. Vegetation types of interior Alaska form a mosaic and reflect fire history, slope and aspect, and presence or absence of permafrost (Viereck and Little 1972).

PB2.3.1.1 Vegetative Profile

A typical vegetation profile from lowland, up a south slope, and down the north slope, would include the following: water, barren, high brush, deciduous forest, white spruce forest, moist tundra, black spruce forest, and mixed forest (Bonito 1980). This profile does not precisely match Viereck and Little's (1972) vegetation types, which were mapped on a statewide scale. Wetland occurs at various altitudes and sometimes only during early successional stages. Localized conditions often result in various combinations of vegetation.

- **Barren Land:** Barren ecosystems on Tanana Flats Training Area are recently deposited gravel bars in rivers.

- **High Brush:** The high brush ecosystem exists as a transitional zone, or ecotone, between forests and barren areas or tundra. It normally is a narrow vegetation band along floodplains or just above tree line. The size of the transitional zone varies dramatically, and in places where there is a well-defined tree line, it may be quite small. The high brush area, however small, is important ecologically. It sustains small to medium-sized woody plants and shrubs (no higher than 20 feet), including alder, willows, cottonwood, birch, mountain ash, and prostrate white spruce. Along floodplains, high brush forms a thick, almost impenetrable barrier. There is little or no ground cover. In subalpine settings, stands may be thinner and more persistent. Ground vegetation is grasses, mosses, small shrubs and forbs, and lichens that often form thick layers. A mixture of wildlife from the alpine and forested communities uses the area. The high brush ecosystem is particularly important for moose forage (Bonito 1980).

- **Forests:** Forests are dominant, diverse ecosystems on Tanana Flats Training Area. Vegetation ranges from pure stands of spruce or hardwoods to spruce/hardwood mixtures. Black spruce stands are found where drainage is poor, such as flat valley bottoms, lakesides, and muskegs. White spruce

stands are rare due to anemic soils and frequent wildfires. Pure stands of paper birch and quaking aspen are commonly found in well-drained uplands and ridge tops. Most forests are heterogeneous mixtures of spruce (white and black) and hardwoods. Predominant hardwoods are birch, quaking aspen, and balsam poplar. Higher, well-drained ridges tend toward stands with a white spruce/birch mixture in early stages leading to pure spruce at the climax stage. In other areas, aspen forms a canopy over an understory of white spruce. Bottomland white spruce/balsam poplar forest occurs on level floodplains, low river terraces, and south slopes. White spruce is dominant and reaches a height of 110 feet. Stands may persist for 50 to 200 years before being replaced by black spruce. Moss gradually accumulates as the forest ages. The deep mat insulates the permafrost below and prevents summer thaw, giving rise to wetter conditions that favor black spruce. Lowland black spruce/hardwood is the most common forest type in interior Alaska. On colder, northern aspects, black spruce may occur up to 2,500 feet (Bonito 1980).

- **Wetland:** On Tanana Flats Training Area, wetland can be divided into marshes and shrub wetland. Much of Tanana Flats Training Area is covered by treeless, herbaceous marsh. These marshes are unique in that they are largely dependent upon groundwater discharge and usually develop as floating vegetation mats over deeper water. The floating mat consists of a dense network of roots and organic material of variable thickness. Standing water may or may not be present on top of the undisturbed mat and may or may not be moving. Dominant mat-forming plants are graminoid sedge, grass and horsetail species, and herbaceous broadleaf forbs, such as buckbean (*Menyanthes trifoliata*) and marsh marigold (*Caltha palustris*). In addition, submerged aquatics, such as bladderwort (*Utricularia* sp.), and floating aquatics, such as duckweed (*Lemma* sp.), are frequently found in these areas. Trees and shrubs are absent, except for occasional willows (Racine et al. 1990). These wetlands attract large numbers of trumpeter swans (*Cygnus buccinator*) and other waterfowl. Williams (1994) studied vegetation patterns in the Tanana Flats wetland complex. Her report includes plant species data from five survey plots and relationships among these species.

  Shrub wetland, also known as bogs, muskeg, and low brush, are associated with slightly higher relief on the edges of marshes, and in poorly-drained basins and depressions with cold, waterlogged soils. The surface consists primarily of a thick layer of peat over a mottled, gray silt or silt loam. The water table, if not exposed, is found only a few inches down. During periods of heavy precipitation, bogs may form temporary lakes. Depth to ice-rich permafrost is often less than 30 inches. Ground cover is characterized by dense accumulations of mosses, lichens, sedges, rushes, liverworts, mushrooms, and other fungi. Stunted black spruce occasionally appears. Along margins of bogs and in drier areas, grasses, small shrubs, berries, and woody plants, such as willow and bog birch, proliferate (Bonito 1980).

The interaction of soils, permafrost, and vegetation on lowland sites results in a dynamic mosaic of ecosystems. Dead and falling trees along the boundary between marsh and forested upland or forested islands suggest massive permafrost thaw and subsidence. Heat is transferred from marsh water to the permafrost, with subsequent melting and subsidence of the upland surface. This results in shrinkage of forested islands and uplands. Conversely, forested islands may expand through a rising of the permafrost table. This results in the rise of the peat above the water level, improving drainage, and allowing trees to become established (Racine et al. 1990).

Fire plays a significant role in forest development. More than 100,000 acres have burned on Tanana Flats Training Area since 1980. White spruce stands may persist for 200 years in the absence of fire. Alternatively, over a 60-year period, a burned stand can progress from willow to aspen/birch to white spruce/birch, and eventually to a mature black spruce forest. Wet muskeg sites may recover to complete vegetative cover in three to five years, while lichens may take 50-100 years. Single fire events in a white

spruce/hardwood stand may perpetuate white spruce/birch communities, while repeated fires result in birch/aspen communities (Bonito 1980).

PB2.3.1.2 Floristics Inventory

During 1995-1996, the Cold Regions Research Engineering Laboratory conducted a floristic inventory for USAG-AK at Fort Wainwright, including Tanana Flats Training Area (Tande et al. 1996). The inventory focused on vascular plants, so cryptogams (i.e., mosses and lichens) were not identified. The inventory found 491 taxa (including subspecies and varieties), representing 227 genera in 72 families. This is about 26% of Alaska's vascular flora. At least 10 taxa collected represented extensions of known ranges (Tande et al. 1996). Plants were collected from five units within the Tanana Flats of the Tanana-Kuskokwim Lowland.

PB2.3.1.3 Threatened or Endangered, and Species of Concern Plants

A comprehensive survey of rare plants was included as part of the floristic inventory for Fort Wainwright and Tanana Flats Training Area conducted in 1995. Only two plant species on the federal endangered species are known to occur in Alaska. Neither species' current or historic ranges include Fort Wainwright, and a report released in 1996 indicated that there are no federally listed endangered or threatened plant species on Fort Wainwright or Tanana Flats Training Area (Tande et al. 1996).

There are, however, 16 vascular plant species of concern that are known to occur on Tanana Flats Training Area. These plants are being tracked by the Alaska Natural Heritage Program because they are thought to be uncommon or rare in Alaska and/or uncommon or rare globally (Alaska Natural Heritage Program. 2000). These species are listed below in Table PB-1 and are documented in the survey results of Tande et al. (1996).

There are no legal ramifications from these listings; rather, they are generated by the Heritage Program to help track the occurrence of these taxa across the state as more botanical work is conducted. The categories listed do not indicate known threats to these species, but they do represent the rather few collections known for each taxa in Alaska and the geographic distribution of those collections. All of these taxa are listed for management in the ecosystem management program for Tanana Flats Training Area.

Table PB-1. Tanana Flats Training Area Rare Plant Species.

SPECIES	ALASKA NATURAL HERITAGE PROGRAM RANKINGS	
	GLOBAL	STATE
Apocynum androsaemifolium	demonstrably secure	imperiled/rare or uncommon
Artemisia laciniata	demonstrably secure	imperiled
Carex crawfordii	demonstrably secure	imperiled or rare
Ceratophyllum demersum	demonstrably secure	imperiled
Cicuta bulbifera	demonstrably secure	critically imperiled or imperiled
Cryptogramma stelleri	demonstrably secure	imperiled or rare
Dodecatheon pulchellum ssp. *pauciflorum*	demonstrably secure	imperiled
Festuca lenensis	cause for concern	imperiled or rare
Glyceria pulchella	demonstrably secure	imperiled or rare
Lycopus uniflorus	demonstrably secure	rare or uncommon
Minuartia yukonensis	rare or uncommon	rare or uncommon
Myriophyllum verticillatum	demonstrably secure	rare or uncommon
Oxytropis tananensis	imperiled or rare	imperiled or rare

SPECIES	ALASKA NATURAL HERITAGE PROGRAM RANKINGS	
	GLOBAL	STATE
Pedicularis macrodonta	cause for concern	rare or uncommon
Rorippa curvisiliqua	demonstrably secure	critically imperiled
Rosa woodsii var. *woodsii*	demonstrably secure	critically imperiled or imperiled

PB2.3.1.4 Ecological Land Classification

An ecological land classification was done for Tanana Flats Training Area during 1994, 1995, and 1998. This report included mapping by geomorphology, permafrost, vegetation, ecotypes, ecosubdistricts, and ecodistricts (Jorgenson et al. 1999). The ecological land classification is a hierarchical means to classify land according to various ecological scales. The Tanana Flats ecological management unit contains portions of the Tanana Floodplain ecodistrict and the Tanana-Wood River Flats ecodistrict. The Tanana Floodplain ecodistrict on Tanana Flats is divided into the Eielson-Tanana Floodplain, Rosie Creek-Tanana Floodplain, Salchaket Slough Floodplain, and Salchaket Slough Lowlands. The Tanana-Wood River Flats ecodistrict on Tanana Flats is composed of Clear Creek Lowlands, Willow Creek Lowlands, Crooked Creek Lowlands, Dry Creek Lowlands, Wood River Lowlands, Little Delta River Lowlands, Tanana-Blair Lake Uplands, and Wood River Uplands eco-subdistricts.

PB2.3.1.5 Wetland

Wetlands on Tanana Flats Training Area consist of freshwater marshes and shrub wetland. Some wetlands may qualify as jurisdictional wetlands as defined in Section 404 of the Clean Water Act. Jurisdictional wetlands are determined by the Army Corps of Engineers on the basis of soils, vegetation, and hydrology. Tanana Flats Training Area has two wetland surveys completed: the National Wetlands Inventory and the Waterways Experiment Station inventory.

The National Wetlands Inventory for Tanana Flats Training Area was completed in 1992. The National Wetlands Inventory included 100% coverage of 11 of 14 map quads with less than 100% inventory of the other three quads. National Wetlands Inventory results were digitized by the Center for Ecological Management of Military Land in 1997. Some smaller wetlands and those obscured by dense forest cover may not be included in this inventory, which renders this survey inadequate for installation natural resources management programs. The U.S. Army Engineer Waterways Experiment Station completed a wetland delineation of Tanana Flats Training Area in 1998. The study included a review of existing information, a wetland identification, a Geographic Information System base map, a wetland characterization, and a final report. Wetlands were divided into five groups that do not clearly delineate all areas as either wetland or upland. It is necessary to conduct on-site investigations before making management decisions involving Section 404 of the Clean Water Act.

PB2.3.1.6 Forest Resources

A forest inventory is an integral part in establishing a plan for managing forest resources. The Tanana Flats Training Area Ecological Management Unit was inventoried by the Directorate of Public Works, Environmental Forestry Staff during the 2004 field season. Tree data was collected from permanent plots as part of an ongoing forest inventory and analysis of U.S. Army Alaska (USAG-AK) lands.

Stand Delineation and Inventory

Stand timber types were delineated utilizing aerial photography and satellite imagery to produce maps that demarcate land into forested and non-forested categories. This process was also used to help identify geographical coordinates for the plots and to establish permanent plots on the ground. Timber stands were further defined into types based on specific characteristics such as species composition, size, and spacing. These stand types are predefined by the Alaska Vegetation Classification system (Viereck et al. 1992). The USAG-AK inventory method further stratifies out stands with higher timber value, greater ecological

importance, and greater potential for military training. Stand timber typing was confirmed on the ground during stand inventory. The fixed plot radius sampling method was used for tree data collection.

Land Classification

The Tanana Flats Training Area contains a total of 652,269 acres of forest and non-forest land (Table PB-2). Forest lands in the project area occupy 46% of the land area or 297,918 acres. Non-forest land amounts to 54 % of the total project land area or 354,351 acres. The forested lands contain 82,390 acres of commercial forestland. Commercial forest lands are those lands containing sawtimber and poletimber size classes.

Table PB-2. Tanana Flats Training Area Forest Land Classification.

Forest Category	Commercial Forest Category	Forested Land Acreage	Total Acreage
Forested Lands	Commercial Forest	82,390 acres	297,918 acres
	Non-Commercial Forest Lands	215,528 acres	
Non-Forested Lands		0	354,351 acres
Total		297,918 acres	652,269 acres

Forest Land Area and Volume by Strata

The total volume found in the various types or strata is found in Table PB-3. The estimated total volume of timber in this area is 163,427,645 cubic feet. Of this amount, commercial saw and pole timber types represent 157,586,181 cubic feet. Reproduction, dwarf, and burned types account for the remaining 5,841,464 cubic feet.

The sawtimber type occupies 2.8% (8,381 acres) of the forested area and contains an estimated volume of 28,394,360 cubic feet. The white spruce-birch-aspen stratum makes up the majority of the sawtimber types with a volume of 22,829,280 cubic feet. Poletimber types occupy 10.6% (31,457 acres) of the forest land, with a total volume of 89,373,016 cubic feet. The white spruce-birch-aspen stratum is the largest in this category for acreage and volume. It occupies 8.6% (25,506 acres) of forested area and accounts for a total volume of 80,598,960 cubic feet. The pole/saw types account for 14.3% (42,552 acres) of forested lands and contain a volume of 39,818,805 cubic feet. The black and white spruce-birch-aspen pole/saw strata accounts for the largest portion of volume and acreage among the pole/saw strata. It represents 8.9% (26,574 acres) of the forested land and contains a volume of 28,248,162 cubic feet. While the dwarf/regeneration/burned strata's occupy most of the forested acreage, accounting for 72.3% (215,528 acres) of the forestland area, this type also accounts for the smallest volume with 5,841,464 cubic feet. This type does not contribute to the commercial volume estimates.

Each stratum has also been broken down into average stems per acre. The dwarf/regeneration/burned strata's are the smallest in this category. The poletimber types generally have the largest values of stems per acre. The white spruce-balsam poplar stratum has the largest value of average stems per acre with 301.

Table PB-3. Tanana Flats Training Area Forest Timber Type.

Forest Timber Type	Acres	Percent Forested Acres	Cubic Feet per Acre	Total Cubic Feet	Percent Volume Cubic Feet	Average Stems per Acre
Sawtimber						
(1) White Spruce	2,645	0.9%	2,104	5,565,080	3.4%	152

(8) White Spruce-Birch-Aspen	5,736	1.9%	3,980	22,829,280	14.0%	179
Subtotal:	**8,381**	**2.8%**		**28,394,360**	**17.4%**	
Poletimber						
(6) Balsam Poplar	1,940	0.7%	2,174	4,217,560	2.6%	292
(9) White Spruce-Birch-Aspen	25,506	8.6%	3,160	80,598,960	49.3%	274
(12)White Spruce-Balsam Poplar	4,011	1.3%	1,136	4,556,496	2.8%	301
Subtotal:	**31,457**	**10.6%**		**89,373,016**	**54.7%**	
Poletimber/Sawtimber						
(3) Black and White Spruce	10,157	3.4%	393	3,991,701	2.4%	162
(7) Birch-Aspen	5,821	2.0%	1,302	7,578,942	4.6%	196
(10) Black and White Spruce-Birch-Aspen	26,574	8.9%	1,063	28,248,162	17.4%	283
Subtotal:	**42,552**	**14.3%**		**39,818,805**	**24.4%**	
Dwarf/Regeneration/Burned Strata:						
(22) Other Coniferous	202,971	68.1%	17	3,450,507	2.1%	14
(24) Birch-Aspen	2,038	0.7%	208	423,904	0.3%	86
(26) Black and White Spruce-Birch-Aspen	10,519	3.5%	187	1,967,053	1.2%	69
Subtotal:	**215,528**	**72.3%**		**5,841,464**	**3.6%**	
Grand Total:	**297,918**	**100.0%**		**163,427,645**	**100.0%**	

Estimated Annual Harvest

An estimate of the annual allowable harvest is a guide for future harvest activities. Calculations are based on the simple area cut method. This method divides the total productive forest area by the rotation age. The result of this method gives the acreage that can be harvested in a year. The acreage is multiplied by the weighted average volume per acre to determine the annual harvest. The following white spruce and hardwood harvest acreage represent saw, pole, and pole/saw timber types; the majority is in the pole/saw type.

Table PB-4. Tanana Flats Training Area Estimated Annual Harvest.

Harvest Timber Type	Potential Harvest Land	Rotation Age	Regeneration Time	Total Rotation Length	Estimated Annual Harvest
White Spruce	74,629 acres	120 years	10 years	130 years	574 acres
Hardwoods	7,761 acres	80 years	10 years	90 years	86 acres

PB2.3.2 Fauna

Most vertebrate species indigenous to central Alaska can be found on Tanana Flats Training Area. Game species found on Tanana Flats Training Area are managed by Alaska Department of Fish and Game. Alaska Department of Fish and Game monitors these species to determine population status, reproductive success, harvest and home ranges. Alaska Department of Fish and Game also sets bag limits and seasons for these species. USAG-AK will cooperate with and contribute funds to help Alaska Department of Fish and Game monitor or study game species on an annual basis to ensure sustainable harvests, based on fund availability.

PB2.3.2.1 Bears

Black and grizzly bears are found throughout Tanana Flats Training Area. Both are hunted, although black bears are taken more often due to larger densities as reported by Alaska Department of Fish and Game (Seaton 2005 and Young 2005). In 1988 USAG-AK and Alaska Department of Fish and Game began a cooperative study of black bear demographics on Tanana Flats Training Area. Between 1988 and 1991, 45 individual bears were captured 111 times. From 1988 to 1990, 29 radio-collared bears were located 916 times. The 29 free-roaming bears caught included eight adult females (mean age 12 years), nine sub adult females (mean age 3.2 years), four adult males (mean age 7.8 years), and eight sub adult males (mean age two years). The sightability of non-denning bears during tracking flights was approximately 49%. Mean home range sizes were used to estimate densities of 46-67 bears/1,000 km^2. Forty-seven den sites were located. Fifteen den sites were in spruce habitat types, nine in birch/aspen stands, seventeen in alder/willow shrubs, six in heath meadows, and none in marshes. Availability of denning sites is not a limiting factor.

Bear harvest appeared to be directly linked to access, with a mean harvest of 11.2 bears/year from Tanana Flats Training Area during the study period. Overall harvest was judged to be sustainable (Hechtel 1991). No serious black bear conservation problems were identified related to Tanana Flats Training Area land management. Since 1974 (when harvested black bears were first required to be sealed), black bear harvest on Tanana Flats Training Area has varied from zero (1975) to 25 (1981). Black bear harvest on Tanana Flats Training Area is primarily opportunistic by moose hunters in fall (Hechtel 1991). Since 1974, the bag limit has been three bears annually with no closed season. Bear baiting was closed from 1977 through the 1982-83 season due to conflicts with pipeline construction activity. Since the 1983-84 season, the practice has been legal. Baiters must have permits. Harvest across Game Management Unit 20 has generally been higher since re-opening of baiting, but the difference is not statistically significant (Hechtel 1991). Grizzly bears are hunted during all but summer months. The bag limit is one bear every four regulatory years. Grizzly bears may not be taken over bait. Only a few grizzly bears (0-3 annually during the past five years) are harvested from Tanana Flats Training Area.

PB2.3.2.2 Moose

Tanana Flats Training Area is included in Alaska Department of Fish and Game's Game Management Unit 20, which supports the state's largest moose harvest. Although not considered good winter moose habitat compared to the foothills portion of Game Management unit 20A, the Tanana Flats Training Area supports year round resident moose population at moderate to high densities with the highest numbers during spring and early summer (Young 2004).

PB2.3.2.2 Wolves

According to the Alaska Department of Fish and Game, there are three wolf packs whose range may include army lands in the Tanana Flats. There are an additional three packs south of Tanana Flats on Donnelly Training Area and about four packs west of the Wood River. It is assumed that wolf populations are stable. Hunting is allowed during the normal state season for Unit 20 from August through April with a bag limit of five. Trappers may take an unlimited number of wolves during the trapping season. Wolves are currently monitored by Alaska Department of Fish and Game to determine pack size, home range, and effects on prey species.

PB2.3.2.3 Small Mammals

Small mammals play important ecological roles as secondary consumers and as prey for a variety of predators. The Alaska tiny shrew (*Sorex yukonicus*) is newly described and apparently rare, found in small numbers in widely separated parts of Alaska. Currently, little information exists regarding species and densities. Survey-inventory activities will be implemented under ADF&G guidelines and regulations.

PB2.3.2.4 Furbearers

Many Alaskan mammal species are listed as furbearers by the Alaska Department of Fish and Game. Population monitoring, trapping seasons and bag limits are set by Alaska Department of Fish and Game for these species.

PB2.3.2.5 Threatened, Endangered, or Rare Birds

The American peregrine falcon (*Falco peregrinus anatum*) was recently de-listed from endangered species status. Though not known to nest on Tanana Flats Training Area, it is an infrequent migrant. Potential peregrine falcon habitat for feeding or nesting can be found in the Salcha Bluff area (Ritchie and Rose 1998).

A federally listed threatened species in the lower 48, the bald eagle is locally common. The golden eagle (*Aquila chrysaetos*) is a resident of forest and alpine habitats of the installation (Nakata Planning Group 1987).

Seven birds are listed as state-sensitive (USAG-AK and Center for Ecological Management of Military Lands 1999), the gray-cheeked thrush (*Catharus minimus*), blackpoll warbler (*Dendroica striata*), American peregrine falcon, golden eagle, olive-sided flycatcher (*Contopus cooperi*), Arctic peregrine falcon (*Falco peregrinus tundrius)*, and Townsend's warbler (*Dendroica townsendi)*. The gray-cheeked thrush was noted in recent surveys (Bureau of Land Management and U.S. Army 1994). All but the Arctic peregrine falcon have been confirmed on Fort Wainwright (U.S. Army Alaska and the Center for Ecological Management of Military Lands 1999).

Two species confirmed on Fort Wainwright are considered sensitive by the U.S. Forest Service, the osprey (*Pandion haliaetus*) and trumpeter swans (*Cygnus buccinator*). A number of species confirmed on Fort Wainwright are included on the Boreal Partners in Flight Working Group (2005) as target or priority species for monitoring because of declines in populations noted across the Americas. There are no legal requirements to manage these species although all migratory bird species are afforded some protection under the Migratory Bird Treaty Act.

Rusty Blackbirds (*Euphagus carolinus*) have shown a chronic population decline in recent decades. The wetlands of interior Alaska are important breeding areas for this species, and may be one of their last strongholds. During the breeding season, they use moist woodlands, bushy bogs, wooded edges of watercourses, and possibly the edges of thermokarst ponds (Andres 1999 and Avery 1995).

PB2.3.2.6 Waterbirds

During migration periods, more than 300,000 sandhill cranes and 20,000 geese, ducks, and swans pass through the Delta area. The wetland complexes, ponds and lakes of the Tanana Flats Training Area may provide important staging sites for some migrating waterbirds. During the breeding season, documented trumpeter swan adult and cygnet counts, as determined from aerial surveys, have fluctuated considerably among years, however the long-term trend (1978-2006) clearly indicates a steady increase in both age classes, consistent with interior Alaska as a whole (Groves 2006)

PB2.3.2.7 Fish

The Tanana River supports king, chum and coho salmon, Arctic grayling, whitefish, longnose suckers, sheefish, burbot, pike, and sculpins. Salchaket Slough and Bear, McDonald, and Clear creeks have the best potential fish habitats in the Tanana Flats drainage.

PB2.3.2.8 Reptiles and Amphibians

The wood frog (*Rana sylvestris*) is the only amphibian residing in the interior of Alaska. There are no reptiles. Declines in amphibian populations are being recorded worldwide and in Alaska. Deformities in frogs are becoming more manifest, and reasons for the deformities are still unclear. Scant information is available on wood frog densities in interior Alaska.

PB2.3.2.9 Special Status Fauna

No federally listed threatened or endangered animals residide on Tanana Flats Training Area. The U.S. Fish and Wildlife Service, Office of Migratory Bird Management maintains a list of *Migratory Nongame Birds of Management Concern in the United States*. Alaskan species of management concern occuring on Tanana Flats Training Area include the trumpeter swan, common loon (*Gavia immer*), northern harrier (*Circus cyaneus*), northern goshawk (*Accipiter gentilis*), olive-sided flycatcher, alder flycatcher (*Empidonax alnorum*), gray-cheeked thrush, and blackpoll warbler.

Eighteen bird species found on Tanana Flats Training Area are exhibiting continant wide population declines, and have been delineated as target or priority species for monitoring by the Boreal Partners in Flight Working Group. There are no legal requirements to manage these species although all migratory bird species are afforded some protection under the Migratory Bird Treaty Act.

PB2.3.3 Special Interest Management Areas

Tanana Flats Training Area has several areas with special natural features. They harbor sensitive or unique wildlife species or represent unique plant communities. The following are special area categories and accompanying restrictions. Most areas have been digitized in the Geographic Information System, and maps showing restricted areas are available to project planners.

PB2.3.3.1 Wood River and Clear Creek Buttes

Buttes near Blair Lakes and along the Wood River have cultural and ecological significance. Many of these buttes have cleared helicopter pads for military training, especially since they are on high, relatively dry ground. These buttes will be placed off-limits to ground and vegetation-disturbing activities with exception of existing helicopter pads. This restriction should not impact military training since most missions on buttes require vegetative cover for concealment.

PB2.3.3.2 Moose Calving Areas on Tanana Flats

Alaska Department of Fish and Game has identified six parcels on Tanana Flats Training Area as important moose calving areas from 15 May through 30 June annually. The Army has agreed with Alaska Department of Fish and Game (U.S. Army 1986) to conduct operations in such a manner that will not adversely affect calving in these parcels between 15 May and 30 June. Since virtually no training occurs on Tanana Flats Training Area during warm months moose calving has not been hindered by the military.

PB2.3.3.3 Waterfowl Migratory Bird Area

The area between Willow Creek and Crooked Creek in Tanana Flats Training Area has many high function floating mat wetlands, which provide high quality habitat for many migratory birds. This area is placed off limits to all recreational vehicles use during the summer non-frozen months. There are no restrictions on hunting, trapping and fishing.

PB2.4 Cultural Resources

Less than two percent of Tanana Flats Training Area has been surveyed for archeological sites. Three districts (which include 47 sites) and one other site have been determined to be eligible for inclusion in the National Register of Historic Places by the Army and State Historic Preservation Officer.

Surveys have been generally very site specific, often required for planned construction projects. Most sites have been found on elevated buttes and on the shores of lakes. Only a relatively small portion of Tanana Flats Training Area has high sensitivity with regard to cultural resources, including the Blair Lakes Bombing Range and Maneuver Area portions.

PB3. Tanana Flats Training Area Management Prescriptions

PB3.1 Prescriptions and Policy

Tanana Flats Training Area ecological management sub-units include Tanana Flats Maneuver Area sub-unit (Training Areas 201, 205, 206, 207 and 208), Tanana Flats Fen Area sub-unit (Training Areas 202 and 203), Tanana Flats Special Interest Area sub-unit (Training Area 204), Dyke Range, Maneuver Area sub-unit, Alpha Impact Area sub-unit, and Blair Lakes Bombing Range sub-unit.

PB3.1.1 Military Use

Access during summer to all Tanana Flats Training Areas is limited to air and boat since no bridges span the Tanana River in this area. In the winter, an ice bridge can be constructed across the river making almost the entire area trafficable. Tanana Flats Training Areas are suitable for platoon, company, battalion and brigade-sized exercises and bivouacs, air-mobile operations, and ski and road marches in winter. These training areas are is suitable for air-mobile operations and foot training in summer. Willow Island Research Site is off-limits to military maneuver training. Activities that are not compatible with these training areas include mechanical digging in wetlands without a permit from the Corps of Engineers, and any permanent, nonmilitary structures, easements, or leases.

Alpha and Blair Lakes Impact Areas are suitable for indirect fire weapon training and aerial gunnery exercises. These areas are impacted by small arms and dud producing munitions and are the ground and associated airspace within Tanana Flats used to contain fired or launched ammunition and explosives and resulting fragments, debris, and components from various weapon systems. Maneuver training, travel, and other military training is prohibited in this unit due to the hazard of unexploded ordnance. Activities that are not compatible with the Alpha Impact Area and Blair Lakes Impact Area include any on-the-ground natural resources management, mechanical digging in wetland without a permit from the Corps of Engineers, hunting, fishing, trapping, bird watching, off-road recreational vehicles and motorized watercraft, dog mushing, airboats, camping, new construction, easements, or leases.

PB3.1.2 Access

Public access in the Tanana Flats Training Area is allowed for recreation subject to safety restrictions and military security, when access does not impair the military mission, as determined by the installation commander. Authorized users must obtain a free recreation access permit and call in to the USARTRAK system to check in and obtain information on temporary closures for military training.

Access into the Alpha Impact Area and Blair Lakes Impact Area is prohibited. Military personnel may request permission to enter the sub-unit and if granted, they must be accompanied by Explosive Ordnance

Disposal personnel. There is no public access allowed in the Alpha Impact Area and Blair Lakes Impact Area or impact area buffer because of the risk of unexploded ordnance.

PB3.1.3 Natural Resources Management

USAG-AK manages all Tanana Flats Training Area sub-units as "*modified*" natural resources management areas, except for the impact areas, which are managed as "*limited*". Modified management areas are areas that receive use, are not accessible by road, but are open to public access. All forms of surveys, monitoring, and active management of land, forest, fish and wildlife, and recreation resources may be conducted, but may not be practical. Limited management areas are sub-units where public access is prohibited. Methods of ecosystem management will concentrate on remote monitoring and passive means of conducting management. Fire protection option for all Tanana Flats Training Area sub-units is "*limited*" protection. This option recognizes areas where natural fire is important or the values at risk do not warrant the expense of suppression. Limited management areas receive routine detection effort. Attack response is based on needs to keep the fire within Limited management areas and to protect individual Critical management sites within Limited management areas. Unmanned fires are monitored. The Bureau of Land Management retains vegetation rights in all of Tanana Flats except for Dyke Range, where vegetation rights are controlled by the Army. All Tanana Flats sub-units are "*open*" to hunting, fishing and trapping during seasons established by Alaska Department of Fish and Game, except the impact areas, which are always "*closed*". Tanana Flats sub-units and their corresponding management options are shown in Table PB-5.

Table PB-5. Tanana Flats Training Area Ecosystem Management Prescriptions.

Ecosystem Management Sub-unit	Natural Resource Management Priorities	Fire Suppression Category	Vegetation Management	Hunting and Trapping	Fishing	Recreational Use Management
Training Areas 201, 205, 206, 207 and 208	Modified	Limited	BLM	Open	Open	Open
Training Area 202 and 203	Modified	Limited	BLM	Open	Open	Open*
Training Area 204	Modified	Limited	BLM	Open	Open	Limited
Dyke Range	Modified	Limited	Army	Open	Open	Limited
Alpha Impact Area	Limited	Limited	BLM	Closed	Closed	Closed
Blair Lakes Impact Area	Limited	Limited	BLM	Closed	Closed	Closed

The Recreation use category for Training Areas 201, 202, 203, 205, 206, 207, and 208 is "open". off-road recreational vehicles under 1500 pounds are permitted on established trails unless there is 12 inches of ground frost and six inches of snow pack on the ground when they can move anywhere across country. off-road recreational vehicles larger than 1500 pounds are not permitted in Tanana Flats Training Area except when there are 12 inches of ground frost and six inches of snow pack on the ground when they are restricted to established trails. Outside of Training Areas 202 and 203, motorized watercraft are permitted but must stay within open water channels.

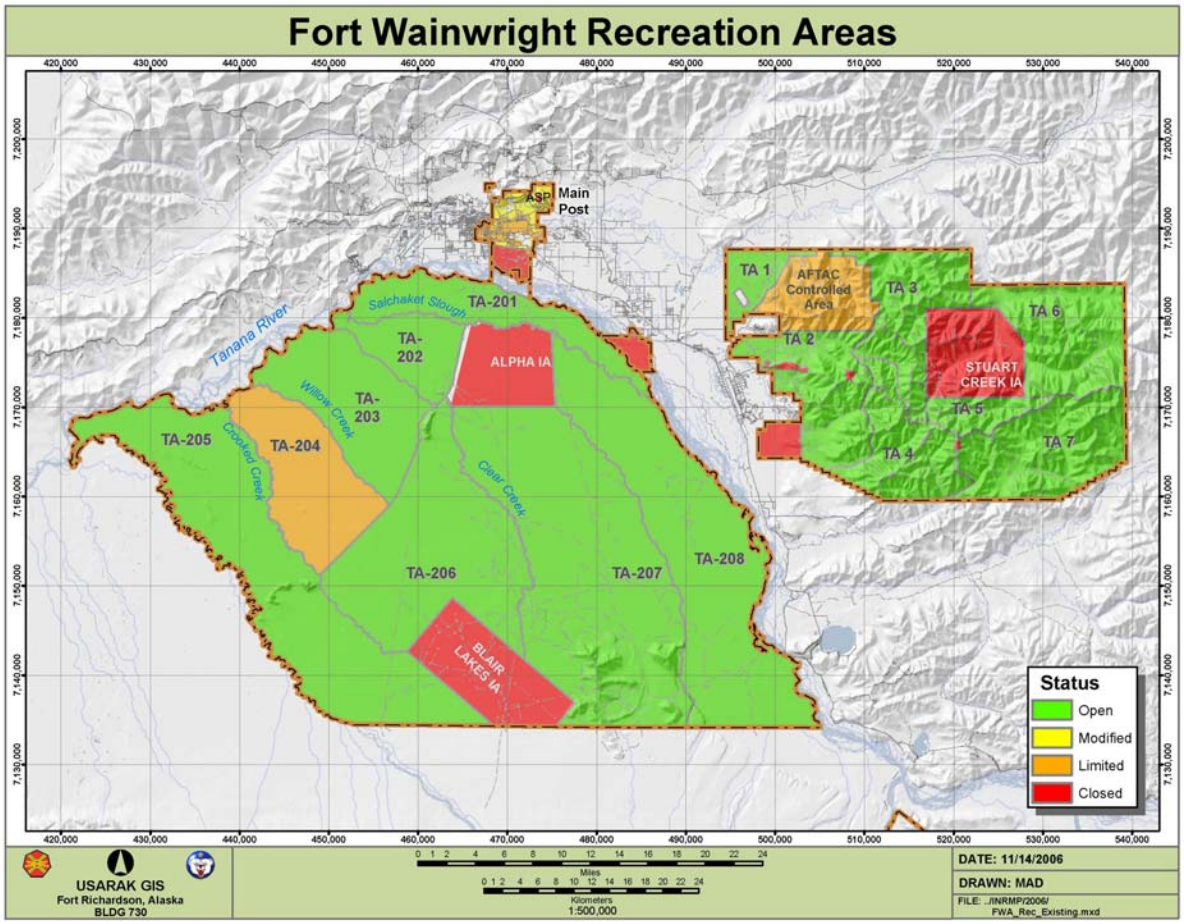
Training Areas 202 and 203 (the upper and lower fens between Salchaket Slough and Willow Creek) are managed as a Special Use Management Area. These training areas would be open to airboats and other motorized watercraft with no restrictions between 15 August and 1 April each year. Between 1 April and

15 July, training areas 202 and 203 are off limits to all off-road recreational vehicles, including airboats and other motorized watercraft. Between 15 July and 15 August, access into the lower fen (Training Area 202) and upper fen (Training Area 203) is managed separately based on water levels.

Clear Creek and Wood River Buttes, Moose calving areas, and Training Area 204 (Willow Creek/Crooked Creek Migratory Bird Area) are managed as special interest areas. Recreation Use category is "limited". Access into Training Area 204 remains closed to all motorized vehicles from 1 April – 30 October.

USAG-AK manages the Tanana Flats Training Area Alpha and Blair Lakes Impact Areas as a "*limited*" management area. Alpha and Blair Lakes Impact Areas are *"closed"* to hunting and trapping. Recreational Use category is "*closed"*. Recreation use areas on Tanana Flats Training Area is shown in Figure P-4.

Figure P-4. Tanana Flats Training Area Recreation Use Areas



Tanana Flats Training Area is not an approved federal or state subsistence area. Tanana Flats Training Area is a traditional subsistence area for upper Tanana tribes. There is no subsistence preference for any subsistence user but any subsistence user may conduct approved subsistence activities after acquiring any required state licenses, USAG-AK recreation access permit, and checking in with USARTRAK.

USAG-AK will comply with all laws, regulations, and Executive Orders pertaining to natural resources management on Tanana Flats Training Area. USAG-AK will complete ongoing projects and conduct full

implementation of ecosystem management projects. USAG-AK will conserve physical resources by conducting Integrated Training Area Management, watershed management, and minerals management. USAG-AK will conserve biological resources by conducting wetland management, forest management, fish and wildlife management, endangered species management, pest management, and urban area management. USAG-AK will integrate social (human) resources into ecosystem management by conducting education, awareness and public outreach, conservation enforcement, outdoor recreation management, and cultural resources management. USAG-AK will support ecosystem management decision-making through implementation of National Environmental Policy Act, Geographic Information System, and other decision support systems, and integration with other land management programs such as Sustainable Range Program and Sustainment, Restoration and Modernization Program.

PB3.2 Projects

Table PB-6 lists Tanana Flats Training Area Ecosystem Management projects for 2007 through 2011.

Table PB-6. Tanana Flats Training Area Ecosystem Management Projects.

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Forest Inventory / Monitoring	Forest Stand Mapping	x	x	x	x	x
High	Inventory and Monitoring	PMO Game Warden Coordination	x	x	x	x	x
High	Inventory and Monitoring	Recreational Impact Monitoring	x	x	x	x	x
High	Inventory and Monitoring	Trespass Cabin Monitor	x	x	x	x	x
High	Inventory/Monitoring	Breeding Bird Surveys	x	x	x	x	x
High	Inventory/Monitoring	Caribou population monitor; 20A/D	x	x	x	x	x
High	Inventory/Monitoring	Fisheries Planning Level Surveys	x	x	x	x	x
High	Inventory/Monitoring	Moose Population Surveys; 20A/B	x	x	x	x	x
High	Inventory/Monitoring	Rusty Blackbird Surveys	x	x	x	x	x
High	Inventory/Monitoring	Trumpeter Swan Brood Surveys	x	x	x	x	x
High	Management	Erect signs designating boundaries of Special Interest Areas	x	x	x	x	x
High	Outreach	Annual Review and Input to ADFG Fishing Regulations	x	x	x	x	x
High	Outreach	Fairbanks Newsminer Hunting Edition	x	x	x	x	x
High	Outreach	Newcomers Briefings	x	x	x	x	x
High	Outreach	Outdoor Recreation Supplement	x	x	x	x	x
High	Outreach	Range Control coordination	x	x	x	x	x
High	Outreach	Recreation Access Permits	x	x	x	x	x
High	Outreach	Recreation User Group Meetings	x	x	x	x	x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Outreach	Update Information Kiosks	x	x	x	x	x
High	Outreach	USARTRAK Brochure	x	x	x	x	x
High	Plan Watershed and Wetland Projects	Alpha Impact Area Survey Line					x
High	Recreational Activities	Off Road Vehicle Management	x	x	x	x	x
High	Suppression	Conduct fire suppression activities as necessary.	x	x	x	x	x
High	Survey and Monitoring	Conduct T&E Species Survey	x	x	x	x	x
High	Trespass Structure Abatement	Trespass Cabin and Camps Removal	x	x	x	x	x
High	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	x	x	x	x	x
High	Wildland Fire Management	Develop program of providing assistance to training military units during periods of high fire danger.	x	x	x	x	x
High	Wildland Fire Monitoring	Collect fuel-loading information as part of the forest inventory.	x	x	x	x	x
High	Wildland Fire Monitoring	Delineate and maintain Geographic Information System data layers showing historical fires.	x	x	x	x	x
High	Wildland Fire Monitoring	Map all known cultural features on suppression maps and develop fire management recommendations for these features.		x			
High	Wildland Fire Monitoring	Map all known natural resources features and areas of concern from wildland fire suppression and management activities on suppression maps. Develop management strategies to avoid conflicts with these natural resource features and areas of concern.			x		
High	Wildland Fire Monitoring	Map all known non-sensitive structures on USAG-AK.				x	
High	Wildland Fire Monitoring	Map all military structures on suppression maps. Assess fire suppression options and recommendations for these structures.		x			
High	Wildland Fire Monitoring	Map past areas where ordnance has been used and develop pre-suppression plans on how to deal with wildland fire suppression in these areas.	x	x	x	x	x
High	Wildland Fire Monitoring	Research causes of fire ignitions on USAG-AK to identify areas of high fire occurrence				x	
High	Wildland Fire Monitoring	Research weather patterns influencing fire behavior and historical weather analysis for each land unit of USAG-AK.	x				
High	Wildland Fire Monitoring	Update fire history map of USAG-AK.			x		

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Wildland Fire Monitoring	Update fire maps with military special use areas and fire management options for these areas.	x				
High	Wildland Fire Monitoring	Update fuels map of USAG-AK.			x		
High	Wildland Fire Planning	Develop Geographic Information System for military fire management office and for use on incidents with current data, maps, photos, suppression options, and restrictions.	x	x	x	x	x
High	Wildland Fire Planning	Develop plans and fuel treatment projects to reduce the threat of fires starting on military lands and impact areas and burning onto adjacent lands of high resource value.		x			
High	Wildland Fire Planning	Develop plans for proposed prescribed fires on USAG-AK.	x	x	x	x	x
High	Wildland Fire Planning	Develop standard operation procedures for each area unit of USAG-AK to assist firefighters and Incident Commanders in establishing priorities, making decisions, dealing with ordnance issues.	x	x	x	x	x
High	Wildland Fire Pre-Suppression	Identify and use fuel reduction treatments to reduce the threat of wildland fire at the urban/wildland interface, military structures, selected training areas, and cultural resources.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop and disseminate procedures for detection and reporting of fires.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop more effective means of calculating fire weather indices for localized training areas and implement a program of relaying fire danger ratings to training units.	x	x	x	x	x
Med	Habitat Management	Moose Habitat Evaluation					
Med	Inventory and Monitoring	Recreational Facility Survey	x		x		x
Med	Inventory and Monitoring	Recreational Impacts: Fishing		x		x	
Med	Inventory and Monitoring	Survey airstrips	x				
Med	Inventory and Monitoring	Fauna Planning Level Survey	x	x	x	x	x
Med	Inventory and Monitoring	Fish monitoring TFTA	x	x	x	x	x
Med	Inventory and Monitoring	Flora Planning Level Survey	x	x	x	x	x
Med	Inventory and Monitoring	Moose Habitat mapping					
Med	Inventory and Monitoring	Owl Surveys	x	x	x	x	x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
Med	Inventory and Monitoring	Raptor Surveys					
Med	Inventory and Monitoring	Small Mammal Surveys	x	x	x	x	x
Med	Inventory and Monitoring	Soils Planning Level Survey	x	x	x	x	x
Med	Inventory and Monitoring	Solitary Sandpiper Surveys	x	x	x	x	x
Med	Inventory and Monitoring	Stream Evaluation	x	x	x	x	x
Med	Inventory and Monitoring	Surface Water Monitoring	x	x	x	x	x
Med	Inventory and Monitoring	Surface Water Planning Level Survey	x	x	x	x	x
Med	Inventory and Monitoring	Threatened & Endangered Species					
Med	Inventory and Monitoring	Topography Planning Level Survey	x	x	x	x	x
Med	Inventory and Monitoring	Trumpeter Swan Habitat mapping					
Med	Inventory and Monitoring	Vegetation Communities Planning Level Survey	x	x	x	x	x
Med	Inventory and Monitoring	Wetlands Monitoring	x	x	x	x	x
Med	Inventory and Monitoring	Wetlands Planning Level Survey	x	x	x	x	x
Med	Inventory and Monitoring	Whimbrel Colony Monitor	x	x	x	x	x
Med	Inventory and Monitoring	Wild Ponds/Lakes survey	x	x	x	x	x
Med	Inventory and Monitoring	Wood Frog Breeding Surveys	x	x	x	x	x
Med	Outreach	FWA Post TV Notices	x	x	x	x	x
Med	Outreach	PAO Radio Spots	x	x	x	x	x
Med	Outreach	Recreation Outreach at Public Events	x	x	x	x	x
Med	Outreach	Write Fairbanks Newsminer AK Post Stories	x	x	x	x	x
Med	Population Management	Harvest Trends: Black Bear Baiting	x	x	x	x	x
Med	Population Management	Harvest Trends: Furbearers	x	x	x	x	x
Med	Population Management	Nuisance/injured Wildlife Issues	x	x	x	x	x
Med	Vegetation Management	Alpha Impact Area Burn	x				
Med	Wildland Fire Planning	Develop pre-suppression plans for each of the area units of USAG-AK.		x			
Med	Forest Inventory / Monitoring	Continuous Forest Inventory	x	x	x	x	x
Med	Forest Land	Alpha Impact Area	x	x		x	

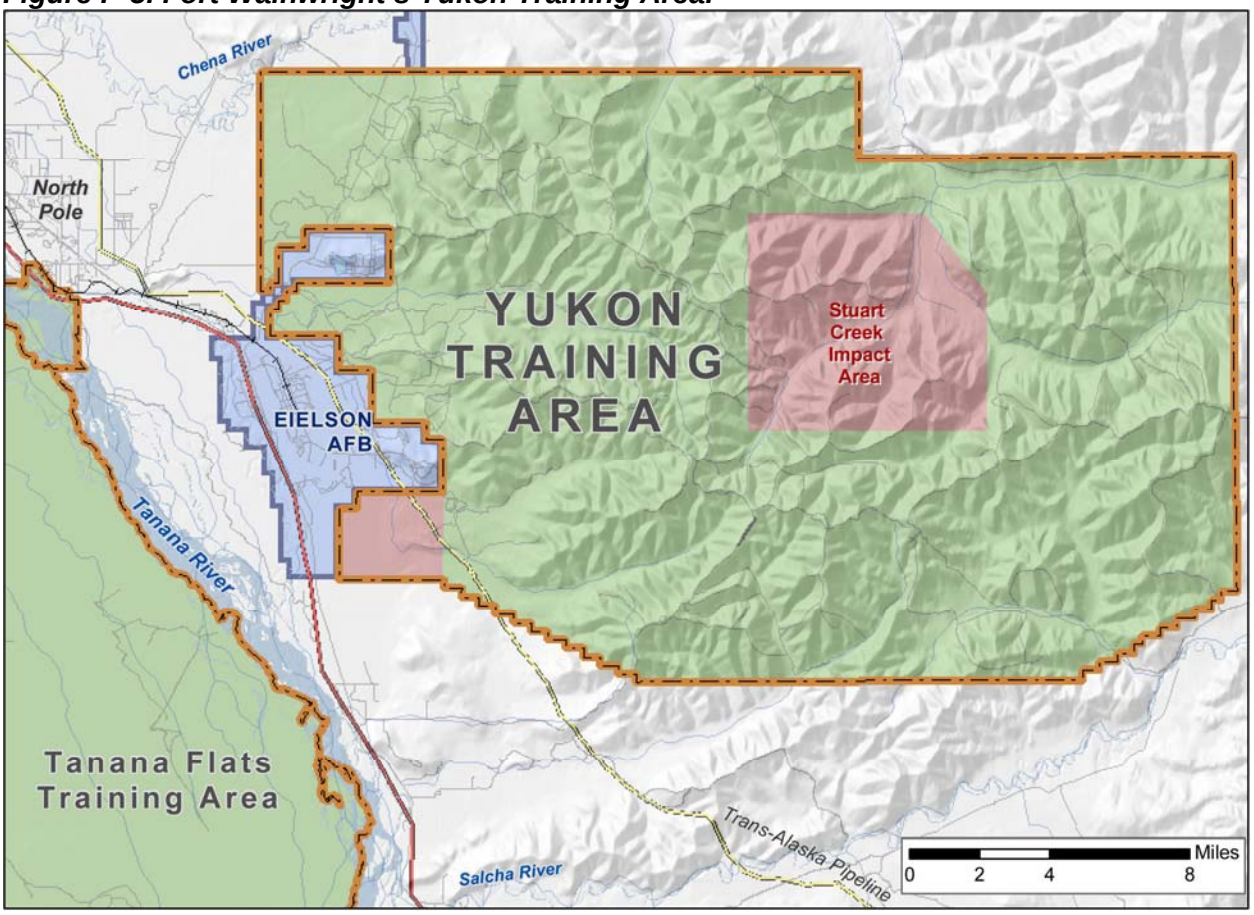
Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
	Improvement						
Low	Habitat Improvement	Tanana Flats Habitat Enhancement		x	x	x	x
Low	Habitat Management	Osprey Nesting Poles					
Low	Habitat Management	Owl Boxes	x	x	x	x	x
Low	Inventory and Monitoring	Map Winter Trails		x			
Low	Inventory and Monitoring	Beaver dams/hydrology TFTA					
Low	Inventory and Monitoring	Waterbird surveys	x	x	x	x	x
Low	Outreach	Interpretive Panels			x		
Low	Outreach	Recreation Surveys	x	x	x	x	x
Low	Outreach	Viewing Platform Material Update			x		
Low	Project Management	Stocked Lakes	x	x	x	x	x
Low	Public Outreach	Wildlife Information /Brochures/presentations					

PC. FORT WAINWRIGHT YUKON TRAINING AREA ECOLOGICAL MANAGEMENT UNIT

PC1. Location

The Yukon Training Area is 16 miles east-southeast of Fairbanks, adjacent to Eielson Air Force Base. The Yukon Training Area is roughly rectangular, stretching 28 miles east-to-west and 17.5 miles north-to-south. Yukon Training Area encompasses much of the land between the Chena and Salcha rivers, northeast of the Richardson Highway (Bureau of Land Management and U.S. Army 1994) almost 260,000 acres. The Chena River State Recreation Area lies adjacent to Yukon Training Area's northern boundary and is managed for public recreation. Eielson Air Force Base adjoins the western boundary of the Yukon Training Area. The Tanana Valley State Forest lies north of Fort Wainwright with private and Fairbanks Northstar Borough-owned land parcels to the south. Parcels of native-owned land also border Yukon Training Area. Yukon Training Area is shown in Figure P-5.

Figure P-5. Fort Wainwright's Yukon Training Area.



PC2. Environment

PC2.1 Facilities

PC2.1.1 Range Facilities

The Yukon Training Area has one demolition range which is similar to an impact area. 26 mortar and artillery firing points utilize Stuart Creek Impact Area on Yukon Training Area. A new Digital Multipurpose Training Range and Infantry Platoon Battle Course are also located on Yukon Training Area. Husky Drop Zone, which supports strategic airborne operations, is also located in Yukon Training Area.

PC2.1.2 Transportation System

Yukon Training Area can only be accessed by road from the west through Eielson Air Force Base or from the south on Johnson Road. There are no paved roads on Yukon Training Area, but there are over 150 miles of gravel roads and undeveloped trails. Yukon Training Area can be accessed by air at the Firebird landing strip.

PC2.2 Physical Resources

PC2.2.1 Topography

Yukon Training Area lies within the Yukon-Tanana Uplands, consisting of rounded, even-topped ridges with gentle side slopes, broad divides, flat-topped spurs, and gently sloping plains. Ridges occupy nearly 10 percent of the area, oriented in a northeast-southwest direction (Bonito 1980). Elevations range from 192 to 3,285 feet.

PC2.2.2 Geology

Bedrock of the Yukon-Tanana Uplands, including most of Yukon Training Area, is characterized by a complex assemblage of Precambrian and Paleozoic-age metamorphic rocks of the Yukon-Tanana crystalline complex (formerly known as the Birch Creek schist). These rocks were later intruded by Cretaceous and Tertiary-age igneous rocks, resulting in a few exposed areas of granite and quartz diorite. Silty micaceous loess, derived from outwash plains south of the Tanana River, was deposited over most of the area during the Pleistocene and Holocene. Some areas are covered by Quaternary deposits, with the most recent deposits occurring along stream valleys in the form of well-stratified gravel, sand, and silt (Bureau of Land Management and U.S. Army 1994).

PC2.2.2.1 Seismicity

Yukon Training Area is in the Salcha seismic zone, a distinct northeast-trending band of epicenters about 50 kilometers long (Page et al. 1991, Alaska Earthquake Information Center and U.S. Geological Survey 1997). Although the epicenters form a conspicuous pattern, no associated fault movement has been identified (Page et al. 1991). The Salcha earthquake of 1937 was one of the largest ever recorded in the Interior, with a magnitude of 7.3. Its epicenter was less than 10 miles from the southwest corner of the Yukon Training Area. In 1996, an earthquake with a magnitude of 4.2 occurred on the Yukon Training Area east of Eielson Air Force Base (U.S. Geological Survey National Earthquake Information Center 1998; Alaska Earthquake Information Center 1998). Many smaller earthquakes are routinely detected.

PC2.2.2.2 Petroleum and Minerals

Mineral resources management on Yukon Training Area is the responsibility of the Bureau of Land Management. Yukon Training Area is exempt from provisions of the Mining Law of 1872, the Mineral Leasing Act of 1920 as amended, the Mineral Leasing Act for Acquired Lands of 1947, and the Geothermal Steam Act of 1970. The withdrawal is closed to all forms of mineral material disposal, both

sale and free use, other than that which supports military activity (Bureau of Land Management and U.S. Army 1994).

Measures to safeguard resource values outlined in 43 CFR 3100, 43 CFR 3600, and 43 CFR 3809 apply to mineral development on withdrawn lands. Under terms of the Defense Appropriations Act of 2000, should withdrawn lands be opened to mineral location, mineral patents could convey title to locatable minerals only. These patents would also carry the right to use as much of the surface as necessary for mining under guidelines established by the Secretary of the Interior by regulation (Bureau of Land Management and U.S. Army 1994).

Yukon Training Area has a low potential for oil or gas deposits, and no known potential for coal and oil shale. Yukon Training Area has no potential for concentrations of phosphate, sodium, potassium, or gilsonite, and moderate potential for geothermal resources (Bureau of Land Management and U.S. Army 1994). There has never been significant mining activity on Yukon Training Area, and the area has been closed to mineral exploration since the 1950s. Placer mining has occurred south and east of Yukon Training Area, and portions of Yukon Training Area have a moderate to high potential for gold and tin deposits (Center for Ecological Management of Military Lands 1998). Historic placer mines are reported on Beaver Creek and Pine Creek. Records from the state of Alaska show a claim staked on a tributary of French Creek in the southwestern part of Yukon Training Area. No valid claims exist now.

The *Proposed Yukon Training Area Resources Management Plan Final Environmental Impact Statement* prohibits mining in drop zones and landing fields, and within one mile of all existing roads and major trails, to maintain safe military operations and training. Mineral material sites are an exception to the one-mile off-limits designation. The military may use sand and gravel for its own purposes. Large amounts of sand and gravel are available just west of Yukon Training Area, and there is high potential for localized sand and gravel in some stream valleys on Yukon Training Area (Bureau of Land Management and U.S. Army 1994).

PC2.2.3 Soils

Soils on Yukon Training Area have been mapped at a broad exploratory level of survey. South slopes consist of well-drained silt loams and are generally free of permafrost. Loams grade from shallow, gravelly silt near ridge tops, to silt loams on mid-slopes, to deep, moist silt loams on lower slopes. Drainage bottoms and depressions are occupied by shallow, gravelly silt loam covered with a thick layer of peat and underlain by permafrost. Soils on north-facing slopes are shallow, gravelly silt loams with thick covers and permafrost (Bureau of Land Management and U.S. Army 1994). A partial soil survey was completed in 2000.

PC2.2.4 Water Resources

Northern and northeastern portions of Yukon Training Area are drained by the Chena River and its tributaries: the South Fork Chena River, Hunts Creek, and Horner Creek. The southern portion of Yukon Training Area is drained by Ninety-Eight Creek, a tributary of the Salcha River and the Little Salcha River. Streams draining the western portion of Yukon Training Area flow directly, or by way of Piledriver Slough, into the Tanana River. All streams originating on Yukon Training Area have their headwaters in the Yukon-Tanana Uplands, in rolling glacier-free terrain (Bureau of Land Management and U.S. Army 1994).

Surface water quality on Yukon Training Area is generally good. The Chena River, from the Chena Slough to the confluence with the Tanana River, has been classified by the state of Alaska as Class A (suitable for agriculture, aquaculture, and industrial), Class B (suitable for water recreation), and Class C

(suitable for growth and propagation of fish, shellfish, other aquatic life, and wildlife). The pH of the Chena River is slightly above neutral during winter and slightly below neutral in summer. Nitrogen concentration is high in relation to phosphate, which may be the limiting inorganic nutrient for phytoplankton production. Only naturally occurring iron concentrations were higher than the secondary state standards. The high iron concentration in the lower portion of the Chena River may be the result of surface water and groundwater discharge from swampy, muskeg areas in this region. Sediment loads are generally low. Non glacier-fed streams generally carry less than 300 mg/l during high flow and as little as 10 mg/l during low flow periods (Bureau of Land Management and U.S. Army 1994).

PC2.2.5 Climate

Yukon Training Area has the northern continental climate of the Alaskan interior, which is characterized by short, moderate summers, long, cold winters, and little precipitation or humidity. Weather is influenced by mountain ranges on three sides, which form an effective barrier to the flow of warm, moist, maritime air during most of the year. Surrounding uplands also cause settling of cold, Arctic air into Tanana Valley lowlands.

Average monthly temperatures in Yukon Training Area range from –11.5^{o}F in January to 61.5^{o}F in July, with an average annual temperature of 26.3^{o}F. The record low temperature is –66°F, and the record high is 98°F. The average frost-free period is 95-100 days. Prevailing winds are from the southwest in June and July, and from the north and northeast in winter. Average wind velocity is 5.3 miles per hour (mph). The greatest average wind speed is in spring, with a high of 40 mph recorded in Fairbanks. Winds are 5 mph or less 60% of the time. Thunderstorms are infrequent, occurring only during late spring and early summer.

Average annual precipitation is 10.4 inches, most of which falls as rain during summer and early fall. Average monthly precipitation ranges from a low of 0.29 inches in April to a high of 1.86 inches in July. Average annual snowfall is 67 inches, with a record high of 168 inches during the winter of 1970-71. Average annual relative humidity is 55%, with lowest levels during spring and early summer (38% during mid-afternoon in May). Heavy fog is relatively common during December and January, with four or five foggy days each month. Ice fog can be expected any time temperatures drop below -30°F, but is normally restricted to areas near human settlements where moisture is emitted from burning fuels (Bonito 1980).

PC2.3 Biological Resources

PC2.3.1 Flora

Yukon Training Area encompasses a large amount of land with a wide array of physiographic features. Vegetation patterns are influenced by climate, soil, topography (slope, aspect, and elevation), depth to water table, permafrost, and fire.

Yukon Training Area has four vegetation types: moist tundra, treeless bogs, open, low-growing spruce forests, and closed spruce-hardwood forests. The white spruce-paper birch forest of interior Alaska is often called the boreal forest or taiga. Vegetation types of interior Alaska form a mosaic and reflect fire history, slope and aspect, and presence or absence of permafrost (Viereck and Little 1972).

PC2.3.2.1 Vegetative Profile

A typical vegetation profile from lowland, up a south slope, and down the north slope, would include the following; water, barren, high brush, deciduous forest, white spruce forest, moist tundra, black spruce forest, and mixed forest (Bonito 1980). This profile does not precisely match Viereck and Little's (1972) vegetation types, which were mapped on a statewide scale. Wetland occurs at various altitudes and

sometimes only during early successional stages. Localized conditions often result in various combinations of vegetation.

- **High Brush:** The high brush ecosystem exists as a transitional zone, or ecotone, between forests and barren areas or tundra. It normally is a narrow vegetation band along floodplains or just above tree line. The size of the transitional zone varies dramatically, and in places where there is a well-defined tree line, it may be quite small. The high brush area, however small, is important ecologically. It sustains small to medium-sized woody plants and shrubs (no higher than 20 feet), including alder, willows, cottonwood, birch, mountain ash, and prostrate white spruce. Along floodplains, high brush forms a thick, almost impenetrable barrier. There is little or no ground cover. In subalpine settings, stands may be thinner and more persistent. Ground vegetation is grasses, mosses, small shrubs and forbs, and lichens that often form thick layers. A mixture of wildlife from the alpine and forested communities uses the area. The high brush ecosystem is particularly important for moose forage (Bonito 1980).

- **Forests:** Forests are dominant, diverse ecosystems on Yukon Training Area. Vegetation ranges from pure stands of spruce or hardwoods to spruce/hardwood mixtures. Black spruce stands are found where drainage is poor, such as flat valley bottoms, lakesides, and muskegs. White spruce stands are rare due to anemic soils and frequent wildfires. Pure stands of paper birch and quaking aspen are commonly found in well-drained uplands and ridge tops. Most forests are heterogeneous mixtures of spruce (white and black) and hardwoods. Predominant hardwoods are birch, quaking aspen, and balsam poplar. Higher, well-drained ridges tend toward stands with a white spruce/birch mixture in early stages leading to pure spruce at the climax stage. In other areas, aspen forms a canopy over an understory of white spruce. Bottomland white spruce/balsam poplar forest occurs on level floodplains, low river terraces, and south slopes. White spruce is dominant and reaches a height of 110 feet. Stands may persist for 50 to 200 years before being replaced by black spruce. Moss gradually accumulates as the forest ages. The deep mat insulates the permafrost below and prevents summer thaw, giving rise to wetter conditions that favor black spruce. Lowland black spruce/hardwood is the most common forest type in interior Alaska. On colder, northern aspects, black spruce may occur up to 2,500 feet (Bonito 1980).

- **Moist Tundra:** Moist tundra occurs on top of Yukon Training Area's hills at 2,500 to 3,000 feet elevations. This windy and cold area is above tree line and supports only the hardiest vegetation in a short growing season. Upper reaches of this zone are generally steep and rocky. Vegetation is sparse-scattered grasses, dry land sedges, lichens, club mosses, and low mat-forming herbaceous and woody plants. Woody perennials rarely exceed three feet in height. This vegetation type is extremely sensitive to damage (Bonito 1980).

- **Wetland:** On Yukon Training Area, wetland can be divided into marshes and shrub wetland. Shrub wetland, also known as bogs, muskeg, and low brush, are associated with slightly higher relief on the edges of marshes, and in poorly drained basins and depressions with cold, waterlogged soils. The surface consists primarily of a thick layer of peat over a mottled, gray silt or silt loam. The water table, if not exposed, is found only a few inches down. During periods of heavy precipitation, bogs may form temporary lakes. Depth to ice-rich permafrost is often less than 30 inches. Ground cover is characterized by dense accumulations of mosses, lichens, sedges, rushes, liverworts, mushrooms, and other fungi. Stunted black spruce occasionally appears. Along margins of bogs and in drier areas, grasses, small shrubs, berries, and woody plants, such as willow and bog birch, proliferate (Bonito 1980).

PC2.3.2.2 Floristics Inventory

During 1995-1996, Cold Regions Research Engineering Laboratory conducted a floristic inventory for USAG-AK at Yukon Training Area (Tande et al 1996). The inventory focused on vascular plants, so cryptogams (i.e. mosses and lichens) were not identified. The inventory found 491 taxa (including subspecies and varieties), representing 227 genera in 72 families. This is about 26% of Alaska's vascular flora. At least 10 taxa collected represented extensions of known ranges (Tande et al. 1996).

Plants were collected from three units of the Yukon-Tanana Upland. A total of 1,005 collections were made at 123 sites within these units. Center for Ecological Management of Military Lands mounted three sets of collected plants. One set was laminated and remains at Fort Wainwright, and the other two are dry mounted and stored at the University of Alaska Museum, Fairbanks.

PC2.3.2.3 Threatened or Endangered, and Species of Concern Plants

Only two plant species on the federal endangered species are known to occur in Alaska. Neither species' current or historic ranges include Yukon Training Area, and a report released in 1996 indicated that there are no federally listed endangered or threatened plant species on Yukon Training Area (Tande et al. 1996).

There are, however, 16 vascular plant species of concern that are known to occur on Yukon Training Area. These plants are being tracked by the Alaska Natural Heritage Program because they are thought to be uncommon or rare in Alaska and/or uncommon or rare globally (Alaska Natural Heritage Program 2000). These species are listed below in table PC-1 and are documented in the survey results of Tande et al. (1996).

There are no legal ramifications from these listings, rather they are generated by the Heritage Program to help track the occurrence of these taxa across the state as more botanical work is conducted. The categories listed do not indicate known threats to these species, but they do represent the rather few collections known for each taxa in Alaska and the geographic distribution of those collections. All of these taxa are listed for management in the ecosystem management program for Yukon Training Area.

Table PC-1. Yukon Training Area Rare Plant Species.

SPECIES	ALASKA NATURAL HERITAGE PROGRAM RANKINGS	
	GLOBAL	STATE
Apocynum androsaemifolium	demonstrably secure	imperiled/rare or uncommon
Artemisia laciniata	demonstrably secure	imperiled
Carex crawfordii	demonstrably secure	imperiled or rare
Ceratophyllum demersum	demonstrably secure	imperiled
Cicuta bulbifera	demonstrably secure	critically imperiled or imperiled
Cryptogramma stelleri	demonstrably secure	imperiled or rare
Dodecatheon pulchellum ssp. pauciflorum	demonstrably secure	imperiled
Festuca lenensis	cause for concern	imperiled or rare
Glyceria pulchella	demonstrably secure	imperiled or rare
Lycopus uniflorus	demonstrably secure	rare or uncommon
Minuartia yukonensis	rare or uncommon	rare or uncommon
Myriophyllum verticillatum	demonstrably secure	rare or uncommon
Oxytropis tananensis	imperiled or rare	imperiled or rare
Pedicularis macrodonta	cause for concern	rare or uncommon
Rorippa curvisiliqua	demonstrably secure	critically imperiled

SPECIES	ALASKA NATURAL HERITAGE PROGRAM RANKINGS	
	GLOBAL	STATE
Rosa woodsii var. woodsii	demonstrably secure	critically imperiled or imperiled

PC2.3.2.4 Ecological Land Classification

An Ecological Land Classification was done for Yukon Training Area lands during 1994, 1995, and 1998. This report included mapping by geomorphology, permafrost, vegetation, ecotypes, ecosubdistricts, and ecodistricts (Jorgenson et al. 1998). The Ecological Land Classification is a hierarchical means to classify land according to various ecological scales.

The Yukon Training Area ecological management unit is contained within the Steese-White Mountains ecodistrict, within the Interior Highlands ecoregion. The Yukon Training Area unit is comprised almost entirely of the Chena-Salcha Highlands ecosubdistrict. The Chena-Salcha Highlands is a mountainous area of weathered bedrock in the alpine areas, residual soils on upper slopes, upland loess near the Tanana River, upland retransported deposits, lowland retransported deposits on lower slopes, and headwater streams. The areas are hydrologically linked by surface and groundwater flow. Permafrost is present on northern and lower slopes and absent on southern slopes. White spruce-birch-aspen forests are found on southern slopes, black spruce forests are found on northern slopes, riverine willows are found in drainages, and alpine tundra are commonly located on high exposed ridges. The Yukon Training Area unit is also made up of small regions of Stuart Creek Lowlands and French-Moose Creek Lowlands ecosubdistricts.

PC2.3.2.5 Wetland

Wetlands on Yukon Training Area consist of shrub wetlands. Some wetlands may qualify as jurisdictional wetland as defined in Section 404 of the Clean Water Act. Jurisdictional wetlands are determined by the Army Corps of Engineers on the basis of soils, vegetation, and hydrology. Fort Wainwright has two wetland surveys completed: the National Wetlands Inventory and the Waterways Experiment Station inventory.

The National Wetlands Inventory for Yukon Training Area was completed in 1992. The National Wetlands Inventory included 100% coverage of 11 of 14 map quads with less than 100% inventory of the other three quads. Some smaller wetlands and those obscured by dense forest cover may not be included in this inventory, which renders this survey inadequate for installation natural resources management programs.

The U.S. Army Engineer Waterways Experiment Station completed a wetland delineation of Yukon Training Area in 1998. The study included a review of existing information, wetlands identification, a Geographic Information System base map, a wetland characterization, and a final report. Wetlands were divided into five groups, which do not clearly delineate all areas as either wetland or upland. It is necessary to conduct on-site investigations before making management decisions involving Section 404 of the Clean Water Act.

PC2.3.2.6 Forest Resources

A forest inventory is an integral part in establishing a plan for managing forest resources. The Yukon Training Area Ecological Management Unit was inventoried by Directorate of Public Works Environmental Forestry Staff during the 2001 and 2002 field seasons. Tree data was collected from permanent plots as part of an on going Forest Inventory and Analysis of U.S. Army Alaska (USAG-AK) lands.

Stand Delineation and Inventory

Stand timber types were delineated utilizing aerial photography and satellite imagery to produce maps that demarcate land into forested and non-forested categories. This process was also used to help identify geographical coordinates for the plots and to establish permanent plots on the ground. Timber stands where further defined into types based on specific characteristics such as species composition, size, and spacing. These stand types are predefined by the Alaska Vegetation Classification system (Viereck, et al. 1992). The USAG-AK inventory method further stratifies out stands with higher timber value, greater ecological importance, and greater potential for military training Stand timber typing was confirmed on the ground during stand inventory. The fixed plot radius sampling method was used for tree data collection.

Land Classification

The Yukon Training Area Ecological Management Unit contains approximately 258,232 acres of forested and non-forested lands (Table PC-2). Forestlands in the project area occupy 86% of the land area or 222,024 acres. Non-forestland amounts to 14% of the total project land area or 36,208 acres. The forested lands contain 50,873 acres of commercial forestland. Commercial forestlands are those lands containing sawtimber and poletimber size classes.

Table PC-2. Yukon Training Area Forest Land Classification

Forest Category	Commercial Forest Category	Forested Land Acreage	Total Acreage
Forested Lands	Commercial Forest	50,873 acres	222,024 acres
	Non-Commercial Forest Lands	171,151 acres	
Non-Forested Lands		0	36,208 acres
Total		222,024 acres	258,232 acres

Forest Land Area and Volume by Strata

The total volume found in the various types or strata is found in table PC-3. The estimated total volume of timber in this area is 83,989,132 cubic feet. Of this amount, commercial saw and pole timber types represent 66,264,187 cubic feet. Reproduction, dwarf, and burned types account for the remaining 17,724,945 cubic feet.

The sawtimber type occupies 1.3% (2,894 acres) of the forested area and contains an estimated volume of 6,444,221 cubic feet. The white spruce-birch-aspen stratum makes up the majority of the sawtimber types with a volume of 5,902,911 cubic feet. This stratum represents 1.2% (2,709 acres) of the forested land. Poletimber types occupy 3.7% (8,257 acres) of the forestland with a total volume of 11,974,308 cubic feet. The white spruce-birch-aspen stratum is the largest in this category for acreage and volume. It occupies 3.5% (7,854 acres) of the forested area and accounts for a total volume of 10,956,330 cubic feet. The pole/saw types account for the majority of the total cubic volume. They occupy 17.9% (39,722 acres) of forested land and contain a volume of 47,845,658 cubic feet. The birch-aspen pole/saw strata accounts for the largest portion of volume among all the different types. It represents 10.4% (23,062 acres) of the forested land and contains a volume of 30,441,840 cubic feet. The dwarf/regeneration/burned types occupy the most acreage making up 77.1% (171,151 acres) of the total forestland area. The dwarf / regeneration / burned types contain a volume of 17,724,945 cubic feet. This type does not contribute to the commercial volume estimates.

Each stratum has also been broken down into average stems per acre. The white spruce stratum is the largest in both the sawtimber and poletimber categories with 263 and 337 stems per acre respectively. The highest values of stems per acre are found in the pole/saw types. The lowest values are found in the dwarf/regeneration/burned types.

Table PC-3. Yukon Training Area Forest Timber Types.

Forest Timber Type	Acres	Percent Forested Acres	Cubic Feet per Acre	Total Cubic Feet	Percent Volume Cubic Feet	Average Stems per Acre
Sawtimber Strata:						
(1) White Spruce	185	0.1%	2,926	541,310	0.7%	263
(8) White Spruce-Birch-Aspen	2,709	1.2%	2,179	5,902,911	7.0%	169
Subtotal:	2,894	1.3%		6,444,221	7.7%	
Poletimber Strata:						
(2) White Spruce	403	0.2%	2,526	1,017,978	1.3%	337
(9) White Spruce-Birch-Aspen	7,854	3.5%	1,395	10,956,330	13.0%	280
Subtotal:	8,257	3.7%		11,974,308	14.3%	
Pole/Saw Strata:						
(4) Other	901	0.4%	986	888,386	1.1%	355
(7) Birch-Aspen	23,062	10.4%	1,320	30,441,840	36.2%	285
(10) Black and White Spruce-Birch-Aspen	15,759	7.1%	1,048	16,515,432	19.7%	244
Subtotal:	39,722	17.9%		47,845,658	57.0%	
Dwarf/Regeneration/Burned Strata:						
(21) Black and White Spruce	2,868	1.3%	123	352,764	0.4%	72
(22) Other Coniferous	93,151	42.0%	57	5,309,607	6.2%	26
(24) Birch-Aspen	22,885	10.3%	123	2,814,855	3.4%	41
(26) Black and White Spruce-Birch-Aspen	52,247	23.5%	177	9,247,719	11.0%	74
Subtotal:	171,151	77.1%		17,724,945	21.0%	
Grand Total:	**222,024**	**100.0%**		**83,989,132**	**100.0%**	

Estimated Annual Harvest

An estimate of the annual allowable harvest is a guide for future harvest activities. Calculations are based on the simple area cut method. This method divides the total productive forest area by the rotation age. The result of this method gives the acreage that can be harvested in a year. The acreage is multiplied by the weighted average volume per acre to determine the annual harvest. The following white spruce and hardwood harvest acreage shown in Table PC-4 represent saw, pole, and pole/saw timber types; the majority is in the pole/saw type.

Table PC-4. Yukon Training Area Estimated Annual Harvest.

Harvest Timber Type	Potential Harvest Land	Rotation Age	Regeneration Time	Total Rotation Length	Estimated Annual Harvest

White Spruce	18,653 acres	120 years	10 years	130 years	143 acres per year
Hardwoods	23,062 acres	80 years	10 years	90 years	256 acres per year

PC2.3.3 Fauna

Most vertebrate species indigenous to central Alaska can be found on Yukon Training Area. Game species found on Yukon Training Area are managed by Alaska Department of Fish and Game. Alaska Department of Fish and Game monitors these species to determine population status, reproductive success, harvest and home ranges. Alaska Department of Fish and Game also sets bag limits and seasons for these species. USAG-AK will cooperate with and contribute funds to help Alaska Department of Fish and Game monitor or study game species on an annual basis to ensure sustainable harvests, based on fund availability.

Black and grizzly bears are found throughout Yukon Training Area. Both are hunted, although black bears are taken more often due to their densities. Bear harvest appear to be directly linked to access, with a mean harvest of 11.2 bears/year from Tanana Flats Training Area and 9.8 from Yukon Training Area (Hechtel 1991).. Overall harvest was judged to be sustainable, although areas in Yukon Training Area may have localized over harvest (Hechtel 1991). No serious black bear conservation problems were identified related to Yukon Training Area land management.

Since 1974 (when harvested black bears were first required to be sealed), black bear harvest on Yukon Training Area has varied from one (1979) to 15 (1977). Black bear harvest on Yukon Training Area occurs mostly during spring (Hechtel 1991). Since 1974, the bag limit has been three bears annually with no closed season. Bear baiting was closed from 1977 through the 1982-83 season due to conflicts with pipeline construction activity. Since the 1983-84 season the practice has been legal. Baiters must have permits. Harvest across Game Management Unit 20 has generally been higher since re-opening of baiting, but the difference is not statistically significant (Hechtel 1991). Grizzly bears are hunted during all but summer months. The bag limit is one bear every four regulatory years. Grizzly bears may not be taken over bait. Only a few grizzly bears (0-3 annually during the past five years) are harvested from Yukon Training Area.

Yukon Training Area is part of GMU 20B. ADF&G rutinly conducts aerial surveys in this area, as part of the state's management plan, and reports suggest healthy moose densities (Young 2004b).

Yukon Training Area is part of the historic range of the Fortymile caribou herd, but rarely are caribou now found on the installation. During the early 1900s, this herd was the largest in Alaska and one of the largest in the world, ranging over 85,000 square miles. In 1920, the herd was estimated at 568,000, but herd size fell to 10,000-20,000 in the 1930s. The herd grew to perhaps 60,000 in 1956, but it decreased to about 6,500 by 1973. This crash was probably due to over harvesting, unfavorable weather, and wolf predation. By 1990, the herd had increased to about 22,000 caribou, and has remained stable until 1995. In 1995 the herd began to increase and by 2000, the herd was estimated at 35,500. No caribou have been taken from Yukon Training Area in recent years (Gross 2005).

Small mammals play important ecological roles as secondary consumers and as prey for a variety of predators. The Alaska tiny shrew,*Sorex yukonicus*, is newly described and apparently rare, found in small numbers in widely separated parts of Alaska. Other small mammals that are potentially rare inhabitants of Yukon Training Area include the long-tailed vole *Microtus longicaudus*, northern bog lemming *Synaptomys borealis*, brown lemming *Lemmus trimucronatus*, and water shrew *Sorex palustris*
.

The American peregrine falcon was recently de-listed from endangered species status. Though not known to nest on Yukon Training Area, it is an infrequent migrant. The Salcha Bluff area in the Yukon Training Area includes habitat able to support feeding and nesting opportunities for peregrine falcons (Ritchie and Rose 1998). Although this raptor has been recently delisted, the U.S. Fish and Wildlife Service requests that USAG-AK continue consultation on any projects taking place in the Yukon Training Area that may hinder their recovery.

The bald eagle, a federally listed threatened species in the lower 48, is locally common in the Yukon Training Area. Bald eagles nest in the Granite Tors in the State Recreation Area just north of Yukon Training Area, and along the Salcha and Tanana Rivers (Ritchie and Rose 1998). The golden eagle is a resident of forest and alpine habitats of the installation (Nakata Planning Group 1987).

A survey of cliff and tree nesting raptors in the Yukon Training Area was conducted in 1998 by ABR (Anderson et al. 2000). Five potential cliff sites were found in the Yukon Training Area, but the habitat value for these cites were judged poor to fair. The small number and size of streams in the Yukon Training Area limits the potential for tree nesting bald eagles.

Seven birds are listed as state-sensitive (U.S. Army Alaska and Center for Ecological Management of Military Lands 1999), the gray-cheeked thrush, blackpoll warbler, American peregrine falcon, golden eagle, olive-sided flycatcher, Arctic peregrine falcon, and Townsend's warbler. The gray-cheeked thrush was commonly noted in recent surveys (Bureau of Land Management and U.S. Army 1994). All but the Arctic peregrine falcon have been confirmed on Fort Wainwright (U.S. Army Alaska and the Center for Ecological Management of Military Lands 1999).

The Chena and Salcha rivers are important spawning areas for chum salmon, arctic grayling and king salmon. All of these species inhabit the Tanana River seasonally.

The wood frog (*Rana sylvestris*) is the only amphibian residing in the interior of Alaska. There are no reptiles. Declines in amphibian populations are being recorded worldwide and in Alaska. Deformities in frogs are becoming more manifest, and reasons for the deformities are still unclear. Scant information is available on wood frog densities in interior Alaska.

No federally listed threatened or endangered animals residide on Yukon Training Area. The U.S. Fish and Wildlife Service, Office of Migratory Bird Management maintains a list of *Migratory Nongame Birds of Management Concern in the United States*. Alaskan species of management concern occuring on Yukon Training Area include the trumpeter swan, common loon (*Gavia immer*), northern harrier (*Circus cyaneus*), northern goshawk (*Accipiter gentilis*), olive-sided flycatcher, alder flycatcher (*Empidonax alnorum*), gray-cheeked thrush, and blackpoll warbler.

Eighteen bird species found on Yukon Training Area are exhibiting continant wide population declines, and have been delineated as target or priority species for monitoring by the Boreal Partners in Flight Working Group. There are no legal requirements to manage these species although all migratory bird species are afforded some protection under the Migratory Bird Treaty Act.

PC2.4 Cultural Resources

Less than four percent of Yukon Training Area has been surveyed for archeological sites, and thirteen sites have been identified (twelve prehistoric and one historic sites).

The Yukon Training Area has probably supported human populations for 10,000 to 12,000 years. Interior Alaska contains the oldest verifiable prehistoric remains in the state since the Interior was ice-free during the Wisconsin glaciation.

The Athabaskan original homeland was in the Tanana Valley. The Tanana Indians, a branch of the Northern Athabaskans, lived there. The Tanana were a highly mobile group at the time of European contact, moving to fish camps in summer, and various hunting and trapping camps during other seasons. The White Mountains and Tanana Hills (Yukon Training Area) were used sporadically during the past several thousand years for hunting, but likely not for year-round settlements.

PC3. Yukon Training Area Management Prescriptions

PC3.1 Prescriptions and Policy

Yukon Training Area is composed of Training Areas 1, 2, 3, 4, 5, 6, 7 and 8, the Multi-Purpose Training Range, Air Force Technical Application Center and Stuart Creek Impact Area. The west portion of Yukon Training Area is managed together as an ecosystem management sub-unit (Training Areas 1, 2, 3, and 4), while the eastern portion (training Areas 5, 6, 7 and 8) is managed as a separate sub-unit. The Multi-Purpose Training Range includes Manchu Range, the Multi-Purpose Training Range, the temporary Infantry Squad Battle Course and the Infantry Platoon Battle Course. The Air Force Technical Application Center is managed as a sub-unit as is the Stuart Creek Impact Area.

PC3.1.1 Military Use

Yukon Training Area sub-units 1, 2, and 4 are suitable for small arms, platoon to brigade-sized exercises, company-sized live-fire exercises, road marches, and bivouacs. These areas are primarily used for large-scale training exercises, airborne drops, and winter bivouacs. The recommended time for military activities involving mechanized vehicles is between freeze-up and spring break-up. Husky Drop Zone will sustain year-round use. Air-mobile and air-drop operations may be conducted in this area. Permission must be obtained from the Air Force to use the Chena Annex at the northern end of Transmitter Road.

Yukon Training Area sub-units 3, 5, 6, and 7 are suitable for indirect fire weapons, platoon to brigade-sized exercises, road marches, and bivouacs. It is also used for large-scale exercises, year-round bivouac, land navigation, and maneuver using Small Unit Support vehicles. The recommended time for military activities involving mechanized vehicles in valley areas is between freeze-up and spring break-up. Other military activities can be conducted year-round. There are no areas off-limits to training.

The Stuart Creek Impact Area is suitable for direct and indirect fire artillery, bombing and potential high hazard dud producing munitions. The Multi-Purpose Training Range is suitable for direct fire small arms and training munitions.

PC3.1.2 Access

The Yukon Training Area ecological management unit is land withdrawn from public use for military use. The public has access to the area for recreational and subsistence purposes. Access to the area can be restricted when non-participants may be endangered by military activities. Once the public has been notified by the local news media, selected main roads leading to the area requested for the exercise will be closed. Temporary road barricades (sawhorses, concertina wire, etc.) supplied by the using unit will be placed at appropriate points along the road network to warn approaching non-participants. Road barriers

will be manned by participating units with knowledge of dates and times of the road closure. Once training plans have been finalized, presented to Range Control, and notice given to the public, changes are not accepted.

Areas not authorized for public use include impact areas, rappelling towers, small arms ranges, and areas published in the weekly bulletin as being a danger area, restricted area, or off-limits. Permanently closed areas are Stuart Creek Impact Area, Air Force Technical Applications Center, Charlie and Bravo Battery Sites, and the Manchu Range Complex.

PC3.1.3 Natural Resources Management

The east portion of Yukon Training Area (Training Areas 1, 2, 3, and 4) are managed as "*full*" natural resource management areas. Full management areas are sub-units that receive use and are accessible by road. All forms of surveys, monitoring, and active management of land, forest, fish and wildlife, and recreation resources may be conducted. Fire suppression category for these areas is "*full*". These areas receive maximum detection coverage and receive immediate and aggressive initial attack responses. For most of these areas the vegetation is managed by the Bureau of Land Management. The Army retains vegetation rights for Bravo and Charlie Batteries. These areas are open for hunting, trapping and fishing. Recreation use category is "*Open*". Ecosystem management prescriptions are shown in Table PC-5.

Table PC-5. Yukon Training Area Ecosystem Management Prescriptions.

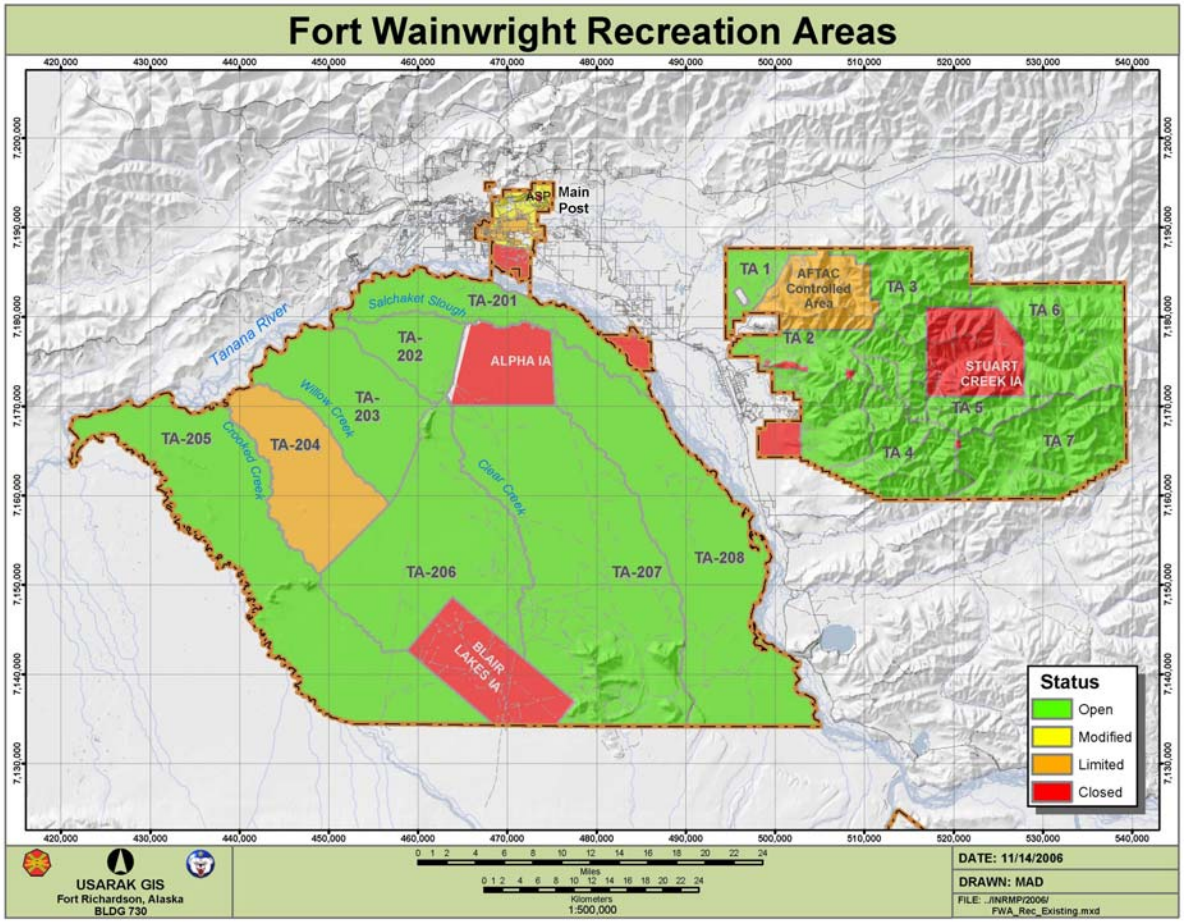
Ecosystem Management Sub-unit	Natural Resource Management Priorities	Fire Suppression Category	Vegetation Management	Hunting and Trapping	Fishing	Recreational Use Management
Training Areas 1,2, 3 and 4	Full	Full*	BLM**	Open	Open	Open
Training Areas 5, 6, 7 and 8	Modified	Limited*	BLM	Open	Open	Open
Manchu Range Complex	Full	Full	BLM	Closed	Closed	Closed
AFTAC	Limited	Full	BLM	Closed	Closed	Closed***
Stuart Creek Impact Area	Limited	Limited	BLM	Closed	Closed	Closed

*Fire suppression category is modified in southern portions of TA 4 and 5.
**Vegetation rights for Bravo and Charlie batteries are controlled by the Army.
***Beaver Creek Road in AFTAC is open for through transit to get to other recreation areas.

The western portion of Yukon Training Area (Training Areas 5, 6, 7, and 8) is managed as "*modified*". Modified management areas are sub-units that receive use, are not accessible by road (only small portions of western Yukon Training Area are accessible by road), but are open to public access. All forms of surveys, monitoring, and active management of land, forest, fish and wildlife, and recreation resources may be conducted, but may not be practical. Fire suppression category is "*limited*" although some areas in the southern portion of Training Area 5 are "*modified*". The "*limited*" option recognizes areas where natural fire is important or the values at risk do not warrant the expense of suppression. Limited management areas receive routine detection effort. Attack response is based on needs to keep the fire within Limited management areas and to protect individual Critical management sites within Limited management areas. The "*Modified*" option provides a relatively high degree of protection during periods of increased fire danger, but a lower level of protection when risks of fires are diminished. Modified areas

receive maximum detection coverage. Western Yukon Training Area is "*open*" for hunting, trapping, fishing and off road recreational vehicles. Recreational use areas on Yukon Training Area are shown in Figure P-6.

Figure P-6. Yukon Training Area Recreation Use Areas.



The Manchu Range Complex includes the area surrounding Manchu Road north of Quarry Road. This area receives "*full*" natural resource management priority and "*full*" fire protection status. BLM retains vegetation management rights for this area. This area is "*closed*" to hunting, trapping, fishing and recreational use. The Air Force Technical Application Center and Stuart Creek Impact Area receive "*limited*" natural resource management priority. Fire protection option for the Air Force Technical Application Center is "*full*", while Stuart Creek Impact Area is "*limited*". There is no hunting, trapping, fishing or off-road recreational vehicle use authorized at any time in either area, except transit through the Air Force Technical Applications Center on Beaver Creek Road.

Yukon Training Area is not an approved federal or state subsistence area. Yukon Training Area is a traditional subsistence area for upper Tanana tribes. There is no subsistence preference for any subsistence user but any subsistence user may conduct approved subsistence activities after acquiring any required state licenses, USAG-AK recreation access permit, and checking in with USARTRAK.

USAG-AK will comply with all laws, regulations, and Executive Orders pertaining to natural resources management on Yukon Training Area. USAG-AK will complete ongoing projects and conduct full implementation of ecosystem management projects. USAG-AK will conserve physical resources by

conducting Integrated Training Area Management, watershed management, and minerals management. USAG-AK will conserve biological resources by conducting wetland management, forest management, fish and wildlife management, endangered species management, pest management, and urban area management. USAG-AK will integrate social (human) resources into ecosystem management by conducting education, awareness and public outreach, conservation enforcement, outdoor recreation management, and cultural resources management. USAG-AK will support ecosystem management decision-making through implementation of National Environmental Policy Act, Geographic Information System, and other decision support systems, and integration with other land management programs such as Sustainable Range Program and Sustainment, Restoration and Modernization Program.

PC3.2 Projects

Ecosystem management projects for Yukon Training Area during 2007 through 2011 are shown below in Table PC-6.

Table PC-6. Yukon Training Area Ecosystem Management Projects.

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Erosion Control and Streambank Stabilization	Bravo Battery FOB	x				
High	Erosion Control and Streambank Stabilization	CACTF Trail Upgrade	x				
High	Erosion Control and Streambank Stabilization	Charlie Battery Forward Operations Base				x	
High	Erosion Control and Streambank Stabilization	FWA TARP FY07	x	x	x	x	x
High	Erosion Control and Streambank Stabilization	Husky DZ Access Road Phase 2		x			
High	Erosion Control and Streambank Stabilization	IPBC Range Berm erosion control				x	
High	Erosion Control and Streambank Stabilization	Warrior Forward Operations Base Phase 3			x		
High	Erosion Control and Streambank Stabilization	YTA Convoy Live Fire Range Phase 1 and 2				x	
High	Erosion Control and Streambank Stabilization	YTA Demolition Range Phase 1-3	x	x	x	x	
High	Erosion Control and Streambank Stabilization	YTA Firing Point 11 Upgrade					x
High	Erosion Control and Streambank Stabilization	YTA Firing Point 12 Upgrade					x
High	Forest Inventory / Monitoring	Forest Stand Mapping	x	x	x	x	x
High	Forest Land Improvement	Moose Creek Timber Stand Improvement	x	x	x	x	x
High	Forest Land Improvement	Stuart Creek Fuels Assessment	x		x		x
High	Inventory and Monitoring	PMO Game Warden Coordination	x	x	x	x	x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Inventory and Monitoring	Recreational Impact Monitoring	x	x	x	x	x
High	Inventory and Monitoring	Trespass Cabin Monitor	x	x	x	x	x
High	Inventory/Monitoring	Breeding Bird Surveys	x	x	x	x	x
High	Inventory/Monitoring	Fisheries Planning Level Surveys	x	x	x	x	x
High	Inventory/Monitoring	Moose Population Surveys; 20A/B	x	x	x	x	x
High	Management	Erect signs designating boundaries of Special Interest Areas	x	x	x	x	x
High	Outreach	Annual Review and Input to ADFG Fishing Regulations	x	x	x	x	x
High	Outreach	Fairbanks Newsminer Hunting Edition	x	x	x	x	x
High	Outreach	Implement FireWise program for private landowners adjacent to military lands.	x	x	x	x	x
High	Outreach	Newcomers Briefings	x	x	x	x	x
High	Outreach	Outdoor Recreation Supplement	x	x	x	x	x
High	Outreach	Range Control coordination	x	x	x	x	x
High	Outreach	Recreation Access Permits	x	x	x	x	x
High	Outreach	Recreation User Group Meetings	x	x	x	x	x
High	Outreach	Update Information Kiosks	x	x	x	x	x
High	Outreach	USARTRAK Brochure	x	x	x	x	x
High	Recreational Activities	Off Road Vehicle Management	x	x	x	x	x
High	Suppression	Conduct fire suppression activities as necessary.	x	x	x	x	x
High	Survey and Monitoring	Conduct T&E Species Survey	x	x	x	x	x
High	Trespass Structure Abatement	Trespass Cabin and Camps Removal	x	x	x	x	x
High	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	x	x	x	x	x
High	Wildland Fire Management	Develop program of providing assistance to training military units during periods of high fire danger.	x	x	x	x	x
High	Wildland Fire Monitoring	Collect fuel-loading information as part of the forest inventory.	x	x	x	x	x
High	Wildland Fire Monitoring	Delineate and maintain Geographic Information System data layers showing historical fires.	x	x	x	x	x
High	Wildland Fire Monitoring	Map all known cultural features on suppression maps and develop fire management recommendations for these features.		x			

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Wildland Fire Monitoring	Map all known natural resources features and areas of concern from wildland fire suppression and management activities on suppression maps. Develop management strategies to avoid conflicts with these natural resource features and areas of concern.			x		
High	Wildland Fire Monitoring	Map all known non-sensitive structures on USAG-AK.				x	
High	Wildland Fire Monitoring	Map all military structures on suppression maps. Assess fire suppression options and recommendations for these structures.		x			
High	Wildland Fire Monitoring	Map past areas where ordnance has been used and develop pre-suppression plans on how to deal with wildland fire suppression in these areas.	x	x	x	x	x
High	Wildland Fire Monitoring	Research causes of fire ignitions on USAG-AK to identify areas of high fire occurrence				x	
High	Wildland Fire Monitoring	Research weather patterns influencing fire behavior and historical weather analysis for each land unit of USAG-AK.	x				
High	Wildland Fire Monitoring	Update fire history map of USAG-AK.			x		
High	Wildland Fire Monitoring	Update fire maps with military special use areas and fire management options for these areas.	x				
High	Wildland Fire Monitoring	Update fuels map of USAG-AK.			x		
High	Wildland Fire Planning	Develop Geographic Information System for military fire management office and for use on incidents with current data, maps, photos, suppression options, and restrictions.	x	x	x	x	x
High	Wildland Fire Planning	Develop plans and fuel treatment projects to reduce the threat of fires starting on military lands and impact areas and burning onto adjacent lands of high resource value.		x			
High	Wildland Fire Planning	Develop plans for proposed prescribed fires on USAG-AK.	x	x	x	x	x
High	Wildland Fire Planning	Develop standard operation procedures for each area unit of USAG-AK to assist firefighters and Incident Commanders in establishing priorities, making decisions, dealing with ordnance issues.	x	x	x	x	x
High	Wildland Fire Planning	Identify and assess fuel management strategies for urban/wildland interface areas.	x	x	x	x	x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Wildland Fire Pre-Suppression	Identify and use fuel reduction treatments to reduce the threat of wildland fire at the urban/wildland interface, military structures, selected training areas, and cultural resources.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop and disseminate procedures for detection and reporting of fires.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop more effective means of calculating fire weather indices for localized training areas and implement a program of relaying fire danger ratings to training units.	x	x	x	x	x
Med	Erosion Control and Streambank Stabilization	BDE CQM 25-Meter Range			x		
Med	Erosion Control and Streambank Stabilization	Brigadier Road Upgrade			x		
Med	Erosion Control and Streambank Stabilization	DMPTR/IPBC Forward Operations Base Phase 1-3				x	
Med	Erosion Control and Streambank Stabilization	Drivers Training Course Phases 1-5 (200,000 per phase)		x			
Med	Erosion Control and Streambank Stabilization	Husky Drop Zone Forward Operations Base – Phase 1, 2 and 3					x
Med	Erosion Control and Streambank Stabilization	Training Area 6 Fuels Break	x				
Med	Erosion Control and Streambank Stabilization	YTA Firing Point 13 Upgrade					x
Med	Erosion Control and Streambank Stabilization	YTA Firing Point Direct Fire		x			
Med	Habitat Management	Moose Habitat Enhancement					
Med	Habitat Management	Moose Habitat Evaluation					
Med	Habitat Management	Ruffed Grouse habitat enhancement; Yukon Training Area					
Med	Inventory and Monitoring	Recreational Facility Survey	x		x		x
Med	Inventory and Monitoring	Recreational Impacts: Fishing		x		x	
Med	Inventory and Monitoring	Survey airstrips	x				
Med	Inventory/Monitoring	BBS route vegetation survey					
Med	Inventory/Monitoring	Fauna Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Fish monitoring YTA	x	x	x	x	x
Med	Inventory/Monitoring	Flora Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Monitor Habitat Work					
Med	Inventory/Monitoring	moose habitat mapping					
Med	Inventory/Monitoring	Owl Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Raptor Surveys					
Med	Inventory/Monitoring	Ruffed Grouse Drumming Counts	x	x	x	x	x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
Med	Inventory/Monitoring	Sharptail Grouse Leks	x	x	x	x	x
Med	Inventory/Monitoring	Small Mammal Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Soils Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Solitary Sandpiper Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Stream Evaluation	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Threatened & Endangered Species					
Med	Inventory/Monitoring	Topography Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Vegetation Communities Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Whimbrel Colony Monitor	x	x	x	x	x
Med	Inventory/Monitoring	Wild Ponds/Lakes survey	x	x	x	x	x
Med	Inventory/Monitoring	Wood Frog Breeding Surveys	x	x	x	x	x
Med	Inventory/Monitoring	YTA/Donnelly Training Area E Grizzly sitings	x	x	x	x	x
Med	Outreach	Fort Wainwright Eielson Air Force Base Stocked Lake Brochure	x				
Med	Outreach	FWA Post TV Notices	x	x	x	x	x
Med	Outreach	PAO Radio Spots	x	x	x	x	x
Med	Outreach	Recreation Outreach at Public Events	x	x	x	x	x
Med	Outreach	Write Fairbanks Newsminer AK Post Stories	x	x	x	x	x
Med	Plan Watershed and Wetland Projects	Stuart Creek Impact Area Survey Line					x
Med	Population Management	Harvest Trends: Black Bear Baiting	x	x	x	x	x
Med	Population Management	Harvest Trends: Furbearers	x	x	x	x	x
Med	Population Management	Nuisance/injured Wildlife Issues	x	x	x	x	x
Med	Project Management	Horseshoe Lake	x				
Med	Vegetation Management	Moose Creek Burn	x				
Med	Wildland Fire Planning	Develop pre-suppression plans for each of the area units of USAG-AK.		x			
Med	Forest Inventory / Monitoring	Continuous Forest Inventory	x	x	x	x	x
Med	Forest Land Improvement	Husky DZ AK 316 2823 JM AA70	x		x		x
Med	Forest Land Improvement	ISBC, IPBC and DMPTR	x	x	x	x	x
Med	Forest Land Improvement	Manchu Range AK 316 2823 JM AA05	x	x	x	x	x
Med	Forest Land Improvement	Yukon Training Area Timber and Maneuverability Improvement Project	x	x	x	x	x

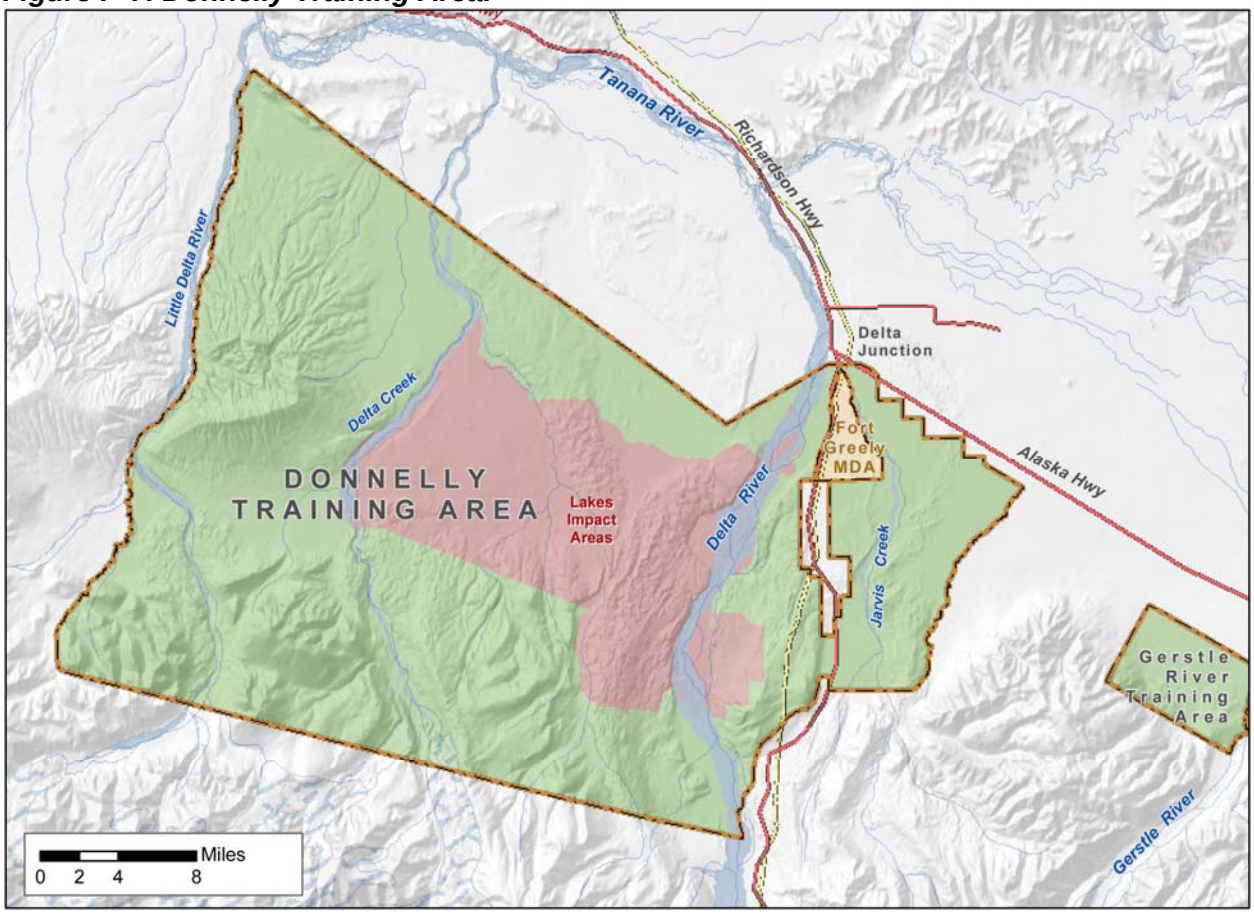
Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
Low	Erosion Control and Streambank Stabilization	Johnson, Skyline, Brigadier and Quarry Road Upgrade					x
Low	Erosion Control and Streambank Stabilization	YTA OP Shack Upgrade	x				
Low	Forest Land Improvement	Personal use firewood and house log areas	x	x	x	x	x
Low	Forest Land Improvement	Stuart Creek East Fuel Break	x	x			
Low	Habitat Improvement	Grouse Habitat Enhancement		x		x	
Low	Habitat Management	Owl Boxes	x	x	x	x	x
Low	Inventory/Monitoring	Bat Surveys					
Low	Inventory/Monitoring	Black Bear Population Estimates, Yukon Training Area	x	x	x	x	x
Low	Inventory/Monitoring	Waterbird surveys	x	x	x	x	x
Low	Outreach	Interpretive Panels			x		
Low	Outreach	Recreation Surveys	x	x	x	x	x
Low	Outreach	Viewing Platform Material Update			x		
Low	Project Management	Stocked Lakes	x	x	x	x	x
Low	Project Management	Manchu Lake Boardwalk			x		
Low	Public Outreach	Wildlife Information /Brochures/presentations					
Low	Vegetation Management	Vegetation Management – General Phase 1					x

PD. DONNELLY TRAINING AREA ECOLOGICAL MANAGEMENT UNIT

PD1. Location

Donnelly Training Area is located 107 road miles southeast of Fairbanks and six road miles south of the junction of the Alaska and Richardson highways. The training area lies within the central valley and hill area, bordered by the Brooks Mountain Range to the north and the Alaska Range to the south (United States Army Alaska 1995a). The entire region lies within the Tanana River Valley. Donnelly Training Area is shown in Figure P-7.

Figure P-7. Donnelly Training Area.



Donnelly Training Area is a sub-training area of Fort Wainwright. Donnelly Training Area consists of two large training areas, Donnelly West Training Area (approximately 531,000 acres) and Donnelly East Training Area (approximately 93,000 acres). The Donnelly West Training Area lies between the east bank of the Delta River and east bank of the Little Delta River. Northern and southern boundaries are two northwest-southeast diagonal lines varying from a little over twenty miles apart in the east to about thirty-five miles apart in the west. The Delta River flows northward along the eastern boundary of the Donnelly West Training Area. The Donnelly East Training Area is located from the eastern bank of the Delta River to Granite Creek on the west. The northern boundary roughly parallels the Alaska Highway, and the southern boundary is in the foothills of the Alaska Range, on a line between Granite Mountain and Donnelly Dome.

Donnelly Training Area is separated from Delta Junction by Jarvis Creek. Delta Junction is the largest community in the area, with 840 residents in 2000 (compared to 703 in 1970) (Bureau of Land Management and U.S. Army 1994, U.S. Census Bureau 2001). Other developed areas include Big Delta to the north and the Clearwater farming and ranching area to the east. The Alaska and Richardson highways and the Trans-Alaska Pipeline cross Fort Greely and Donnelly Training Area. The pipeline generally parallels the Richardson Highway, with above and below ground sections located within the Donnelly East Training Area.

Neighboring Tribes include the Healy Lake Traditional Council, Dot Lake Village Council, and the Tanacross Village Council. These represent the nearest federally recognized Indian Tribes that have ties to the Fort Greely and Donnelly Training Area-associated lands. Other Upper Tanana Tribes are also affiliated with the area through familial relationships (Jim Simon personal communication 2001).

Donnelly Training Area comprises approximately 660,000 acres. Most of the Donnelly Training Area land is withdrawn from public use by stipulations that vary with each withdrawal document. Some stipulations are consistent throughout all withdrawals and Executive Orders. Withdrawn lands are not available for disposal, including state or native selection, sales under Federal Land Policy and Management Act or the Recreation and Public Purposes Act, or exchanges. In addition, no rights-of-way are allowed on withdrawn lands that are closed for public access. However, there is a process identified to determine the validity of rights-of-way claims for administrative purposes only.

In 1950, the Army obtained a Special Land Use permit from the Department of the Interior for use of 572,000 acres known then as the West Training Area. The permit was granted in six-month extensions until passage of legislation in 1961 granted withdrawal for a ten-year term. The withdrawal was renewed in 1971 for five years, excluding a five-acre trade and manufacturing site near the western edge of the West Training Area. In 1976, the West Training Area was segregated from public use pending renewal of the existing withdrawal legislation by Congress. Congress renewed the withdrawal in 1986 for a fifteen-year term with the passage of the Military Lands Withdrawal Act (Public Law 99-606). These lands were withdrawn again in 2001 for a period of 25 years for military use by Public Law 106-65. With the finalization of BRAC, the boundary has shifted to the east bank of the Delta River, making it about 531,000 acres, and the name is now the Donnelly West Training Area.

The Army obtained permanent use of a 160-acre tract called the East Training Area by a Public Land Order. In late 1958, the Army obtained the use of 51,750 acres of the East Training Area by a permit from the Department of the Interior (including the 160 acre tract). The permit was granted six-month extensions until passage of Congressional legislation. The legislation passed in 1961, granting the Army use of 51,590 acres of the East Training Area for a ten-year term. That legislation excluded the 160-acre tract, which was returned to the Bureau of Land Management. The withdrawal was renewed in 1971 for five years. In 1976, the East Training Area was segregated from public use pending renewal of the existing withdrawal by Congress. Congress renewed the withdrawal in 1986 for a fifteen-year term with the passage of the Military Lands Withdrawal Act (Public Law 99-606). These lands were withdrawn again in 2001 for a period of 25 years for military use by Public Law 106-65. Due to final BRAC actions, the name has changed to Donnelly East Training Area, and the west boundary has shifted to the Delta River, enlarging it to approximately 93,000 acres.

PD2. Environment

PD2.1 Facilities

PD2.1.1 Ranges

Donnelly Training Area includes approximately 501,022 acres of maneuver land and 147,463 acres of impact areas. Donnelly Training Area has 13 existing firing ranges, which are briefly described (U.S. Army Alaska 1995). A Battle Area Complex and Combined Arms Collective Training Facility are under construction.

Alabama Range is used to zero privately owned weapons. It includes eight firing tables with benches and target frames at 25, 50, 100, 150, 200, 250, and 300 meters.

Arkansas Range is a qualification range for small arms, including M16, 9 mm, and .45 caliber at 25 meters, and 7.62 mm (M60 / M240 / Mk. 48 Mod. 0) munitions at 10 meters.

Collective Training Range includes two Infantry Platoon Battle Courses (IPBC) and one Multi-Purpose Training Range (MPTR), and is capable of supporting Platoon and Company live fire exercises and crew qualifications.

Colorado Range is designed for testing and qualifying with small arms and direct fire weapons requiring 50 meters or more. Targets are set at known distances, with 10 firing berms spaced 100 yards apart.

Georgia Range is designed for multi-purpose testing/training and qualification with small arms, direct fire weapons, and aerial gunnery. This range is equipped with one refueling Forward Area Arming and Refueling Point (FAARP), one arming FAARP, and four helicopter pads.

Lampkin Range is utilized for multi-purpose testing/training and firing of small arms, direct fire weapons, and limited engineer demolitions.

Mississippi Range, a former combination mortar range and helicopter rearm point, is used by the Cold Regions Test Center for testing.

Oklahoma/Delta Creek Range is primarily used by the Air Force for bombing and gunnery.

Texas Range is a firing test range, capable of supporting large caliber direct and indirect fire weapons, and defensive missile systems. In recent years it has primarily been used by Cold Regions Test Center.

Washington Range can accommodate the Area Weapons Scoring System (AWSS) for evaluating air to surface firing, surface-to-air fire for any TOE air defense battery with target drone equipment, and surface-to-surface direct and indirect fire weapons systems.

Bondsteel CALFEX is a building site combined arms live-fire range.

CALFEX Bowl is a small arms defensive or tactical live fire area. It lies between OP 7 and OP 8 and is used for combined arms live fire exercises.

Simpsonville Maneuver Range is a building site combined arms live-fire range.

Other significant training facilities include ten drop zones and two combat assault strips that support airborne and air-land operations. Donnelly Drop Zone can support a battalion-sized airborne operation. Eight of these drop zones are located in the Donnelly East Training Area and two are located in the Donnelly West Training Area. All are used primarily as non-firing maneuver areas. Cold Regions Test Center utilizes Donnelly Training Area for experimental airdrops, airborne training, and testing of clothing, vehicles, and equipment. In 1991, a $6.2 million test facility was completed at Bolio Lake to conduct natural environment cold weather testing of military equipment by the Cold Regions Test Center. In 2004 the Cold Regions Test Center constructed an automotive test complex, including a 3-mile test track, just south of the Fort Greely boundary.

PD2.1.2 Transportation Systems

The Richardson and Alaska highways serve Fort Greely and Donnelly Training Area and the Delta Junction area. Both are maintained year-round. The Richardson Highway is a two-lane primary road that connects the port of Valdez to the south, with Fairbanks to the north. It intersects the Glenn Highway at Glenallen, providing a direct link with Anchorage. Thus, the Richardson Highway links Donnelly Training Area to both Fort Richardson and Fort Wainwright, and it links with the Alaska Highway, connecting Alaska with the Canadian road system.

There is no rail service to Donnelly Training Area, nor are there navigable waterways for waterborne transportation. The nearest rail service is at Eielson Air Force Base, about 70 miles north. The Alaska Railroad provides year-round passenger, freight, and vehicle service between Anchorage and Fairbanks. Most northbound freight arrives by sea at either the port of Anchorage or the port of Whittier for transfer to the railroad. The Alaska Railroad provides a connection to Seward, 80 miles to the south of Anchorage, the nearest port with intermodal capability.

Allen Army Airfield at Fort Greely can support C-5 aircraft in winter and C-130 aircraft at all other times. Ladd Army Airfield at Fort Wainwright and Eielson Air Force Base can support any type of military aircraft. In addition, there is a small, unpaved light aircraft landing strip north of Delta Junction.

Donnelly East Training Area contains the 33-mile and 11-mile vehicle test loops used to test wheeled and tracked vehicles under extreme temperature conditions and varying snow depths. There is also a good network of roads and trails between the Delta River and the Richardson Highway. Donnelly West Training Area is only accessible to ground vehicles when the Delta River is frozen and the minimal network of winter trails are frozen and groomed.

PD2.2 Physical Resources

PD2.2.1 Topography

Donnelly Training Area lies north of the Alaska Range, in the Tanana River watershed. The area has a number of features associated with past and present glacial activities, including terminal moraines, outwash fans, braided streams, kettle lakes, and loess deposits. The Donnelly East Training Area and the northern half of the Donnelly West Training Area lie within the Tanana-Kuskokwim lowland. The entire lowland area is a structural basin. It subsided as the Alaska Range rose to the south and then filled with materials eroded from those mountains. The area consists of alluvial fans that slope northward from the mountains and drop 20 to 50 feet in elevation per mile until they reach the floodplain along the Tanana River. The terrain consists of generally flat lowlands, ranging from 1,200 to 1,600 feet above sea level.

The southern half of the Donnelly West Training Area primarily lies within the northern foothills of the Alaska Range. The area is characterized by flat-topped ridges that are oriented west to east and range

from 2,000 to 4,500 feet in elevation. Ridges are three to seven miles wide and five to twenty miles long, and are separated by rolling lowlands ranging from 700 to 1,500 feet in elevation, and spans two to ten miles in width. The foothills are largely unglaciated, although glaciers from the Alaska Range widened valleys. In the southwestern portion of the Donnelly West Training Area, elevations range from 4,000 to 6,200 feet, and some valley glaciers extend onto the installation (U.S. Army Alaska 1979).

PD2.2.2 Geology

Climatic fluctuations during the Quaternary Period caused glacial expansion and recession (Racine and Walters 1991). While central Alaska was not glaciated, glaciers during glacial advances surrounded the area. Rivers flowing from glaciers deposited several hundred feet of silt, sand and gravel in the Tanana and Yukon valleys. Most northern portions of Donnelly Training Area are composed of these Quaternary deposits. A complex assemblage of Precambrian and Paleozoic-aged metamorphic rocks of the Yukon-Tanana crystalline complex (formerly known as Birch Creek schist) characterizes bedrock of the northern foothills. These rocks were later intruded by Cretaceous and Tertiary-aged igneous rocks, resulting in a few exposed areas of granite and quartz diorite (U.S. Army Alaska 1979).

PD2.2.2.1 Seismicity

Even though seismic activity in Alaska exceeds that found in any other state, few shocks have caused severe damage because of the absence of large population centers. Donnelly Training Area lies in a 200-mile wide seismic zone that extends from Fairbanks southward through Prince William Sound. Since the 1960s, several minor seismic events occurred on the Donnelly East and West Training Areas. Although this is not a sufficient time span to assess seismic hazard, there is no record of damage sustained from these events. The Denali Fault extends through the Alaska Range just south of the installation, and slip on this fault is on the order of 1 cm per year (Matmon et al. 2004).

PD2.2.2.2 Petroleum and Minerals

Petroleum and mineral rights management on withdrawn lands is the responsibility of the Bureau of Land Management. Many glacial deposits in the area are good sources of sand and gravel for aggregate or base course materials. They were used for construction of the Richardson and Alaska highways and the Trans Alaska Pipeline. In 1942, a gold and molybdenum deposit was found along Ptarmigan Creek in the southwestern portion of the West Training Area. Ore was mined from this deposit, but it was never shipped. Other deposits of gold, lead and tin have been reported from areas surrounding the post (Bureau of Land Management and U.S. Army 1994). Portions of the withdrawn lands have moderate to high potential for placer gold deposits. Localized placer deposits may also occur in streams draining the Granite Mountains and Tertiary-age gravel benches (Center for Ecological Management of Military Lands 1998).

The Jarvis Creek coalfield is located southeast of Donnelly East Training Area. Coal resources in that area are estimated to be 76 million tons; two-thirds of which occur at depths of less than 1,000 feet. A few hundred tons of coal were extracted from one small mine in the Jarvis Creek field in 1958. The mine provided all the coal requirements at Fort Wainwright and Eielson Air Force Base for at least one year and was active from 1966 to 1972 (U.S. Army Alaska 1979).

Four areas of Donnelly Training Area are described in the *Fort Greely Resources Management Plan/Final Environmental Impact Statement* (Bureau of Land Management and U.S. Army 1994b) as having mineral potentials. They include: (1) the Middle Tanana Basin, which occupies the northern and northeastern strip of the installation and encompasses approximately 30% of the post; (2) the Nenana Coal Basin, which lies in the southern and southwestern portions and encompasses about 40% of Fort Greely and Donnelly Training Area; (3) a non basin area occupies a strip between the Middle Tanana Basin and the Nenana Coal Basin, about 20% of the post; and (4) igneous/metamorphic rock outcrops

occupy two areas in the southwestern corner of the post (Bureau of Land Management and U.S. Army 1994b). Coalfields are scattered throughout the Nenana Coal Basin, and it has a high potential for producing coal. Whereas the central non-basin area has low potential, the northern Middle Tanana Basin has moderate potential, and the outcrops have no potential (Bureau of Land Management and U.S. Army 1994b). The potential of finding economic deposits of Tertiary coal on Fort Greely and Donnelly Training Area is unknown due to poor outcrops, a lack of subsurface information, the extensive erosion of Tertiary sediments, and structural deformation of the bedrock (Center for Ecological Management of Military Lands 1998).

Coal and organics within the Tertiary sediments could generate and trap gas under suitable geologic conditions. The Nenana Basin, with its known coal deposits, has moderate potential for producing gas (Center for Ecological Management of Military Lands 1998). Granitic plutons occur near the eastern and western borders of Donnelly Training Area. Elsewhere in Alaska, these features are associated with thermal springs. Donnelly Training area is classified as having moderate potential for geothermal resources (Bureau of Land Management and U.S. Army 1994b). The rock outcrops have no potential for phosphate, sodium, potassium, or gilsonite, while other areas have low potential for these minerals.

The Fort Greely Resources Management Plan (Bureau of Land Management and U.S. Army 1994b) prohibits mining in drop zones and landing fields, and within one mile of existing roads and major trails to maintain safe military operations and training. Mineral material sites are an exception to the one-mile off-limits designation. The military may mine sand and gravel for its own purposes.

Measures to safeguard resource values outlined in 43 CFR 3100, 43 CFR 3600, and 43 CFR 3809 apply to mineral development on withdrawn lands. Under terms of the Defense Appropriations Act of 2000, should withdrawn lands be opened to mineral location, mineral patents could convey title to locatable minerals only. These patents would carry the right to use as much of the surface as necessary for mining under guidelines established by the Secretary of the Interior by regulation (Bureau of Land Management and U.S. Army 1994b).

The Fort Greely Resource Management Plan (Bureau of Land Management and U.S. Army 1994b) continues the exemption of withdrawn lands from provisions of the 1872 Mining Law, the 1920 Mineral Leasing Act (as amended), the 1947 Mineral Leasing Act for Acquired Lands, and the 1970 Geothermal Steam Act. Withdrawn lands are closed to all forms of mineral material disposal, both sale and free use, other than to support military activities.

PD2.2.3 Soils

The soils on Donnelly Training Area have been mapped in detail. The cantonment area and surrounding land east of the Delta River have been mapped at a scale of 1:25,000. The area west of the Delta River have been mapped at a scale of 1:63,000. In general, soils are derived from glacial actions and modified by streams and discontinuous permafrost. The Natural Resources Conservation Service (formerly the Soil Conservation Service) identified 12 soil associations in the area of Donnelly Training Area. Soils in the northern, west-central, and eastern portions of the West Training Area are silt loam associations, while the East Training Area is predominantly shallow silt loam over gravelly sand. Soils in the river floodplains consist of alternate layers of sand, silt loam, and gravelly sand. Highly organic wet soils, underlain by permafrost, and having a high water table characterize muskeg soils. Upland foothills have moist, loamy soils, while mountain soils are rocky, steep, and unvegetated. Lowland soils have moderate erosion potential, while foothill soils have moderate to high erosion potential (U.S. Army Alaska 1979).

Table PD-1. Donnelly Training Area Soil Associations*

Soil Map Unit	Soil Type	Location	Description
1	Typic Cryochrepts in association with Aeric Cryaquept	High terraces, outwash plains, and footslopes - north part of Fort Greely and Donnelly Training Area.	Silt loams, moderately to well drained with underlying gravelly sand.
2	Histic Pergelic Cryaquepts	Broad rolling hills and valleys in the northwest portion of Fort Greely and Donnelly Training Area.	Poorly drained silt loam soils with textures ranging from sand loam to clay loam and are fairly gravelly in areas.
3	Histic Pergelic Cryaquepts in association with Typic Cryofluvents	Level floodplains along the Delta and Tanana rivers.	45% - poorly-drained loams with textures of either silt loam or sandy loam. 35% - alluvial soils of stratified silt loam and sand. Remainder of the soil consists of peat deposits with shallow loam materials over very gravelly sand located in depressions within the floodplain.
4	Afic Cryochrepts in association with Histic Pergelic Cryaquepts	Uplands north of Fort Greely and Donnelly Training Area	35% - well-drained deep silt loams. 20% - poorly drained silt loams with an overlying peat layer and a shallow permafrost table. 10% - moderately drained silt loams and well-drained shallow silt loams over bedrock. Remainder – poorly drained shallow silt loam underlain by permafrost (north facing).
5	Typic Cryochrepts in association with Histic Pergelic Cryaquepts	Uplands to the north of Fort Greely and Donnelly Training Area.	30% - very gravelly silt loam or very gravelly loam. 25% - poorly drained silt loams with overlying peat. Remainder - a mixture of soil types including gravelly and stony silt loams to silt soils.
6	Pergelic Cryaquepts in association with Pergelic Cryochrepts	Foothills and moraines of the Alaska Range in the southern part of Fort Greely and Donnelly Training Area.	40% - poorly drained gravelly and stony loams. 35% - well-drained gravelly and stony loams. Remainder – poorly drained silt loams.
7	Histic Pergelic Cryaquepts	Low slopes subject to seepage and in drainage ways in the southwestern and southeastern portions of Fort Greely and Donnelly Training Area.	Poorly drained shallow loams with permafrost over very gravelly and stony loam. An overlying peat layer is also present.
8	Typic Cryochrepts in association with Histic Pergelic Cryaquepts	Hilly portions along the Delta River in the eastern portion of Fort Greely and Donnelly Training Area.	45% - well-drained silt loams. 30% - poorly drained shallow silt loams. Remainder - a mixture of very gravelly loams and silt loams.
9	Typic Cryochrepts	Terraces, outwash plains, and low moraines along Jarvis Creek.	70% - shallow silt loams. 30% - shallow loams or gravels and poorly-drained silty to gravelly soils.

Soil Map Unit	Soil Type	Location	Description
10	Typic Cryochrepts	Hilly and steep moraines northeast of the Air Drop Zone.	65% - shallow silt loams. Remainder - gravelly loams.
11	Rocklands	Mountainous areas and foothills of the Alaska Range in the southern portion of Fort Greely and Donnelly Training Area.	75% - rockland. Remainder - very gravelly shallow soils.
12	Typic Cryochrepts in association with Histic Pergelic Cryaquepts	Moraines and footslopes to the east of Jarvis Creek.	65% - gravelly silt loams over very gravelly loams. Remainder - gravelly, stony silt loam or sand loam.

*From (Rieger et al. 1979).

Isolated patches of permafrost exist under Fort Greely and Donnelly Training Area's sandy gravel from 2 to 40 feet below ground level. Thickness of permafrost varies between 10 to 118 feet.

PD2.2.4 Water Resources

PD2.2.4.1 Surface Water

Donnelly Training Area lies entirely within the Tanana River drainage basin. Surface water from around the Main Post drains into the Delta River and Jarvis Creek. The West Training Area drains into the Delta River, Delta Creek, East Fork of Little Delta River, Buchanan Creek, and the Little Delta River. The Delta River, Delta Creek, and Little Delta River all drain directly into the Tanana River. Surface water from the East Training Area drains into the Delta River, and Granite, Ober, and Jarvis creeks. The Gerstle River Training Area drains into the Gerstle River and Sawmill Creek, both of which drain into the Tanana River.

Glaciers that lie along or just south of the installation's southern boundary feed most rivers, streams, and creeks. Glacial meltwaters feed the Delta River, Delta Creek, and the Little Delta River from the Alaska Range. Principal glaciers include Canwell, Castner, and Black Rapids (which drain into the Delta River); Trident and Hayes (which drain into Delta Creek); and Hayes and Gillam (which drain into the Little Delta River). Jarvis Creek is fed by meltwater from glaciers on Mt. Silvertip (U.S. Army Alaska 1979). The volume of surface water flow fluctuates dramatically by season. From October to May, flow is limited to groundwater seepage from aquifers into streams, and many small streams freeze solid (zero discharge). Snowmelt typically begins in May and reaches its peak in June. Flows are greatest during June and July. After July, most of the snow has melted, and a steady flow during August and September is sustained by rainfall.

The state of Alaska has not designated streams on Donnelly Training Area into water-use categories. Without such designations, fresh waters in Alaska are considered to be in their original and natural condition and suitable for all uses. The state of Alaska, Department of Natural Resources has claimed an interest in submerged lands on Donnelly Training Area, and has sought cleanup. USAG-AK has respectfully declined taking cleanup action for a number of reasons including excessive land disturbance and habitat loss to ensure cleanup and because the areas in question are part of the post's active ranges. The pH levels in the Delta River and Jarvis Creek are slightly alkaline, but they are within limits

established by the state. Dissolved oxygen levels generally vary with water flow; oxygen levels are highest in June, July, and August and they may approach zero during periods of prolonged ice cover (Bonito 1980; U.S. Army Alaska 1979).

Lakes are abundant on Donnelly Training Area, but information on their water quality is scarce. Water samples collected from Bolio Lake had a pH of 8.8 to 9.2, a level beyond acceptable alkalinity as defined by the state. Most nitrogen in Bolio Lake is in organic forms (0.98 mg/l) with low concentrations of nitrates and nitrate nitrogen (0.02 mg/l). Samples collected from Bolio Lake in August 1975, had dissolved oxygen concentrations of 9.8 mg/l near the surface and 10.0 mg/l at a depth of 15 feet. Alaska Department of Fish and Game stocks 16 lakes with sport fish. Most other lakes on Donnelly Training Area are not suitable for stocking, due to poor accessibility or their susceptibility to freezing.

PD2.2.4.2 Groundwater

Although surface water is abundant in the Tanana Basin, most of Donnelly Training Area's water is obtained from wells. Potential groundwater supply is greatest in the floodplain alluvium along the Little Delta River, Delta River, Delta Creek, and Jarvis Creek, and in the alluvial fans extending along the northern flanks of the Alaska Range. The surface to groundwater depth at Donnelly Training Area is between 100 and 210 feet. Most wells on the post tap unconfined aquifers found in unconsolidated alluvial deposits. Groundwater recharge is from influent seepage of glacier-fed streams.

The quality of surface water has remained high throughout Army occupation. There has been no reason to suspect degradation (beyond localized, temporary sedimentation) to Donnelly Training Area surface waters. Limited monitoring of these waters has occurred due to little indication of problems.

PD2.2.5 Climate

Donnelly Training Area has the northern continental climate of interior Alaska, which is characterized by short, moderate summers; long, cold winters; and low precipitation and humidity. Weather is influenced by mountain ranges on three sides that form an effective barrier to the flow of warm, moist maritime air during most of the year. Surrounding upland areas tend to aid drainage and the settling of cold Arctic air into Tanana Valley lowlands.

The Alaska Meteorological Team at the Central Meteorological Observatory, Fort Greely, monitors weather at the post to support Cold Regions Test Center projects. Average monthly temperatures range from -6.4ºF in January to 60.0ºF in July, with an average annual temperature of 27.4ºF. The record low temperature is -63ºF, and the record high is 92ºF. The average frost-free period is 95-100 days (27 years of Alaska Meteorological Team data). Prevailing winds are from the east-southeast from September through March and from the west, southwest, or south from April through August. Average wind velocity is 8.2 miles per hour (mph). The greatest wind speeds occur during winter, with a high of 104 mph recorded in the month of February. Winds are 5 mph or less only 13.6 percent of the time, and wind speeds greater than 60 mph have been recorded in every month. Thunderstorms are infrequent and occur only during summer (20 years of Alaska Meteorological Team data).

Average annual precipitation is 11.12 inches, which falls over 90.4 days, mostly during summer and early fall. Average monthly precipitation ranges from a low of 0.24 inches in April to a high of 2.38 inches in June. Average annual snowfall is 40.5 inches, with a record 99.7 inches in 1945 (27 years of Alaska Meteorological Team data). Average annual relative humidity is 55 percent with lowest levels occurring during spring and early summer (38 percent during mid-afternoon in May). Heavy fog is relatively common during December and January, with three or more foggy days occurring each month. Temperature inversions can be pronounced in the Delta Junction area, especially when temperatures drop below - 25°F. Ice fog can be expected any time that temperatures drop to -30°F or lower, but ordinarily

ice fog will only occur in areas near human settlements where moisture is exhausted by burning fuels (U.S. Army Alaska 1979).

PD2.3 Biological Resources

PD2.3.1 Flora

Vegetation types of interior Alaska form a mosaic and reflect fire history, slope and aspect, and presence or absence of permafrost (Viereck and Little 1972). Donnelly Training Area has five recognized cover types: ice and snow; alpine tundra; moist tundra; open, low growing spruce forests; and closed, spruce-hardwood forests. The white spruce-paper birch forest of interior Alaska is often called the boreal forest or taiga.

PD2.3.1.1 Vegetative Profile

The huge landscapes at Donnelly Training Area encompass a wide array of physiographic settings. Patterns of vegetation are determined by a variety of natural influences, including climate, topography (slope, aspect, and elevation), glaciation, flooding, depth to water table, and most importantly, permafrost and fire. A typical vegetation profile from the north slope of the Alaska Range to the Tanana River floodplain includes: barren areas (rock, gravel, snow, and/or ice), alpine tundra, moist tundra, forests (black spruce, white spruce, deciduous, and mixed), tall shrubs, barren, and water (Anonymous 1979; Bonito 1980). This vegetation profile does not precisely match Viereck and Little's (1972) vegetation types, which were assessed on a statewide basis. Wetlands occur at various altitudes and sometimes only during early vegetation successional stages. Local conditions often result in combinations or the absence of a vegetation type when moving up or downslope. Each cover type is described below.

***Barren Land*:** These include glaciers, snowfields, bare and exposed rock in mountains, and recently deposited gravel bars in rivers. All barren land on Donnelly Training Area occurs either at high altitudes or adjacent to rivers and streams. A small portion of Trident Glacier occurs on Donnelly Training Area.

***Tundra (Alpine and Moist*):** Windy and cold tundra occurs above tree line, and supports only the hardiest vegetation in a short growing season. Vegetation in alpine and moist tundra is a low, dwarf, or procumbent growth form and is limited by severe weather. Vegetation in ecotones between alpine and moist tundra can be found in both types, including sparse and scattered grasses, sedges, lichens, club mosses, and low mat-forming herbaceous and woody plants. Woody perennials rarely exceed three feet in height. This ecosystem is extremely sensitive to damage. In southern portions of Donnelly Training Area, moist tundra grades into alpine tundra and then into glaciers (barren land).

***High Brush*:** The high brush type forms the transitional zone, or ecotone, between forests and barren areas or tundra. At lower elevations, it occurs between forests and barren areas adjacent to waterways. High brush normally occurs as a narrow vegetative band along floodplains or just above tree line. The size of the transitional zone varies dramatically, and in places where there is a well-defined tree line, it may be quite small. The high brush area is important ecologically. It sustains small to medium-sized woody plants (no larger than 20 feet in height) including alder, willows, cottonwood, birch, aspen, and prostrate white spruce. Along floodplains, high brush forms a thick, almost impenetrable barrier with little or no ground cover. In sub-alpine settings, stands may be thinner and more persistent. Ground vegetation consists of grasses, mosses, forbs, low shrubs, and lichens that often form thick layers. Wildlife, particularly moose, from both alpine and forest communities use high brush for forage (Bonito 1980).

***Forest*:** The forests of Donnelly Training Area range from pure stands of spruce or hardwoods to spruce/hardwood mixtures. Predominate hardwoods are birch, quaking aspen, and balsam poplar. Bottomland forest of white spruce/balsam poplar occurs on level floodplains, low river terraces, and

south-facing slopes. Stands of black spruce occur where drainage is poor, such as flat valley bottoms, lakesides, and muskegs. Lowland forest of black spruce/hardwood is the most common type in interior Alaska. On colder northern aspects, black spruce stands may grow at altitudes of up to 2,500 feet.

***Wetland*:** Wetlands occur in a variety of forms, but on Donnelly Training Area most are shrub wetlands. Shrub wetlands, also known as bogs or low brush, are associated with slightly higher relief of marsh edges and poorly drained basins and depressions with cold, waterlogged soils. The surface primarily consists of a thick layer of peat over a mottled gray silt or silt loam. If not exposed, the water table is found only a few inches beneath the surface and during periods of heavy precipitation may form temporary lakes. Depth to ice-rich permafrost is often less than 30 inches. Ground cover is characterized by a dense accumulation of mosses, lichens, sedges, rushes, liverworts, mushrooms, and other fungi. Stunted black spruce occasionally occurs. Along the margins of bogs and in drier areas, grasses, small shrubs, and smaller trees, such as willow and dwarf Arctic birch, proliferate (U.S. Army Alaska 1979).

PD2.3.1.2 Role of Fire

Interior Alaska's vegetative pattern is largely influenced by fire. On Donnelly Training Area, fires are most frequent on northern portions of the Donnelly West Training Area. Between 1956 and 1987, 60 known fires burned over 150,000 acres in the Donnelly Training Area/Delta Junction area. Particularly large fires included a 54,413-acre Carla Lake Fire in 1998; a 43,500-acre fire east of Jarvis Creek in 1987; a 35,450-acre fire near Delta Creek in 1971; the 18,000-acre Donnelly Flats Fire in 1999; and a 17,500-acre fire west of the East Fork of Little Delta River in 1971 (Bureau of Land Management-Alaska Fire Service 2000; Bureau of Land Management and U.S. Army 1994; Bonito 1980).

Bonito (1980) bases the following summary of post-fire succession on a literature review. The first year after a fire, grasses, fireweed, horsetail, and morel mushrooms are common. Grasses and sedges along streams recover quickly, and birch seeds germinate by the second year. In wet muskeg, a continuous cover of grasses usually can be found within three to five years after a fire. Willow, Labrador tea, and birch recover first, followed by black spruce, and perhaps 100-200 years later, spruce-dominated sites develop again into muskegs. Post-fire successional stages can differ from this based on the ecotype that burned, the intensity of the fire, and numerous other variables (Randi Jandt, personal communication 1997).

Lichens may take 50-150 years to recover after a burn. On dry sites, aspen and birch replace willow. The birch may remain for 150 years and may be replaced by white spruce. Repeated burning tends to favor birch/aspen communities.

PD2.3.1.3 Floristics Inventory

During 1995-1996, Cold Regions Research Engineering Laboratory conducted a floristic inventory for USAG-AK at Fort Wainwright (Tande et al. 1996). The inventory focused on vascular plants, so cryptogams (i.e., mosses and lichens) were not identified. This inventory was the basis for the less intensive inventory at Fort Greely and Donnelly Training Area (Racine et al. 2001).

During 1997 and 1998 Cold Regions Research Engineering Laboratory conducted a floristic inventory in conjunction with other work at Donnelly Training Area, and collected 723 specimens. These collections represented 497 vascular plant taxa from 64 families and 198 genera. Eleven of these species represent significant range extensions (>150 km). Center for Ecological Management of Military Lands laminated one full set of collected plants for use by the Donnelly Training Area ITAM program. A mounted set was kept at the Donnelly Training Area natural resources office, and an incomplete mounted set was kept by Cold Regions Research Engineering Laboratory (Racine et al. 2001).

PD2.3.1.4 Threatened or Endangered, and Species of Concern Plants

Interior Alaska has no federally-listed threatened, endangered, or candidate plant species. This was expected because there are no listed or candidate species native to interior Alaska. Seventeen of the species collected are vascular plants being tracked by the Alaska Natural Heritage Program's (AKNHP) Biological Conservation Database for interior Alaska. The following table (Table PD-2) provides information on species of concern found on Donnelly Training Area (Racine et al. 2001). Rankings are listed on the Alaska Natural History Preservation's Vascular Plant Tracking List, which was last updated April 18, 2006, by Robert Lipkin and published on their web site (Lipkin 2006).

Table PD-2. Global and Alaska Rankings for Donnelly Training Area Plants.

Species	Common Name	Global Ranking*	Alaska Ranking**
Artemisia laciniata	lacinate sagewort	G4?	S2
Carex atratiformis		G5	S2
Carex crawfordii	Crawford's sedge	G5	S3
Carex deweyana	Dewey sedge	G5	S2?
Carex eburnea	bristleleaf sedge	G5	S2S3
Carex sychnocephala	manyhead sedge	G4	S1
Cryptogramma stelleri	fragile rock-brake	G5	S2S3
Draba incerta	Yellowstone draba	G5	S2S3
Glyceria pulchella	MacKenzie Valley mannagrass	G5	S2S3
Phlox hoodii	spiny phlox	G5	S1S2
Phlox richardsonii ssp. *richardsonii*	Richardson's phlox	G4T2T3Q	S2?
Potamogeton obtusifolius	bluntleaf pondweed	G5	S2S3
Salix setchelliana	Setchell's willow	G4	S3
Saxifraga adscendens spp. *oregonensis*	small saxifrage	G5T4T5	S2S3
Sisyrinchium montanum	strict blue-eyed grass	G5	S1
Stellaria alaskana	Alaska starwort	G3	S3
Viola selkirkii	Selkirk's violet	G5?	S3

* Alaska Natural Heritage Program Rare Species Global Rankings
G3 Either very rare and local throughout its range or found locally in a restricted range (typically 21-100 occurrences)
G4 Apparently secure globally
G5 Demonstrably secure globally
G#G# Global rank of species uncertain; best described as a range between the two ranks
G#T# Global rank of species and global rank of the described variety or subspecies of the species Q Taxonomically questionable
? Inexact

** Alaska Natural Heritage Program Rare Species State Rankings

S1 Critically imperiled in state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state (typically 5 or fewer occurrences, or very few remaining individuals or acres)

S2 Imperiled in state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state (typically 6 to 20 occurrences, or few remaining individuals or acres)

S3 Rare or uncommon in the state (typically 21-100 occurrences)

S4 Apparently secure in state, with many occurrences

S#S# State rank of species uncertain; best described as a range between the two ranks

SE possibly introduced

PD2.3.1.5 Ecological Land Classification

U.S. Army Cold Regions Research and Engineering Laboratory (Cold Regions Research Engineering Laboratory) contracted ABR, Environmental Research and Services, Inc., to produce ecological land classification maps for Donnelly Training Area. Ecodistricts are physiographic units within a climatic region that influence moisture availability and exposure to radiant solar energy and have similar geology, geomorphology, and hydrology. Names of ecodistricts are based on prominent geographic features and broad physiographic landforms. Ecosubdistricts are small physiographic regions having distinct, repeating associations of vegetation, soils, permafrost characteristics, water bodies, and fauna. West Donnelly Training Area is located in the Hayes Mountains, Delta Highlands and Delta Lowlands ecodistricts. East Donnelly Training Area and Fort Greely are located in the Delta Lowlands and are dissected by the middle Tanana Floodplain (Delta River floodplain and Jarvis Creek floodplain). The southern portion of East Donnelly Training Area extends into the Delta Highlands with a small portion (Donnelly Dome) included in the Gakona ecodistrict. By extension from the Fort Greely and Donnelly Training Area ecological land classification, it can be inferred that Gerstle River is located in the Delta Lowlands ecodistrict and Black Rapids is located in the Hayes Mountains ecodistrict.

PD2.3.1.6 Wetlands

Approximately 68 percent (431,940 acres) of Donnelly Training Area is wetland (Lichvar 2000), with palustrine, riverine, and lacustrine classes included. Palustrine shrub wetlands are the most common types of wetlands found on Donnelly Training Area.

Palustrine wetlands are nontidal and tidal-freshwater wetlands intermittently to permanently flooded, open water bodies of less than 20 acres in which water is less than 6.6 feet deep. Vegetation is predominantly trees; shrubs, persistent or nonpersistent emergent, erect, rooted herbaceous plants; mosses and lichens; or submersed and floating plants (Cowardin et al. 1979).

Riverine wetlands are contained within a river channel except for sites dominated by trees, shrubs, or persistent emergent plants (Cowardin et al. 1979).

Lacustrine wetlands are found within topographic depressions or dammed river channels, or associated with lakes. Sites lack trees, shrubs, or persistent emergent vegetation. These sites are larger than 20 acres and/or have a depth greater than 6.6 feet at low water (Cowardin et al. 1979).
According to Lichvar 2000, the most prevalent ecotypes likely to be wetlands at Donnelly Training Area include:

Lowland Wet Low Scrub and Lowland Tussock Scrub Bog (35 percent of Donnelly Training Area) – These palustrine wetlands are characterized by loamy soils that are poorly drained because of permafrost. The bogs contain sedges, tussock meadows, and lowland moist meadows with bluejoint reedgrass (*Calamagrostis canadensis*). Willows, dwarf birches, and forbs may also be present.

Lowland Wet Needleleaf Forests (12 percent of Donnelly Training Area) – Soils are loamy, poorly drained because of permafrost, and moderately acidic. These forests are dominated by black spruce (*Picea*

mariana). This type of wetland is common in the Donnelly Drop Zone and Eddy Drop Zone alternatives.

Alpine Wet Tussock Meadow and Alpine Wet Low Scrub (6 percent of Donnelly Training Area) – These ecotypes are characterized by loamy soils, underlain by permafrost, and are moderately to strongly acidic. These areas are found above tree line, primarily in the southern portion of Donnelly Training Area West, along the foothills of the Alaska Range.

Riverine Wetland Complex (6 percent of Donnelly Training Area) – These areas are located along inactive floodplains of meandering and headwater streams with soils consisting of inter-bedded silts and sands. Wetlands located along the Delta River and Jarvis Creek are riverine systems.

Lacustrine Wetland Complex (1 percent of Donnelly Training Area) – Lacustrine water bodies are ponds and lakes with or without emergent or floating vegetation, and wetland vegetation on the margins. This also includes basins in fine-grained lacustrine deposits with vegetation dominated by grasses.

PD2.3.1.7 Forest Resources

A forest inventory is an integral part in establishing a plan for managing forest resources. The Donnelly Training Area Ecological Management Unit was inventoried by Directorate of Public Works Environmental Forestry Staff during the 2003 field season. Tree data was collected from permanent plots as part of an on going Forest Inventory and Analysis of U.S. Army Alaska (USAG-AK) lands.

Stand Delineation and Inventory

Stand timber types were delineated utilizing aerial photography to produce maps that demarcate land into forested and non-forested categories. This process was also used to help identify geographical coordinates for the plots and to establish permanent plots on the ground. Timber stands where further defined into types based on specific characteristics such as species composition, size, and spacing. These stand types are predefined by the Alaska Vegetation Classification system (Viereck, et al. 1992). The USAG-AK inventory method further stratifies out stands with higher timber value, greater ecological importance, and greater potential for military training. Stand timber typing was confirmed on the ground during stand inventory. The fixed plot radius sampling method was used for tree data collection.

Forest Land Classification

The Donnelly Training Area east of the Delta River contains approximately 111,546 acres of land (Table PD-3). Forestlands in this area occupy 53% of the land area or 58,655 acres. Non-forestland amounts to 47 % of the total land area or 52,891 acres. The Forest Inventory and Analysis considered 50,361 acres of the total forested lands in this area. Of this amount, there are approximately 15,881 acres of commercial forestland. Commercial forestlands are those lands containing sawtimber and poletimber size classes.

Table PD-3. Donnelly Training Area Forest Land Classification

Ecological Management Unit	Forest Category	Commercial Forest Category	Forested Land Acreage*	Total Acreage
Donnelly East	Forested Lands	Commercial Forest	15,881 acres	58,655 acres
		Non-Commercial Forest Lands	34,480 acres	
	Non-Forested Lands		0 acres	52,891 acres
	Donnelly East Sub-Total		**50,361 acres**	**111,546 acres**
Donnelly West	Forested Lands	Commercial Forest	59,983 acres	147,315 acres
		Non-Commercial Forest Lands	332 acres	

	Non-Forested Lands		0 acres	428,138 acres
	Donnelly West Sub-Total		**60,315 acres**	**575,453 acres**
Donnelly Training Area	**Total**		**110,676 acres**	**686,999 acres**

*Forested lands available for timber harvest

The Donnelly Training Area West contains about 575,453 acres of land. Forested lands in this area occupy 26% of the land area or 147,315 acres. Non-forestland amounts to 74 % of the total land area or 428,138 acres. The Forest Inventory and Analysis considered 60,315 acres of the total forested lands in this area. Of this amount, there are approximately 59,983 acres of commercial forestland.

Forest Land Area and Volume by Strata

The total volume found in the various types or strata on Donnelly East Training Area is found in Table PD-4. For example, white spruce sawtimber (stratum 1) for the Donnelly Training Area East reports a volume of about 9,777,222 cubic feet, all of this volume is in the white spruce sawtimber type. The estimated total volume of timber in this area is 25,061,076 cubic feet. Of this amount, commercial saw and pole timber types represent 22,534,266 cubic feet. Reproduction, dwarf, and burned types account for the remaining 2,526,810 cubic feet.

White spruce sawtimber type occupies 10.9% (5,499 acres) of the forestland area and contains approximately 9,777,222 cubic feet. Poletimber types occupy 17% (8,540 acres) of the forestland area and contain a volume of 9,704,850 cubic feet. The white spruce poletimber type contains about 6,039,915 cubic feet. The white spruce-birch-aspen poletimber type represents a total of 2,392,390 cubic feet. The pole/saw stratum is made up of birch-aspen and has a total volume of 3,052,194 cubic feet. This stratum represents 3.7% (1,842 acres) of the forested area. A total of 15,881 acres of sawtimber and poletimber types comprise the volume estimates in this study. Reproduction, dwarf, and burned types together occupy 68.5% (34,480 acres) of the forestland area. These types do not contribute to the commercial volume estimates.

Each stratum has also been broken down into average stems per acre. White spruce sawtimber contains an average of about 219 stems per acre. White spruce poletimber contains an average of 267 stems per acre. The white spruce-birch-aspen poletimber type contains 324 stems per acre, the highest density among all the classes. The white spruce-birch-aspen dwarf/regeneration/burned stratum has an average of 138 stems per acre.

Table PD-4. Donnelly Training Area Forest Timber Types.

Forest Timber Type	Acres	Percent Forested Acres	Cubic Feet per Acre	Total Cubic Feet	Percent Volume Cubic Feet	Average Stems per Acre
Donnelly East Ecological Management Unit						
Sawtimber						
(1) White Spruce	5,499	10.9%	1,778	9,777,222	39.0%	219
Subtotal:	5,499	10.9%		9,777,222	39.0%	
Poletimber						
(2) White Spruce	4,715	9.4%	1,281	6,039,915	24.2%	267
(6) Balsam Poplar	1,169	2.3%	265	309,785	1.2%	120

Forest Timber Type	Acres	Percent Forested Acres	Cubic Feet per Acre	Total Cubic Feet	Percent Volume Cubic Feet	Average Stems per Acre
(9) White Spruce-Birch-Aspen	1,806	3.6%	1,325	2,392,950	9.5%	324
(12)White Spruce-Balsam Poplar	850	1.7%	1,132	962,200	3.8%	319
Subtotal:	8,540	17.0%		9,704,850	38.7%	
Pole/Saw						
(7) Birch-Aspen	1,842	3.6%	1,657	3,052,194	12.2%	294
Subtotal:	1,842	3.6%		3,052,194	12.2%	
Dwarf/Regeneration/Burned						
(22) Other Coniferous	15,447	30.7%	29	447,963	1.8%	26
(23) Balsam Poplar	1,656	3.3%	111	183,816	0.7%	78
(24) Birch-Aspen	9,585	19.0%	59	565,515	2.3%	32
(25) White Spruce-Birch-Aspen	1,772	3.5%	363	643,236	2.6%	138
(26) Black and White Spruce-Birch-Aspen	6,020	12.0%	114	686,280	2.7%	68
Subtotal:	34,480	68.5%		2,526,810	10.1%	
Donnelly East Total:	**50,361**	**100.0%**		**25,061,076**	**100.0%**	
Donnelly West Ecological Management Unit						
Sawtimber						
(1) White Spruce	12,965	21.5%	2,238	29,015,670	28.3%	214
Subtotal:	12,965	21.5%		29,015,670	28.3%	
Poletimber						
(2) White Spruce	28,619	47.4%	1,530	43,787,070	42.6%	302
(6) Balsam Poplar	5,515	9.2%	1,406	7,754,090	7.6%	469
Subtotal:	34,134	56.6%		51,541,160	50.2%	
Pole/Saw						
(7) Birch-Aspen	12,884	21.4%	1,702	21,928,568	21.4%	330
Subtotal:	12,884	21.4%		21,928,568	21.4%	
Dwarf/Regeneration/Burned						
(23) Balsam Poplar	332	0.6%	301	99,932	0.1%	69
Subtotal:	332	0.6%		99,932	0.1%	
Donnelly West Total:	**60,315**	**100.0%**		**102,585,330**	**100.0%**	
Grand Total	**110,676**			**127,646,406**		

The total volume found in the various types or strata on Donnelly West is also found in Table PD-4. The estimated total volume of timber in this area is 102,585,330 cubic feet. Of this amount, commercial saw

and pole timber types represent 102,485,398 cubic feet. Reproduction, dwarf, and burned types account for the remaining 99,932 cubic feet.

The white spruce sawtimber type occupies 21.5% (12,965 acres) of the forestland area and contains approximately 9,777,222 cubic feet. Poletimber types occupy 56.6% (34,134 acres) of the forestland area and contain approximately 51,541,160 cubic feet. The white spruce poletimber type contains about 43,787,070 cubic feet. The balsam poplar poletimber type represents a total of 7,754,090 cubic feet. The pole/saw stratum is made up of birch-aspen and has a total volume of 21,928,568 cubic feet and occupies 21.4% (12,884 acres) of the area. Reproduction, dwarf, and burned types together occupy 0.6% (332 acres) of the forested area. This type does not contribute to the commercial volume estimates.

Each stratum has also been broken down into average trees per acre. White spruce sawtimber contains an average of about 214 stems per acre. White spruce poletimber contains an average of about 302 stems per acre. The balsam poplar poletimber type contains 469 stems per acre, the highest density among all the classes. The balsam poplar dwarf/regeneration/burned stratum has an average of 330 stems per acre.

Estimated Annual Harvest
An estimate of the annual allowable harvest is a guide for future harvest activities. Calculations are based on the simple area cut method. This method divides the total productive forest area by the rotation age. The result of this method gives the acreage that can be harvested in a year. The acreage is multiplied by the weighted average volume per acre to determine the annual harvest. The following white spruce and hardwood harvest acreage represent saw, pole, and saw/pole timber types; the majority is in the poletimber type.

Table PD-5. Donnelly Training Area Estimated Annual Harvest.

Harvest Timber Type	Potential Harvest Land	Rotation Age	Regeneration Time	Total Rotation Length	Estimated Annual Harvest
Donnelly East Ecological Management Unit					
White Spruce	12,870acres	120 years	10 years	130 years	99 acres per year
Hardwoods	3,011 acres	80 years	10 years	90 years	33 acres per year
Donnelly West Ecological Management Unit					
White Spruce	41,584 acres	120 years	10 years	130 years	320 acres per year
Hardwoods	18,399 acres	80 years	10 years	90 years	204 acres per year

PD2.3.2 Fauna

PD2.3.2.1 Moose

Moose are the most visible and economically important wildlife species on Donnelly Training Area. Alaska Department of Fish and Game's Game Management Unit 20A has one of the state's largest moose harvests, part of which encompasses the Donnelly West Training Area. The south-central and northeastern portion of the Donnelly West Training Area and the far southern portion of the Donnelly East Training Area are fall concentration areas for moose. Spring and summer concentrations are found in the north-central portion of the Donnelly West Training Area. Winter concentrations are found in the northeastern portions of the Donnelly West Training Area, as well as the northern portion of the Donnelly East Training Area (Bonito 1980). A 1984, late-fall survey for moose indicated that the population was 384 animals (± 20%). The 1995 fall estimate was 700 to 1,100 moose on Donnelly Training Area (Steve Dubois, personal communication). It is difficult to conduct meaningful moose surveys for Donnelly Training Area alone because of the migratory habits of these animals. For all of Game Management Unit 20A, early winter aerial estimates of population size have been 10,100 in 1990, 13,300 in 1994,. 12,550

in1999, 11,824 2000, 12,892 2001, and 16,446 2003. The 2003 corrected estimate yields a density of >3 moose/mi^2 (16,446 moose/5040 mi^2 of suitable moose habitat) (Alaska Department of Fish and Game 2004).

PD2.3.2.2 Bison

Bison were introduced into the Big Delta-Delta Junction area in 1928 after they were extirpated from the area 450-500 years ago. There are now four herds in Alaska; one at Donnelly Training Area and the other three originating from this herd stock. In the 1950s, the Delta bison herd included more than 500 animals. By 1973, the herd was estimated to include 325 animals and by 1980 there were about 300 bison. The herd size was maintained through strict hunting regulations. In 1994, the number of bison in the herd was estimated at 446, with 70 bulls/100 cows and 53 calves/100 cows. During the 1994-95 season, 18 cows and 21 bulls were taken. When winter food is plentiful, the cows have a high birth rate (70%), calf mortality is low (80% survival), and the herd's general health is good. Hunting is the main mortality factor. The Delta cows calve (April through July), primarily in the Delta River basin along terraces and gravel bars on or near the Texas and Washington ranges. Bison are generally off of Donnelly Training Area by late July-early August (U.S. Army Alaska 1979, Kiker and Fielder 1980). DuBois and Rogers (2000) summarized the history, natural history, and management of the herd in the Delta Bison Management Plan 2000-2005. The Delta bison herd is currently being managed by Alaska Department of Fish and Game at a population level of about 360 bison at the pre-calving, with no less than 50 bulls for every 100 cows (Alaska Department of Fish and Game 2004b).

PD2.3.2.3 Dall Sheep

Dall sheep (*Ovis dalli*) are found in the Molybdenum Ridge area in the southwestern portion of the Donnelly West Training Area. The population was estimated at less than 100 animals (Bonito 1980). Spiers and Heimer (1990) studied this herd and found five subpopulations. They noted that their movements included lands both on and off Donnelly Training Area. This study found 150 sheep on Donnelly Training Area in winter and 100 in summer.

PD2.3.2.4 Caribou

Of the 32 caribou herds or populations in Alaska (Alaska Department of Fish and Game Wildlife Notebook Series) 2 occur on Donnelly Training Area. The Delta Caribou Herd and the Macomb Caribou Herd. The Delta caribou herd ranges throughout moist tundra habitat along the Alaska Range. This relatively small herd spends spring and summer on calving grounds in the Trident Glacier foothills and then moves to the west of Donnelly Training Area for the winter (U.S. Army Alaska 1995b). Alaska Department of Fish and Game identified the Donnelly Dome area as winter habitat for caribou. In 1963, the herd was estimated at 5,000 head that ranged over 3,000 square miles. By 1974, the herd dropped to 1,400-2,000 animals (U.S. Army Alaska 1979). In 1979, the herd was estimated at about 4,000 animals with a high (63:100) calf/cow ratio (Spiers 1982). Alaska Department of Fish and Game estimated the 2004 Delta Caribou Herd population to be 2168 (Alaska Department of Fish and Game 2005).

The Macomb caribou herd occupies the mountains of the eastern Alaska Range from the Delta River to the Mentasta Highway. Their core range is in unit 20D between the Robertson River and the Richardson Highway, and their primary calving grounds are on the Macomb Plateau the Macomb herd also uses the lowlands of the Tanana River drainage as winter range. Alaska Department of Fish and Game estimated the 2004 Macomb Caribou Herd population to be between 600 and 650 (Alaska Department of Fish and Game 2005).

PD2.3.2.5 Other Mammal Species

Large predators include grizzly (*Ursus arctos*) and black (*Ursus americanus*) bears, wolves(*Canis lupus*), red foxes(*Vulpes vulpes*), American marten (*Martes americana*), coyotes (*Canis latrans*), and wolverines (*Gulo gulo*). Many of these species, in addition to mink (*Mustela vison*), muskrat (*Ondatra zibethicus*),

and beaver (*Castor canadensis*) are trapped for fur on Donnelly Training Area.. There is no accurate harvest or population data for these species. Small mammals that are potentially rare inhabitants of Donnelly Training Area that have not been documented include the long-tailed vole (*Microtus longicaudus*), yellow-cheeked vole (*M. xanthognathus*), Alaska tiny shrew (*Sorex yukonicus*), and water shrew (*S. palustris*) (Anderson et al. 2000).

Several small game and related species are found on Donnelly Training Area, including snowshoe hare (*Lepus americanus)* willow (*Lagopus lagopus*) and rock (*L. mutus*) ptarmigan; spruce (*Falcipennis Canadensis*), sharp-tailed (*Tympanuchus phasianellus*), and ruffed (*Bonasa umbellus*) grouse; swans; ducks; geese; and cranes. Waterfowl nest on Donnelly Training Area pothole lakes and are absent from the area during winter. There are no accurate harvest or population data for these species.

PD2.3.2.6 Birds

Anderson et al. (2000) conducted landbird surveys in 1998 on Donnelly Training Area. Some common nongame birds observed on the installation include the alder flycatcher (*Empidonax alnorum*), American kestrel (*Falco sparverius*), hawk owl (*Surnia ulula*), great-horned owl (*Bubo virginianus*), yellow-rumped (*Dendroica coronata*) and orange-crowned warbler (*Vermivora celata*), common (*Carduelis flammea*) and hoary redpoll (*Carduelis hornemanni*), dark-eyed junco (*Junco hyemalis*), hairy woodpecker (*Picoides villosus*), black-backed woodpeckers (*Picoides arcticus*), red-tailed hawk (*Buteo jamaicensis*), mew gull (*Larus canus*), gray jay (*Perisoreus canadensis*), common raven (*Corvus corax*), black-capped chickadee (*Poecile atricapilla*), American robin (*Turdus migratorius*), varied thrush (*Ixoreus naevius*), hermit thrush (*Catharus guttatus*), Swainson's thrush (*Catharus ustulatus*), gray-cheeked thrush, (*Catharus minimus*) Bohemian waxwing (*Bombycilla garrulus*), snow bunting (*Plectrophenax nivalis*), and cliff swallows (*Petrochelidon pyrrhonota* (*Hirundo pyrrhonota*)) (U.S. Army Alaska 1979).

Several small game and related species are found on Donnelly Training Area, including willow (*Lagopus lagopus*) and rock (*L. mutus*) ptarmigan; spruce, sharp-tailed (*Tympanuchus phasianellus*), and ruffed (*Bonasa umbellus*) grouse; swans; ducks; geese; and cranes. Waterfowl nest on Donnelly Training Area pothole lakes and are absent from the area during winter. There are no accurate harvest or population data for these species.

Sandhill crane habitat exists on Donnelly Training Area. Cranes are common migrants but it is unknown if any nesting occurs. A survey for trumpeter swans in 2001 found 56 swans on the installation including 26 cygnets (Amji and Payne, 2006). Trumpeter swan surveys conducted by U.S. Fish and Wildlife Service in 1990, 1995, and 2000 covered parts of Donnelly Training Area including kettle lakes in the southwest portion of the Donnelly West Training Area, and along the Delta River.

PD2.3.2.7 Fish

The Delta River is important fall chum salmon (*Oncorhynchus keta*) and coho (*Oncorhynchus kisutch* (Walbaum)) spawning habitat, although the latter are more common in Clearwater Creek. Salmon spawn at the mouth of the Delta River and do not occur in upstream sections including Donnelly Training Area. Major streams on Donnelly Training Area (e.g., Delta River, Delta Creek, Jarvis Creek and 100 mile Creek) support Arctic grayling throughout the open water season. A few clear streams flowing into these larger streams provide summer habitat for grayling, but none are important for spawning grayling (Bureau of Land Management and U.S. Army 1994a).

While some lakes and ponds on Donnelly Training Area have naturally occurring populations of lake chub (*Couesius plumbeus*), northern pike, sculpin, and suckers, most are too shallow or oxygen deficient in the winter to support fish. Alaska Department of Fish and Game stocks 16 Lakes on Donnelly Training Area with silver salmon (*Oncorhynchus kisutch*) , Arctic grayling (*Thymallus arcticus (Pallus*)), Arctic char (*Salvelinus alpinus*), lake trout (*Salvelinus namaycush*), and rainbow trout (*Oncorhynchus mykiss*),

(PMO data, ERD 2000). Annual fishing visits to these lakes average about 1400 angler-use days. Most of these lakes are readily accessible from the Richardson Highway. Koole Lake is west of the Delta River and is inaccessible by road (Bureau of Land Management and U.S. Army 1994b).

PD2.3.2.8 Reptiles and Amphibians

Wood frogs (*Rana sylvatica*) are the only amphibians in the Alaska Interior, and they are found on Donnelly Training Area. There are no reptiles.

PD2.3.2.9 Special Status Fauna

The American peregrine falcon was de-listed from endangered species status in 1999. Breeding has been documented on Donnelly Training Area along the Delta River in recent years. Peregrine falcons are known to nest within a few miles of the northwestern corner of the Donnelly East Training Area (Ritchie and Rose 1998). Although this raptor has been recently delisted, the U.S. Fish and Wildlife Service requests that USAG-AK continue consultation on any projects that may hinder their recovery. Peregrine falcons do not winter in Alaska.

A federally listed threatened species in the lower 48, the bald eagle is locally common.

Four passerines listed as species of special concern by the state of Alaska have been confirmed on Donnelly Training Area. They are the olive-sided flycatcher, gray-cheeked thrush, Townsend's warbler, and blackpoll warbler. A species of concern listing was generated to bring attention to the needs of vulnerable species before they require more extreme and costly management actions. Alaska Department of Fish and Game created the new category in 1993. At this time there are no legal requirements for managing the species, but attention should be given to protecting habitats (Center for Ecological Management of Military Lands 1998).

These migratory birds nest mainly in the coniferous forests of Alaska. The olive-sided flycatcher is also found in open woodlands, forest burns, boreal bogs, and muskegs. The gray-cheeked thrush nests in conifers and dense stands of alder or willow (Center for Ecological Management of Military Lands 1998).

The U.S. Fish and Wildlife Service, Office of Migratory Bird Management maintains a list of *Migratory Nongame Birds of Management Concern in the United States*. Species listed for Alaska that occur on Donnelly Training Area are trumpeter swan, common loon, northern harrier, northern goshawk, olive-sided flycatcher, alder flycatcher, gray-cheeked thrush, and blackpoll warbler.

Anderson et al. (2000) conducted landbird surveys in 1998 on Donnelly Training Area. Nine of ten birds listed as priority species by the Western Working Group, Partners in Flight (1998) were found. Anderson et al. (2000) discuss habitat associations of each of these species.

Eighteen species confirmed on Donnelly Training Area are included on the Boreal Partners in Flight Working Group as target or priority species for monitoring because of declines in populations noted across the Americas.

PD2.3.3 Special Interest Management Areas

Donnelly Training Area has several areas with special natural features. They harbor sensitive or unique wildlife species or represent unique plant communities. The following are special area categories and accompanying restrictions. Most areas either have been or soon will be digitized in the Geographic Information System, and maps showing restricted areas will be available to project planners.

PD2.3.3.1 Delta Bison Area

A 1980 cooperative agreement (Bonito 1980) designated areas as important bison calving and summer range on the Donnelly West Training Area. The 1980 agreement also identified the Donnelly East Training Area as important late summer and early winter range. An agreement in 1986 with Alaska Department of Fish and Game (U.S. Army 1986) also identified bison calving and summer range. USAG-AK has imposed restrictions to limit disturbance to bison calving areas from 15 April through 15 June, if bison are present.

PD2.3.3.2 Sandhill Crane Roosting Area

The 1986 agreement with Alaska Department of Fish and Game (U.S. Army 1986) identified several areas along the Delta River on Donnelly Training Area as important for migrating Sandhill cranes (*Grubs canadensis*). Consultation with Alaska Department of Fish and Game for the military Lands Withdrawal Renewal EIS identified additional areas along the Delta Creek wash, near the Delta Creek Assault Landing Strip, as important for migrating sandhill cranes (Center For Ecological Management Of Military Lands 1998). The agreement limited disturbance in designated sandhill crane areas each year from 25 April through 15 May, and 1 September through 30 September when sandhill cranes are present.

PD2.3.3.3 Delta Caribou Calving and Post-Calving Areas

The cooperative agreement between the Army and Alaska Department of Fish and Game (U.S. Army 1986) identified 12 parcels on Donnelly Training Area as important calving and post-calving areas for caribou. In the 1986 agreement, the Army agreed to suspend activities or operations that would adversely affect these areas during 15 May through 31 May without consultation with Alaska Department of Fish and Game. Restrictions in these areas are in effect only when caribou are present. In addition, all development and military actions in the caribou calving grounds will be conducted under winter conditions when there is sufficient snow cover and the ground is adequately frozen to minimize the damage to vegetation and soils.

2.4 Cultural Resources

The Donnelly Training Area has probably supported human populations for 10,000 to 12,000 years. Interior Alaska contains the oldest verifiable prehistoric remains in the state since the Interior was ice-free during the Wisconsin glaciation.

The Athabaskan original homeland was in the Tanana Valley. The Tanana Indians, a branch of the Northern Athabaskans, lived there. The Tanana were a highly mobile group at the time of European contact, moving to fish camps in summer, and various hunting and trapping camps during other seasons.

Twenty-four archaeological investigations have been conducted on Donnelly Training Area since 1963, identifying approximately 400 sites to date. Twenty of these sites comprise the Donnelly Ridge Archaeological District, which is within Donnelly Training Area East. The majority of the archaeological surveys conducted in Donnelly Training Area have been limited to Donnelly Training Area East, which comprises 25 percent of the entire Donnelly Training Area.

PD3. Donnelly Training Area Management Prescriptions

PD3.1 Donnelly Training Area East Sub-Unit

PD3.1.1 Prescriptions and Policy

The Donnelly East Training Area consists of one ecological management unit called Donnelly East. The Donnelly East ecological management unit consists of all of Fort Greely and Donnelly Training Area east of the Delta River, except for the area commonly known as the keyhole, which is private land that surrounds the Richardson Highway. Donnelly East is made up of three sub-units.

The first sub-unit is the Ranges sub-unit. The Ranges sub-unit includes all of the firing ranges that make the Wills Range Complex, Texas Range and Washington Range.

The second sub-unit is Donnelly East Training Areas sub-unit. This sub-unit consists of all remaining areas in Donnelly East Ecological management unit not included in the Fort Greely Main Post sub-unit or the Ranges sub-unit.

PD3.1.1.1 Military Use

The Donnelly East Training Area is used primarily as a maneuver area. Battalion-sized and larger elements of the 172nd Infantry Brigade train throughout the year. Training exercises may include deployment of troops by truck and helicopter, field bivouac, and construction of temporary fighting/defensive positions. Exercises typically involve approach marches, weapons firing, and infantry tactical maneuvers. Cold Regions Test Center utilizes the East Training Area for experimental airdrops; airborne training; and testing of clothing, vehicles, and equipment.

The Ranges sub-unit is suitable for direct and indirect fire weapon training and aerial gunnery exercises. Small arms munitions impact the area. This sub-unit has been classified for small arms, as a non-dud producing impact area. Other compatible uses include live-fire maneuver training, remote monitoring of natural resources and military impacts, and limited on-the-ground natural resources management. Other activities that are not compatible with this sub-unit include most on-the-ground natural resources management, digging without a permit from the Army Corps of Engineers, mineral or vegetative extraction, hunting, fishing, trapping, bird watching, off-road recreational vehicles of any kind, dog sledding, airboats, camping, new construction, easements, and leases.

The Donnelly East Training Areas sub-unit is suitable for indirect fire weapons, aerial gunnery, small arms, platoon- to brigade-sized exercises, company-sized live-fire exercises, road marches, and bivouacs. This sub-unit is primarily used for large-scale military training exercises, airborne drops, and winter bivouacs. The recommended time for military activities in low areas for mechanized vehicles is between freeze-up and spring break-up. Donnelly, Bear, Fox Drop, and Buffalo Drop Zones and Donnelly Assault Air Strip will sustain year-round use. Eddy and Butch Drop Zones will sustain only winter use. Other compatible uses include natural resources management, habitat improvement, mineral or vegetative resources extraction, hunting, fishing, trapping, bird watching, hiking, skiing, dog sledding, and off-road recreational vehicle use. Activities that are not compatible with the Donnelly East Training Areas sub-unit include digging without a permit, and any permanent nonmilitary structures, easements, or leases.

PD3.1.1.2 Access

Public access is allowed in the Donnelly East Training Areas and Fort Greely Main Post sub-units for recreation, subject to safety restrictions and military security, when access does not impair the military mission, as determined by the installation commander. Access is not permitted to unauthorized personnel in the Ranges sub-unit. The Texas Range is covered by R-2202A and R-2202C restricted airspace. R2202A covers up to but not including 10,000 feet mean sea level. R-2202C covers 10,000 feet mean sea level to unlimited. Eielson Range Control will activate one or both restricted airspace coverages based on the Air Force's needs. Access into the Wills Range Complex and Texas Range on the ground is prohibited. Military personnel may request permission to enter this sub-unit, and if permission is granted, explosive ordnance personnel must accompany them.

PD3.1.1.3 Natural Resources Management

Natural resource management priority for Donnelly East is "*full*". Fire suppression category for all of Donnelly East is "*full*", except for the very northern tip of Donnelly East, which is "*critical*". BLM retains vegetation management rights for all of Donnelly Training Area. Hunting, trapping and fishing is "*open*" in Donnelly Training Area East Recreation Areas 1-4, but is "*closed*" in the training areas west of Meadows Road, Battle Area Complex and Combined Arms Collective Training Ranges, Texas and Washington Ranges, and in the Small Arms Complex. Recreation use for off-road recreational vehicles is "*open*" in Donnelly Training Area East Recreation Areas 1, 2, 3, and 4. All other areas on Donnelly East are "*closed*" to off-road recreational vehicle use.

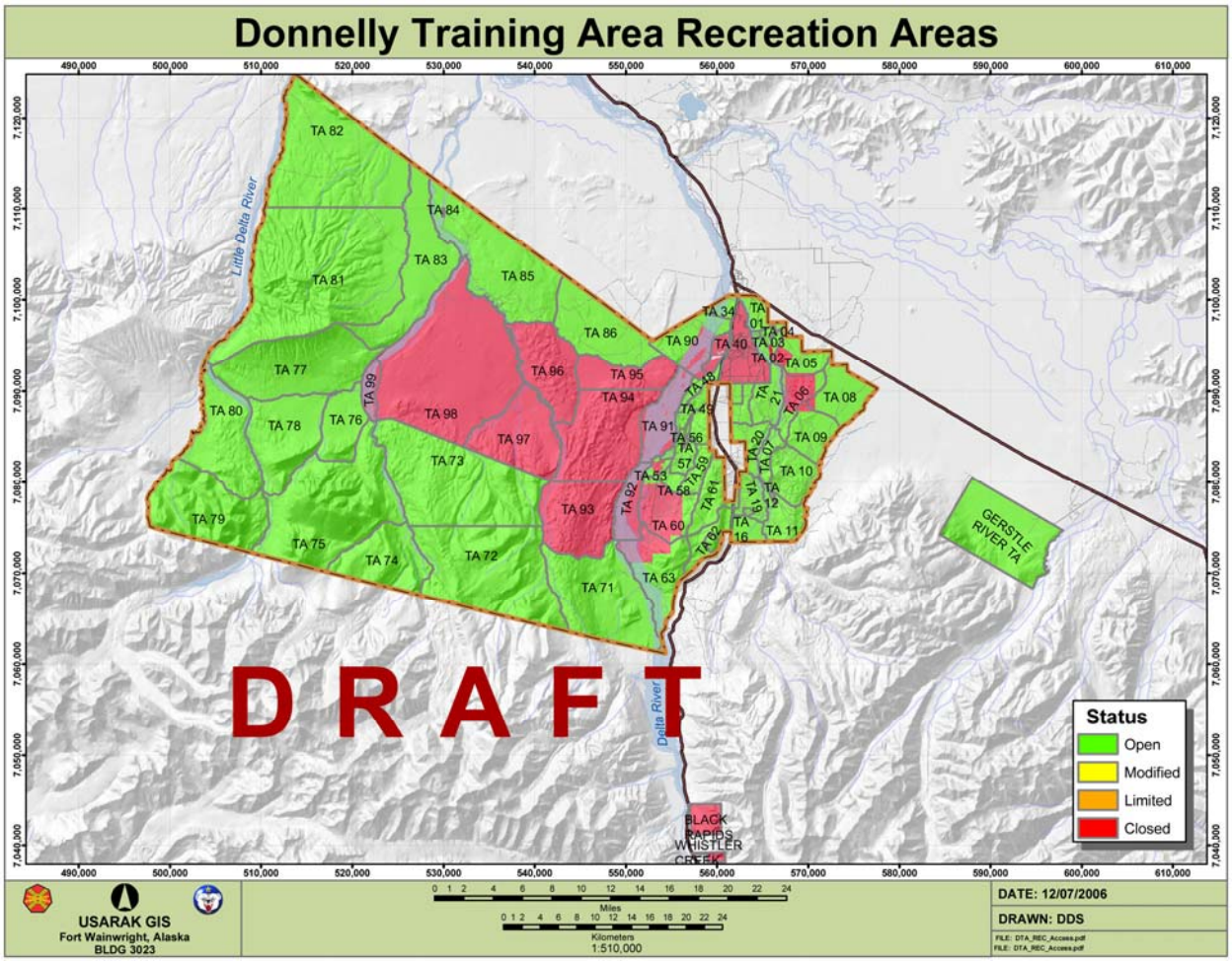
Table PD-6. Donnelly East Training Area Ecosystem Management Prescriptions.

Ecosystem Management Sub-Unit	Natural Resource Management Priorities	Fire Suppression Category	Vegetation Management	Hunting and Trapping	Fishing	Recreational Use Management
Donnelly East Training Area Recreation Areas 1-4	Full	Full	BLM	Open	Open	Open
Donnelly East Training Areas West of Meadows Road	Full	Full	BLM	Closed	Closed	Closed
BAX / CACTF	Full	Full	BLM	Closed	Closed	Closed*
Texas / Washington Ranges	Full	Full	BLM	Closed	Closed	Closed
Small Arms Complex	Full	Full	BLM	Closed	Closed	Closed

*33 Mile Loop remains open except when ranges are in use.

Donnelly East Training Area is not an approved federal or state subsistence area. There is no subsistence preference for any subsistence user but any subsistence user may conduct approved subsistence activities after acquiring any required state licenses, USAG-AK recreation access permit, and checking in with USARTRAK. Figure P-8 shows the recreation use areas on Donnelly Training Area East.

Figure P-8. Donnelly East Training Area Recreation Use Areas.



USAG-AK will comply with all laws, regulations, and Executive Orders pertaining to natural resources management on Donnelly East Training Area. USAG-AK will complete ongoing projects and conduct full implementation of ecosystem management projects. USAG-AK will conserve physical resources by conducting Integrated Training Area Management, watershed management, and minerals management. USAG-AK will conserve biological resources by conducting wetland management, forest management, fish and wildlife management, endangered species management, pest management, and urban area management. USAG-AK will integrate social (human) resources into ecosystem management by conducting education, awareness and public outreach, conservation enforcement, outdoor recreation management, and cultural resources management. USAG-AK will support ecosystem management decision-making through implementation of National Environmental Policy Act, Geographic Information System, and other decision support systems, and integration with other land management programs such as Sustainable Range Program and Sustainment, Restoration and Modernization Program.

PD3.1.2 Projects

Table PD-7 lists the Donnelly East Training Area ecosystem management projects for 2007-2011.

Table PD-7. Donnelly East Training Area Ecosystem Management Projects.

Project Information	Year

Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Erosion Control and Streambank Stabilization	33 Mile Loop Road Phase 8A and B				x	
High	Erosion Control and Streambank Stabilization	Donnelly Training Area TARP FY07	x	x	x	x	x
High	Erosion Control and Streambank Stabilization	J Lake Access Control					x
High	Erosion Control and Streambank Stabilization	J- Lake Gabion Repair					x
High	Erosion Control and Streambank Stabilization	OP Road Drainage Upgrades				x	
High	Erosion Control and Streambank Stabilization	Windy Ridge Road Upgrade and Repair Phase 1-2		x			
High	Forest Land Improvement	BAX / CACTF	x	x	x	x	x
High	Forest Land Improvement	Bolio Lake Training Area Timber Stand Improvement	x	x	x	x	x
High	Forest Land Improvement	Donnelly Training Area Fuel Reduction	x	x	x	x	x
High	Forest Land Improvement	Jarvis North Training Area Timber and Maneuverability Improvement Project	x	x	x	x	x
High	Inventory and Monitoring	PMO Game Warden Coordination	x	x	x	x	x
High	Inventory and Monitoring	Recreational Impact Monitoring	x	x	x	x	x
High	Inventory and Monitoring	Trespass Cabin Monitor	x	x	x	x	x
High	Inventory/Monitoring	Breeding Bird Surveys	x	x	x	x	x
High	Inventory/Monitoring	Caribou population monitor; 20A/D	x	x	x	x	x
High	Inventory/Monitoring	Fisheries Planning Level Surveys	x	x	x	x	x
High	Inventory/Monitoring	Monitor Bison populations	x	x	x	x	x
High	Inventory/Monitoring	Moose Population Surveys; 20A/B	x	x	x	x	x
High	Inventory/Monitoring	Moose Population Surveys; 20D	x	x	x	x	x
High	Inventory/Monitoring	Rusty Blackbird Surveys	x	x	x	x	x
High	Inventory/Monitoring	Trumpeter Swan Brood Surveys	x	x	x	x	x
High	Management	Erect signs designating boundaries of Special Interest Areas	x	x	x	x	x
High	Outreach	Annual Review and Input to ADFG Fishing Regulations	x	x	x	x	x
High	Outreach	Fairbanks Newsminer Hunting Edition	x	x	x	x	x
High	Outreach	Implement FireWise program for private landowners adjacent to military lands.	x	x	x	x	x
High	Outreach	Newcomers Briefings	x	x	x	x	x
High	Outreach	Outdoor Recreation Supplement	x	x	x	x	x
High	Outreach	Range Control coordination	x	x	x	x	x
High	Outreach	Recreation Access Permits	x	x	x	x	x
High	Outreach	Recreation User Group Meetings	x	x	x	x	x
High	Outreach	Update Information Kiosks	x	x	x	x	x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Outreach	USARTRAK Brochure	x	x	x	x	x
High	Recreational Activities	Off Road Vehicle Management	x	x	x	x	x
High	Suppression	Conduct fire suppression activities as necessary.	x	x	x	x	x
High	Survey and Monitoring	Conduct T&E Species Survey	x	x	x	x	x
High	Trespass Structure Abatement	Trespass Cabin and Camps Removal	x	x	x	x	x
High	Vegetation Management	Bison Plot Vegetation Management – Burn, Fertilize and Mow	x	x	x	x	x
High	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	x	x	x	x	x
High	Wildland Fire Management	Develop program of providing assistance to training military units during periods of high fire danger.	x	x	x	x	x
High	Wildland Fire Monitoring	Collect fuel-loading information as part of the forest inventory.	x	x	x	x	x
High	Wildland Fire Monitoring	Delineate and maintain Geographic Information System data layers showing historical fires.	x	x	x	x	x
High	Wildland Fire Monitoring	Map all known cultural features on suppression maps and develop fire management recommendations for these features.		x			
High	Wildland Fire Monitoring	Map all known natural resources features and areas of concern from wildland fire suppression and management activities on suppression maps. Develop management strategies to avoid conflicts with these natural resource features and areas of concern.			x		
High	Wildland Fire Monitoring	Map all known non-sensitive structures on USAG-AK.				x	
High	Wildland Fire Monitoring	Map all military structures on suppression maps. Assess fire suppression options and recommendations for these structures.		x			
High	Wildland Fire Monitoring	Map past areas where ordnance has been used and develop pre-suppression plans on how to deal with wildland fire suppression in these areas.	x	x	x	x	x
High	Wildland Fire Monitoring	Research causes of fire ignitions on USAG-AK to identify areas of high fire occurrence				x	
High	Wildland Fire Monitoring	Research weather patterns influencing fire behavior and historical weather analysis for each land unit of USAG-AK.	x				
High	Wildland Fire Monitoring	Update fire history map of USAG-AK.			x		

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Wildland Fire Monitoring	Update fire maps with military special use areas and fire management options for these areas.	x				
High	Wildland Fire Monitoring	Update fuels map of USAG-AK.			x		
High	Wildland Fire Planning	Develop Geographic Information System for military fire management office and for use on incidents with current data, maps, photos, suppression options, and restrictions.	x	x	x	x	x
High	Wildland Fire Planning	Develop plans and fuel treatment projects to reduce the threat of fires starting on military lands and impact areas and burning onto adjacent lands of high resource value.		x			
High	Wildland Fire Planning	Develop plans for proposed prescribed fires on USAG-AK.	x	x	x	x	x
High	Wildland Fire Planning	Develop standard operation procedures for each area unit of USAG-AK to assist firefighters and Incident Commanders in establishing priorities, making decisions, dealing with ordnance issues.	x	x	x	x	x
High	Wildland Fire Planning	Identify and assess fuel management strategies for urban/wildland interface areas.	x	x	x	x	x
High	Wildland Fire Pre-Suppression	Identify and use fuel reduction treatments to reduce the threat of wildland fire at the urban/wildland interface, military structures, selected training areas, and cultural resources.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop and disseminate procedures for detection and reporting of fires.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop more effective means of calculating fire weather indices for localized training areas and implement a program of relaying fire danger ratings to training units.	x	x	x	x	x
Med	Erosion Control and Streambank Stabilization	33 Mile Loop Phase 1A and 1B				x	x
Med	Erosion Control and Streambank Stabilization	33 Mile Loop Road Shortcut Upgrade				x	
Med	Erosion Control and Streambank Stabilization	Big Lake Road Upgrade and Repair					x
Med	Erosion Control and Streambank Stabilization	Buffalo Drop Zone Access Phase 1-2	x				
Med	Erosion Control and Streambank Stabilization	Butch Training Area TARP			x		
Med	Erosion Control and Streambank Stabilization	Dome Road Upgrade and Repair					x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
Med	Erosion Control and Streambank Stabilization	Donnelly Training Area TARP			x		
Med	Erosion Control and Streambank Stabilization	Jarvis East Training Area TARP			x		
Med	Erosion Control and Streambank Stabilization	Ober Training Area TARP			x		
Med	Erosion Control and Streambank Stabilization	Observation Post 2A FOB Upgrade					x
Med	Erosion Control and Streambank Stabilization	Observation Post Training Area TARP			x		
Med	Forest Land Improvement	Texas Range *AK 316 2823 JM AA85		x		x	
Med	Habitat Management	Bison habitat enhancement					
Med	Habitat Management	Duck Boxes	x	x	x	x	x
Med	Habitat Management	Moose Habitat Enhancement					
Med	Habitat Management	Moose Habitat Evaluation					
Med	Inventory and Monitoring	Recreational Facility Survey	x		x		x
Med	Inventory and Monitoring	Recreational Impacts: Fishing		x		x	
Med	Inventory and Monitoring	Survey airstrips	x				
Med	Inventory/Monitoring	BBS route vegetation survey	x	x	x	x	x
Med	Inventory/Monitoring	bison habitat mapping	x	x	x	x	x
Med	Inventory/Monitoring	Cliff Swallow Monitor	x	x	x	x	x
Med	Inventory/Monitoring	Fauna Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Fish monitoring Donnelly Training Area E	x	x	x	x	x
Med	Inventory/Monitoring	Flora Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Monitor Habitat Work	x	x	x	x	x
Med	Inventory/Monitoring	moose habitat mapping	x	x	x	x	x
Med	Inventory/Monitoring	Owl Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Raptor Surveys		x		x	
Med	Inventory/Monitoring	Ruffed Grouse Drumming Counts	x	x	x	x	x
Med	Inventory/Monitoring	Sandhill crane roosting	x	x	x	x	x
Med	Inventory/Monitoring	Sharptail Grouse Leks	x	x	x	x	x
Med	Inventory/Monitoring	Small Mammal Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Small Mammal Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Soils Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Solitary Sandpiper Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Stream Evaluation	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Threatened & Endangered Species	x	x	x	x	x
Med	Inventory/Monitoring	Topography Planning Level Survey	x	x	x	x	x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
Med	Inventory/Monitoring	Trumpeter Swan Habitat mapping	x	x	x	x	x
Med	Inventory/Monitoring	Vegetation Communities Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Whimbrel Colony Monitor	x	x	x	x	x
Med	Inventory/Monitoring	Wild Ponds/Lakes survey	x	x	x	x	x
Med	Inventory/Monitoring	Wood Frog Breeding Surveys	x	x	x	x	x
Med	Inventory/Monitoring	YTA/Donnelly Training Area E Grizzly sitings	x	x	x	x	x
Med	Outreach	Donnelly Training Area Stocked Lakes brochure		x			
Med	Outreach	FWA Post TV Notices	x	x	x	x	x
Med	Outreach	PAO Radio Spots	x	x	x	x	x
Med	Outreach	Recreation Outreach at Public Events	x	x	x	x	x
Med	Outreach	Write Fairbanks Newsminer AK Post Stories	x	x	x	x	x
Med	Population Management	Harvest Trends: Black Bear Baiting	x	x	x	x	x
Med	Population Management	Harvest Trends: Furbearers	x	x	x	x	x
Med	Population Management	Nuisance/injured Wildlife Issues	x	x	x	x	x
Med	Vegetation Management	Buffalo Drop Zone Vegetation Management – Burn / Mow		x			
Med	Vegetation Management	Wills Range Complex Donnelly Training Area RX Burn	x				
Med	Wildland Fire Planning	Develop pre-suppression plans for each of the area units of USAG-AK.		x			
Low	Erosion Control and Streambank Stabilization	Big Lake/Windy Ridge Trail Upgrade Phase 1					x
Low	Erosion Control and Streambank Stabilization	Jarvis West Training Area TARP			x		
Low	Erosion Control and Streambank Stabilization	Meadows Road Upgrade and Repair Phase 1-2	x				
Low	Erosion Control and Streambank Stabilization	Old Richardson Highway Upgrade					x
Low	Forest Land Improvement	Personal use firewood and house log areas	x	x	x	x	x
Low	Forest Land Improvement	Wills Range complex Buffalo DZ Eddy DZ		x		x	x
Low	Habitat Improvement	Delta River Bison Range Habitat Enhancement	x		x		x
Low	Habitat Management	Osprey Nesting Poles	x		x		x
Low	Habitat Management	Owl Boxes	x	x	x	x	x
Low	Habitat Management	Swallow boxes					
Low	Inventory and Monitoring	Map Winter Trails		x			
Low	Inventory/Monitoring	Animal displays		x		x	

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
Low	Inventory/Monitoring	Bat Surveys		x		x	
Low	Inventory/Monitoring	Waterbird surveys	x	x	x	x	x
Low	Outreach	Interpretive Panels			x		
Low	Outreach	Recreation Surveys	x	x	x	x	x
Low	Outreach	Viewing Platform Material Update			x		
Low	Project Management	Stocked Lakes	x	x	x	x	x
Low	Project Management	Donnelly Dome Hiking Trail			x		
Low	Public Outreach	Wildlife Information /Brochures/presentations	x	x	x	x	x

PD3.2 Donnelly Training Area West Training Area Sub-Unit

PD3.2.1 Prescriptions and Policy

The Donnelly West Training Area consists of one ecological management unit called Donnelly West ecological management unit. The Donnelly West ecological management unit covers all of Fort Greely and Donnelly Training Area west of and including the Delta River. The Donnelly West unit consists of flat, lowland wetlands in the north, portions of the Alaska Range in the south, and most of the Delta floodplain ecodistrict. The Delta River unit contains numerous braided channels and riverbed deposits. The Donnelly West Impact Areas sub-unit consists of Oklahoma, Delta Creek, Lakes, Washington and Mississippi Impact Areas.

PD3.2.1.1 Military Use

The Donnelly West Training Area is used for training and testing weapons and equipment (including experimental designs) under conditions of extreme cold. Weaponry testing include rockets, mortars, small arms, and artillery. The Donnelly West Training Area also is used for testing wheeled and tracked vehicles. The Donnelly West Training Areas sub unit is used primarily for winter exercises only and is suitable for foot training at any time of year.

The Donnelly West Impact Area sub-unit is used for aerial gunnery, surface-to-air, and direct and indirect firing and is the ground and associated airspace within the training complex used to contain fired or launched ammunition and explosives and resulting fragments, debris, and components from various weapons systems. The Lakes Impact Areas are primarily used for live-fire exercises and act as a buffer to Oklahoma Impact Area to the west and Mississippi and Washington Impact Areas to the east. This impact area can also be used for aerial gunnery, surface-to-air, and direct and indirect firing. Impact areas are the ground and associated airspace within the training complex and are used to contain fired or launched ammunition and explosives and resulting fragments, debris, and components from various weapons systems.

The Donnelly West Impact Area sub-unit is suitable for indirect fire weapon training and aerial gunnery exercises. The area is impacted by small arms and dud-producing munitions. USAF uses the Oklahoma/Delta Creek Impact Area as its primary tactical air-to-ground weapons range, and for low and high altitude bombing by B1 and B52 aircraft. This sub-unit has been classified as a high hazard impact area. Other compatible uses include remote monitoring of natural resources and military impacts, and prescribed burning to reduce fire hazards and improve habitat. Military maneuver is prohibited in the

Donnelly West Impact Areas sub-unit. There is hazard of unexploded ordnance in this area. Commanders will ensure that safety personnel maintain surveillance of the area and have the officer-in-charge suspend firing immediately at the approach of an aircraft.

PD3.2.1.2 Access

Public access into the Donnelly West Training Areas sub-unit is allowed for recreation, subject to safety restrictions and military security, when access does not impair the military mission, as determined by the installation commander. Access into the Donnelly West Impact Areas sub-unit is prohibited. Military personnel may request permission to enter this sub-unit, and if permission is granted, personnel must be accompanied by Explosive Ordnance Disposal personnel. Oklahoma/Delta Creek Impact Area has been designated as restricted airspace by the Federal Aviation Administration and can be closed to all aircraft during periods of scheduled firing.

PD3.2.1.3 Natural Resources Management

Nattual resources priority for Donnelly West Training Areas is "*modified*" while the priority for all impact areas is "*limited*". Fire suppression category for all of Donnelly west is "*limited*". Bureau of Land Management retains vegetation rights for all of Donnelly West. Hunting, trapping and fishing are "*open*" in Donnelly West Training Areas and are "*closed*" in all impact areas. Off-road recreational vehicles are prohibited from entereing any of the impact areas on Donnelly West. Recreational use management is "*modified*" for the Donnelly West training areas and "*closed*" for the impact areas.

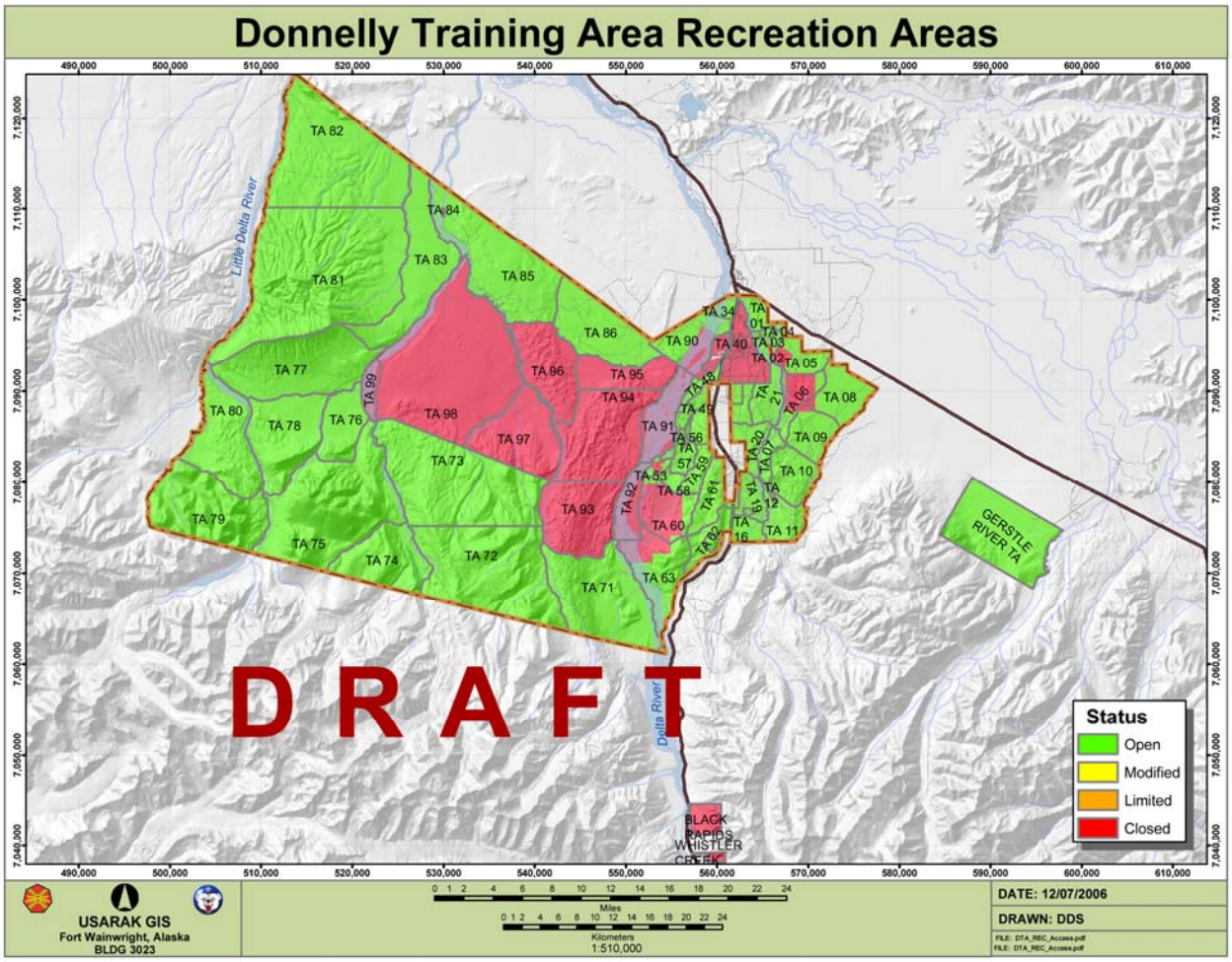
Table PD-8. Donnelly West Training Area Ecosystem Management Prescriptions.

Ecosystem Management Sub-unit	Natural Resource Management Priorities	Fire Suppression Category	Vegetation Management	Hunting and Trapping	Fishing	Recreational Use Management
Donnelly West Training Area Recreation Areas 1-4	Modified	Limited*	BLM	Open	Open	Modified
Washington and Mississippi Impact Areas	Limited	Limited	BLM	Closed	Closed	Closed
Lakes Impact Areas	Limited	Limited	BLM	Closed	Closed	Closed
Oklahoma and Delta Creek Impact Areas	Limited	Limited	BLM	Closed	Closed	Closed

*The very northern portion of these training areas is designated "modified" fire suppression category.

Donnelly West Training Area is not an approved federal or state subsistence area. There is no subsistence preference for any subsistence user but any subsistence user may conduct approved subsistence activities after acquiring any required state licenses, USAG-AK recreation access permit, and checking in with USARTRAK. Figure P-9 shows the recreation use areas on Donnelly West Training Area.

Figure P-9. Donnelly West Training Area Recreation Use Areas.



USAG-AK will comply with all laws, regulations, and Executive Orders pertaining to natural resources management on Donnelly West Training Area. USAG-AK will complete ongoing projects and conduct full implementation of ecosystem management projects. USAG-AK will conserve physical resources by conducting Integrated Training Area Management, watershed management, and minerals management. USAG-AK will conserve biological resources by conducting wetland management, forest management, fish and wildlife management, endangered species management, pest management, and urban area management. USAG-AK will integrate social (human) resources into ecosystem management by conducting education, awareness and public outreach, conservation enforcement, outdoor recreation management, and cultural resources management. USAG-AK will support ecosystem management decision-making through implementation of National Environmental Policy Act, Geographic Information System, and other decision support systems, and integration with other land management programs such as Sustainable Range Program and Sustainment, Restoration and Modernization Program.

PD3.2.2 Projects

Donnelly West ecosystem management projects for 2007-2011 are shown in Table PD-9 below.

Table PD-9. Donnelly West Training Area Ecosystem Management Projects.

Project Information			Year				
Priority	Standard Project	Project Title	FY	FY	FY	FY	FY

	Category		07	08	09	10	11
High	Forest Land Improvement	Oklahoma Impact Area *AK 316 2823 JM AA88	x	x	x	x	x
High	Inventory and Monitoring	PMO Game Warden Coordination	x	x	x	x	x
High	Inventory and Monitoring	Recreational Impact Monitoring	x	x	x	x	x
High	Inventory and Monitoring	Trespass Cabin Monitor	x	x	x	x	x
High	Inventory/Monitoring	Caribou population monitor; 20A	x	x	x	x	x
High	Inventory/Monitoring	Fisheries Planning Level Surveys	x	x	x	x	x
High	Inventory/Monitoring	Monitor Bison populations	x	x	x	x	x
High	Inventory/Monitoring	Moose Population Surveys; 20D	x	x	x	x	x
High	Inventory/Monitoring	Rusty Blackbird Surveys	x	x	x	x	x
High	Inventory/Monitoring	Trumpeter Swan Brood Surveys	x	x	x	x	x
High	Management	Erect signs designating boundaries of Special Interest Areas	x	x	x	x	x
High	Outreach	Fairbanks Newsminer Hunting Edition	x	x	x	x	x
High	Outreach	Outdoor Recreation Supplement	x	x	x	x	x
High	Outreach	Range Control coordination	x	x	x	x	x
High	Outreach	Recreation Access Permits	x	x	x	x	x
High	Recreational Activities	Off Road Vehicle Management	x	x	x	x	x
High	Suppression	Conduct fire suppression activities as necessary.	x	x	x	x	x
High	Survey and Monitoring	Conduct T&E Species Survey	x	x	x	x	x
High	Trespass Structure Abatement	Trespass Cabin and Camps Removal	x	x	x	x	x
High	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	x	x	x	x	x
High	Wildland Fire Management	Develop program of providing assistance to training military units during periods of high fire danger.	x	x	x	x	x
High	Wildland Fire Monitoring	Collect fuel-loading information as part of the forest inventory.	x	x	x	x	x
High	Wildland Fire Monitoring	Delineate and maintain Geographic Information System data layers showing historical fires.	x	x	x	x	x
High	Wildland Fire Monitoring	Map all known cultural features on suppression maps and develop fire management recommendations for these features.		x			
High	Wildland Fire Monitoring	Map all known natural resources features and areas of concern from wildland fire suppression and management activities on suppression maps. Develop management strategies to avoid conflicts with these natural resource features and areas of concern.			x		
High	Wildland Fire Monitoring	Map all known non-sensitive structures on USAG-AK.				x	
High	Wildland Fire Monitoring	Map all military structures on suppression maps. Assess fire suppression options and		x			

		recommendations for these structures.					
High	Wildland Fire Monitoring	Map past areas where ordnance has been used and develop pre-suppression plans on how to deal with wildland fire suppression in these areas.	x	x	x	x	x
High	Wildland Fire Monitoring	Research causes of fire ignitions on USAG-AK to identify areas of high fire occurrence				x	
High	Wildland Fire Monitoring	Research weather patterns influencing fire behavior and historical weather analysis for each land unit of USAG-AK.	x				
High	Wildland Fire Monitoring	Update fire history map of USAG-AK.			x		
High	Wildland Fire Monitoring	Update fire maps with military special use areas and fire management options for these areas.	x				
High	Wildland Fire Monitoring	Update fuels map of USAG-AK.			x		
High	Wildland Fire Planning	Develop Geographic Information System for military fire management office and for use on incidents with current data, maps, photos, suppression options, and restrictions.	x	x	x	x	x
High	Wildland Fire Planning	Develop plans and fuel treatment projects to reduce the threat of fires starting on military lands and impact areas and burning onto adjacent lands of high resource value.		x			
High	Wildland Fire Planning	Develop plans for proposed prescribed fires on USAG-AK.	x	x	x	x	x
High	Wildland Fire Planning	Develop standard operation procedures for each area unit of USAG-AK to assist firefighters and Incident Commanders in establishing priorities, making decisions, dealing with ordnance issues.	x	x	x	x	x
High	Wildland Fire Pre-Suppression	Identify and use fuel reduction treatments to reduce the threat of wildland fire at the urban/wildland interface, military structures, selected training areas, and cultural resources.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop and disseminate procedures for detection and reporting of fires.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop more effective means of calculating fire weather indices for localized training areas and implement a program of relaying fire danger ratings to training units.	x	x	x	x	x
Med	Forest Land Improvement	Lakes Impact Area		x		x	
Med	Habitat Management	Moose Habitat Evaluation	x	x	x	x	x
Med	Inventory and Monitoring	Recreational Facility Survey	x		x		x
Med	Inventory and Monitoring	Survey airstrips	x				
Med	Inventory/Monitoring	bison habitat mapping	x	x	x	x	x

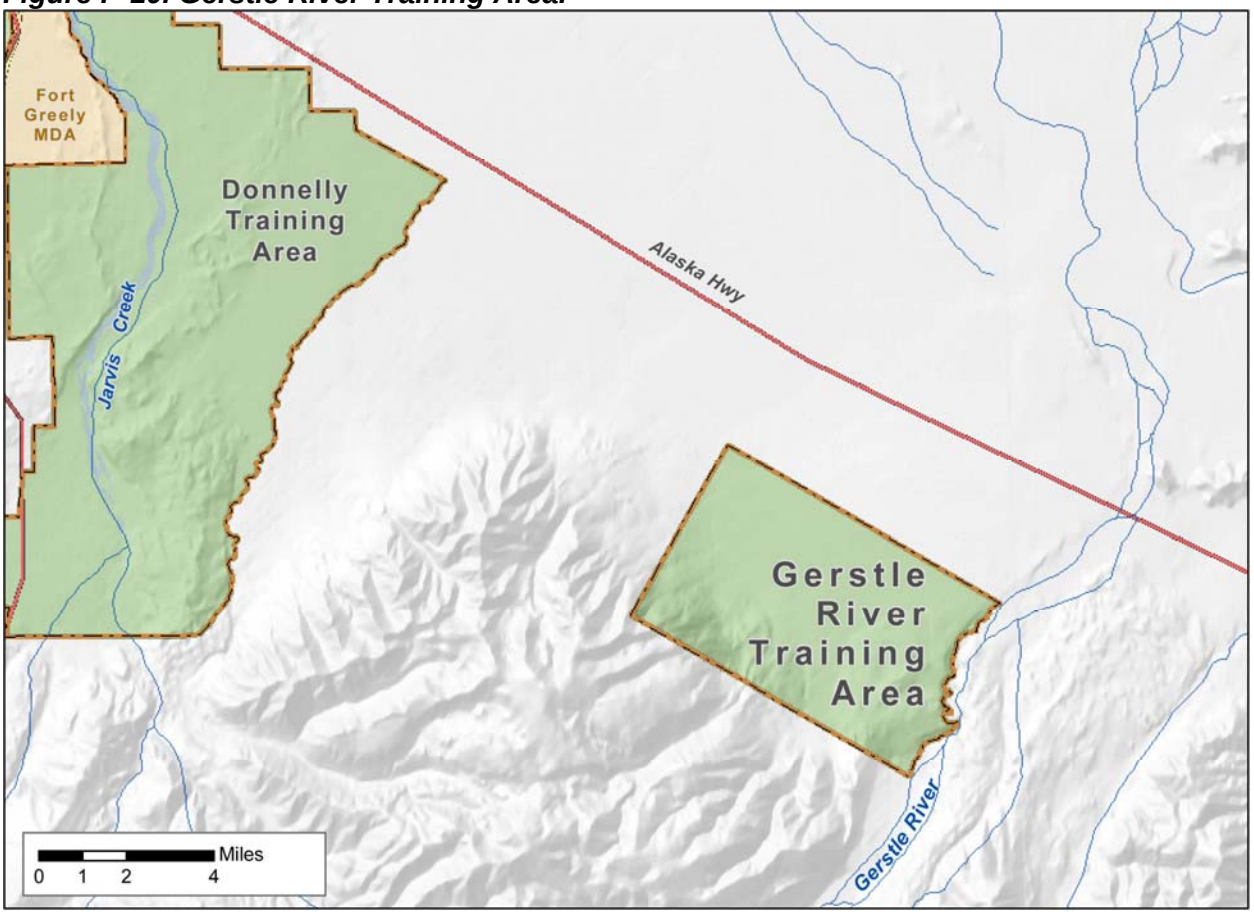
Med	Inventory/Monitoring	Fauna Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Fish monitoring Donnelly Training Area W	x	x	x	x	x
Med	Inventory/Monitoring	Flora Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Small Mammal Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Soils Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Threatened & Endangered Species	x	x	x	x	x
Med	Inventory/Monitoring	Topography Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Trumpeter Swan Habitat mapping		x		x	
Med	Inventory/Monitoring	Vegetation Communities Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Wild Ponds/Lakes survey	x	x	x	x	x
Med	Inventory/Monitoring	Wood Frog Breeding Surveys	x	x	x	x	x
Med	Outreach	Recreation Outreach at Public Events	x	x	x	x	x
Med	Outreach	Write Fairbanks Newsminer AK Post Stories	x	x	x	x	x
Med	Population Management	Harvest Trends: Black Bear Baiting	x	x	x	x	x
Med	Population Management	Harvest Trends: Furbearers	x	x	x	x	x
Med	Population Management	Nuisance/injured Wildlife Issues	x	x	x	x	x
Med	Vegetation Management	Nevada Lakes Impact Area, Donnelly Training Area Rx Burn	x				
Med	Wildland Fire Planning	Develop pre-suppression plans for each of the area units of USAG-AK.		x			
Low	Forest Land Improvement	Donnelly West Fuel Break		x	x		x
Low	Forest Land Improvement	Hays Lake Fuel Break			x	x	x
Low	Inventory and Monitoring	Map Winter Trails		x			
Low	Inventory/Monitoring	Waterbird surveys	x	x	x	x	x
Low	Public Outreach	Wildlife Information / Brochures / Presentations	x	x	x	x	x

PE. GERSTLE RIVER TRAINING AREA ECOLOGICAL MANAGEMENT UNIT

PE1. Location

Gerstle River Training Area, formerly known as Gerstle River Test Site, is located approximately twenty miles southeast of Delta Junction, Alaska. The Gerstle River Training Area lies between Granite Mountain and Gerstle River, about three miles south of the Alaska Highway; the rectangular area is oriented northwest to southeast and measures about five miles, north to south, and nine miles, east to west. Gerstle River Training Area, withdrawn indefinitely under Public Land Order 910, is approximately 20,580 acres. Gerstle River Training Area is shown in Figure P-10.

Figure P-10. Gerstle River Training Area.



PE2. Environment

PE2.1 Facilities

There are no permanent facilities on Gerstle River Training Area beyond remains of a few test buildings remaining from testing in the 1950 and 1960s. Except for a small off limits area, Gerstle River Training Area is a light training area

Gerstle River is reached by a gravel road off of the Alaska Highway. The Alaska Highway serves both Delta Junction and the Gerstle River Training Area, connecting Alaska with the Canadian road system.

There is no rail service to Gerstle River Training Area, nor are there navigable waterways for waterborne transportation. The nearest rail service is at Eielson Air Force Base, about 100 miles north. The Alaska Railroad provides year-round passenger, freight, and vehicle service between Anchorage and Fairbanks. Most northbound freight arrives by sea at either the port of Anchorage or the port of Whittier for transfer to the railroad. The Alaska Railroad provides a connection to Seward, 80 miles to the south of Anchorage, the nearest port with intermodal capability.

Allen Army Airfield at Fort Greely can support C5/C141 aircraft in winter and C130 aircraft at all other times. Ladd Army Airfield at Fort Wainwright and Eielson Air Force Base can support any type of military aircraft. In addition, there is a small, unpaved light aircraft landing strip north of Delta Junction.

PE2.2 Physical Resources

Gerstle River Training Area lies north of the Alaska Range, in the Tanana River watershed. The area has a number of features associated with past and present glacial activities, including terminal moraines, outwash fans, braided streams, kettle lakes, and loess deposits.

Climatic fluctuations during the Quaternary Period caused glacial expansion and recession (Racine and Walters 1991). While central Alaska was not glaciated, glaciers during glacial advances surrounded the area. Rivers flowing from glaciers deposited several hundred feet of silt, sand and gravel in the Tanana and Yukon valleys. Most of Gerstle River Training Area is composed of these Quaternary deposits.

The Denali Fault extends through the Alaska Range just south of Gerstle River Training Area and slip on this fault is on the order of 1 cm per year (Matmon et al. 2004).

Petroleum and mineral rights management on withdrawn lands is the responsibility of the Bureau of Land Management. Many glacial deposits in the area are good sources of sand and gravel for aggregate or base course materials.

Soils on Gerstle River Training Area have not been mapped.

Isolated patches of permafrost exist under Gerstle River Training Area sandy gravel from 2 to 40 feet below ground level. Thickness of permafrost varies between 10 to 118 feet. Existing and abandoned river channels, lakes, wetlands, and other low-lying areas are permafrost-free (Williams 1970).

The Gerstle River Training Area lies entirely within the Tanana River drainage basin. Sawmill Creek drains the majority of the Gerstle River Training Area, while some drains into the Gerstle River. Both are tributaries of the Tanana River.

Gerstle River Training Area has the northern continental climate of interior Alaska, which is characterized by short, moderate summers; long, cold winters; and low precipitation and humidity. Weather is influenced by mountain ranges on three sides that form an effective barrier to the flow of warm, moist maritime air during most of the year. Surrounding upland areas tend to aid drainage and the settling of cold Arctic air into Tanana Valley lowlands.

PE2.3 Biological Resources

PE2.3.1 Flora

Vegetation types of interior Alaska form a mosaic and reflect fire history, slope and aspect, and presence or absence of permafrost (Viereck and Little 1972). Gerstle River Training Area has two recognized cover types: open, low growing spruce forests; and closed, spruce-hardwood forests. The white spruce-paper birch forest of interior Alaska is often called the boreal forest or taiga.

Patterns of vegetation at Gerstle River Training Area are determined by a variety of natural influences, including climate, topography (slope, aspect, and elevation), glaciation, flooding, depth to water table, and most importantly, permafrost and fire. A typical vegetation profile from the north slope of the Alaska Range to the Tanana River floodplain includes: barren areas (rock, gravel, snow, and/or ice), alpine tundra, moist tundra, forests (black spruce, white spruce, deciduous, and mixed), tall shrubs, barren, and water (U.S. Army Alaska 1979; Bonito 1980). This vegetation profile does not precisely match Viereck and Little's (1972) vegetation types, which were assessed on a statewide basis. Wetlands occur at various altitudes and sometimes only during early vegetation successional stages. Local conditions often result in combinations or the absence of a vegetation type when moving up or downslope. Each cover type is described below.

***High Brush*:** The high brush type forms the transitional zone, or ecotone, between forests and barren areas or tundra. At lower elevations, it occurs between forests and barren areas adjacent to waterways. High brush normally occurs as a narrow vegetative band along floodplains or just above tree line. The size of the transitional zone varies dramatically, and in places where there is a well-defined tree line, it may be quite small. The high brush area is important ecologically. It sustains small to medium-sized woody plants (no larger than 20 feet in height) including alder, willows, cottonwood, birch, aspen, and prostrate white spruce. Along floodplains, high brush forms a thick, almost impenetrable barrier with little or no ground cover. In sub-alpine settings, stands may be thinner and more persistent. Ground vegetation consists of grasses, mosses, forbs, low shrubs, and lichens that often form thick layers. Wildlife, particularly moose, from both alpine and forest communities use high brush for forage (Bonito 1980).

***Forest*:** The forests of Gerstle River Training Area range from pure stands of spruce or hardwoods to spruce/hardwood mixtures. Predominate hardwoods are birch, quaking aspen, and balsam poplar. Bottomland forest of white spruce/balsam poplar occurs on level floodplains, low river terraces, and south-facing slopes. Stands of black spruce occur where drainage is poor, such as flat valley bottoms, lakesides, and muskegs. Lowland forest of black spruce/hardwood is the most common type in interior Alaska. On colder northern aspects, black spruce stands may grow at altitudes of up to 2,500 feet.

***Wetland*:** Wetlands occur in a variety of forms, but on Gerstle River Training Area most are shrub wetlands. Shrub wetlands, also known as bogs or low brush, are associated with slightly higher relief of marsh edges and poorly drained basins and depressions with cold, waterlogged soils. The surface primarily consists of a thick layer of peat over a mottled gray silt or silt loam. If not exposed, the water table is found only a few inches beneath the surface and during periods of heavy precipitation may form temporary lakes. Depth to ice-rich permafrost is often less than 30 inches. Ground cover is characterized by a dense accumulation of mosses, lichens, sedges, rushes, liverworts, mushrooms, and other fungi. Stunted black spruce occasionally occurs. Along the margins of bogs and in drier areas, grasses, small shrubs, and smaller trees, such as willow and dwarf Arctic birch, proliferate (U.S. Army Alaska 1979).

Gerstle River Training Area has no federally-listed threatened, endangered, or candidate plant species. This was expected because there are no listed or candidate species native to interior Alaska.

Shrub wetland is the dominant wetland variety found on Fort Gerstle River Training Area.

***Forest Resources*:** A forest inventory is an integral part in establishing a plan for managing forest resources. The Gerstle River Test Site project area was inventoried by Directorate of Public Works Environmental Forestry Staff during the 2000 field season.

Stand Delineation and Inventory
Stand timber types were delineated using aerial photographs taken in 1995. Stand timber typing was confirmed on the ground during stand inventory. The variable plot radius sampling method was used

Land Classification
The project area covers 20,581 acres of forest and non-forest lands (Table PE-1). Forestlands in the project area occupy 36% of the land area or 7,477 acres. Non-forestland amounts to 64% of the total project land area or 13,104 acres. The 1994 Hajdukovich fire burned 11,320 acres of the Gerstle River Training Area land and is classified as non-forest with Calamagrostis, willow, and hardwood regeneration covering most of the burned area. The forested lands contain 2,342 acres of commercial forestland. Commercial forestlands are those lands containing sawtimber and poletimber size classes.

Table PE-1. Gerstle River Training Area Forest Land Classification

Forest Category	Commercial Forest Category	Forested Land Acreage	Total Acreage
Forested Lands	Commercial Forest	2,342acres	7,477 acres
	Non-Commercial Forest Lands	5,135 acres	
Non-Forested Lands		0	13,104 acres
Total		7,477 acres	20,581 acres

Forest Volume by Timber Type
Cubic volume includes all species in all size classes found in the type (Table 2). For example, the white spruce sawtimber type reports a volume of about 761,631cubic feet, all of this volume is in the white spruce sawtimber type.

A total of 2,342 acres of sawtimber and poletimber types comprise the volume estimates in this study. The project area contained a total forestland area of 7,477 acres that includes reproduction and dwarf timber types.

Sawtimber types occupy 3.9% (292 acres) of the forestland area and contain approximately 761,631cubic feet.

Poletimber types occupy 27.3% (2,050 acres) of the forestland area and contain approximately 1,733,273 cubic feet. White spruce poletimber types contain about 646,016 cubic feet. The aspen poletimber types contain the majority of the forestland volume and total 841,939 cubic feet.
Reproduction and dwarf timber types together occupy 68.8% (5,135 acres) of the forestland area. These types were not sampled and do not contribute to the volume estimates. The reproductive timber type comprises the majority of the forestland acreage (2,866 acres).

Each timber type has also been broken down into average stems per acre. White spruce sawtimber contains an average of about 378 stems per acre. White spruce poletimber contains an average of about 374 trees per acre. Black spruce has 806 stems per acre, the highest among the poletimber class.

Table PE-2. Gerstle River Training Area Forest Timber Type.

Forest Timber Type	Acres	Percent Forested	Cubic Feet	Total Cubic	Percent Volume	Average Stems per

		Acres	per Acre	Feet	Cubic Feet	Acre
Sawtimber						
White Spruce	292	3.9	2,608	761,631	30.5	378
Subtotal	**292**	**3.9**		**761,631**	**30.5**	
Poletimber						
Black Spruce	45	0.6	698	31,429	1.3	806
White Spruce	450	6.0	1,436	646,016	25.9	374
Black and White Spruce	70	0.9	315	22,067	0.9	662
Birch	72	0.9	509	36,622	1.5	492
Aspen	1,291	17.3	652	841,939	33.7	506
Birch/Aspen	33	0.4	1,070	35,326	1.4	707
White Spruce/Birch/Aspen	89	1.2	1,347	119,874	4.8	446
Subtotal	**2,050**	**27.3**		**1,733,273**	**69.5**	
Reproduction						
Black Spruce	11	0.2				
White Spruce	68	0.9				
Aspen	53	0.7				
Birch/Aspen	44	0.6				
Black Spruce/Birch	43	0.6				
Black Spruce/Aspen	48	0.6				
White Spruce/Birch/Aspen	2,599	34.8				
Subtotal	**2,866**	**38.4**				
Dwarf						
Black spruce	2,269	30.4				
Subtotal	2,269	30.4				
TOTAL	**7,477**	**100**		**2,494,903**	**100**	

Estimated Annual Harvest
An estimate of the annual allowable harvest is a guide for future harvest activities. Calculations are based on the simple area cut method. This method divides the total productive forest area by the rotation age. The result of this method gives the acreage that can be harvested in a year. The acreage is multiplied by the weighted average volume per acre to determine the annual harvest.

Identification of Sustained Yield Timber Base
The sustained yield timber base is defined as forestland where periodic harvests from the resource can be regulated to be continued for a long period of time if not indefinitely. Estimated annual harvest amounts may fluctuate at variable levels because of market conditions, risks to resources (such as beetle infestation or fire), resources access, or other factors that may encourage or discourage harvest levels. Based on these fluctuations, timber harvest may be concentrated into periods of time separated by years without harvest.

Generally, only productive timberland, where the land manager allows timber harvest, is included in the sustained yield timber base. Management if the sustained yield timber base should be conducted in a manner where the basic productivity of the resource is not negatively affected. Through observation made of Gerstle River Test Site lands during the field work, it has been determined that timber types containing poor stocking levels or black spruce generally occur on relatively unproductive sites. Based on this knowledge, timberland that comprises timber types within poorly stocked strata of black spruce is considered not feasible for timber management and is excluded from the sustained yield base. In addition, strata containing recently burned timber types are excluded form the sustained yield acreage. Sawtimber white spruce stands contained varying amounts of root disease and bole rot, which could reduce merchantable volumes for these stands.

The following white spruce and hardwood harvest acreage represent saw, pole, and reproduction timber types; the majority is in the reproductive type. The black spruce timber types were eliminated from the sustained yield timber base for both the white spruce and hardwood harvest levels.

The following white spruce and hardwood harvest acreage represent saw, pole, and reproduction timber types; the majority is in the reproductive type. The black spruce timber types were eliminated from the sustained yield timber base for both the white spruce and hardwood harvest levels.

Table PE-3. Gerstle River Training Area Estimated Annual Harvest.

Harvest Timber Type	Potential Harvest Land	Rotation Age	Regeneration Time	Total Rotation Length	Estimated Annual Harvest
White Spruce	3,568 acres	120 years	10 years	130 years	27 acres per year
Hardwoods	1,584 acres	80 years	10 years	90 years	18 acres per year

PE2.3.2 Fauna

Moose and bison are the most visible wildlife species on Gerstle River Training Area. Gerstle River Training Area is a portion of the Delta Junction Bison Range Management Area. The Delta bison calve (April through July), primarily in the Delta River basin along terraces and gravel bars on or near the Texas and Washington ranges. Bison move to the Delta Bison Range during July through August when they move north of the Alaska Highway into the agricultural fields. Bison are most found on Gerstle River Training Area during winter.

Large predators include grizzly and black bears, wolves, foxes, martens, coyotes, and wolverines. These species, in addition to lynx, and snowshoe hare are found on Gerstle River Training Area.

Several small game and related species are found on Gerstle River Training Area, including including willow ptarmigan (*Lagopus lagopus*); spruce (*Falcipennis Canadensis*), sharp-tailed (*Tympanuchus phasianellus*), and ruffed (*Bonasa umbellus*) grouse; swans; ducks; geese; and cranes. Waterfowl nest on Gerstle Training Area pothole lakes and are absent from the area during winter. There are no accurate harvest or population data for these species.

Gerstle River and its clear water tributaries support Arctic grayling.

Wood frogs (*Rana sylvatica*) are the only amphibians in the Alaska Interior, and they are found on Gerstle River Training Area. There are no reptiles.

There are no special interest management areas on Gerstle River Training Area.

PE3. Gerstle River Training Area Management Prescriptions

PE3.1 Prescriptions and Policy

PE3.1.1 Military Use

Gerstle River Training Area was primarily used in the past as a testing area. The Gerstle River Training Area was associated with a much larger Gerstle River Expansion Area that occupied the area between Gerstle River Training Area and Donnelly East Training Area. Now Gerstle River Training Area is used for maneuver training and small arms training.

The Gerstle River Training Area ecological management unit is suitable for small arms, platoon- to company-sized exercises, company-sized live-fire exercises, road marches, and bivouacs. This sub-unit is primarily used for small-scale military training exercises and winter bivouacs. The recommended time for military activities in low areas for mechanized vehicles is between freeze-up and spring break-up. Other compatible uses include natural resources management, habitat improvement, mineral or vegetative resources extraction, hunting, fishing, trapping, bird watching, hiking, skiing, dog sledding, and off-road recreational vehicle use. Activities that are not compatible with the Gerstle River Training Area sub-unit includes digging without a permit, and any permanent nonmilitary structures, easements, or leases.

PE3.1.2 Access

Public access is allowed in the Gerstle River Training Area for recreation, subject to safety restrictions and military security, when access does not impair the military mission, as determined by the installation commander. Public access is not allowed into the area directly surrounding Blueberry Lake.

PE3.1.3 Natural Resources Management

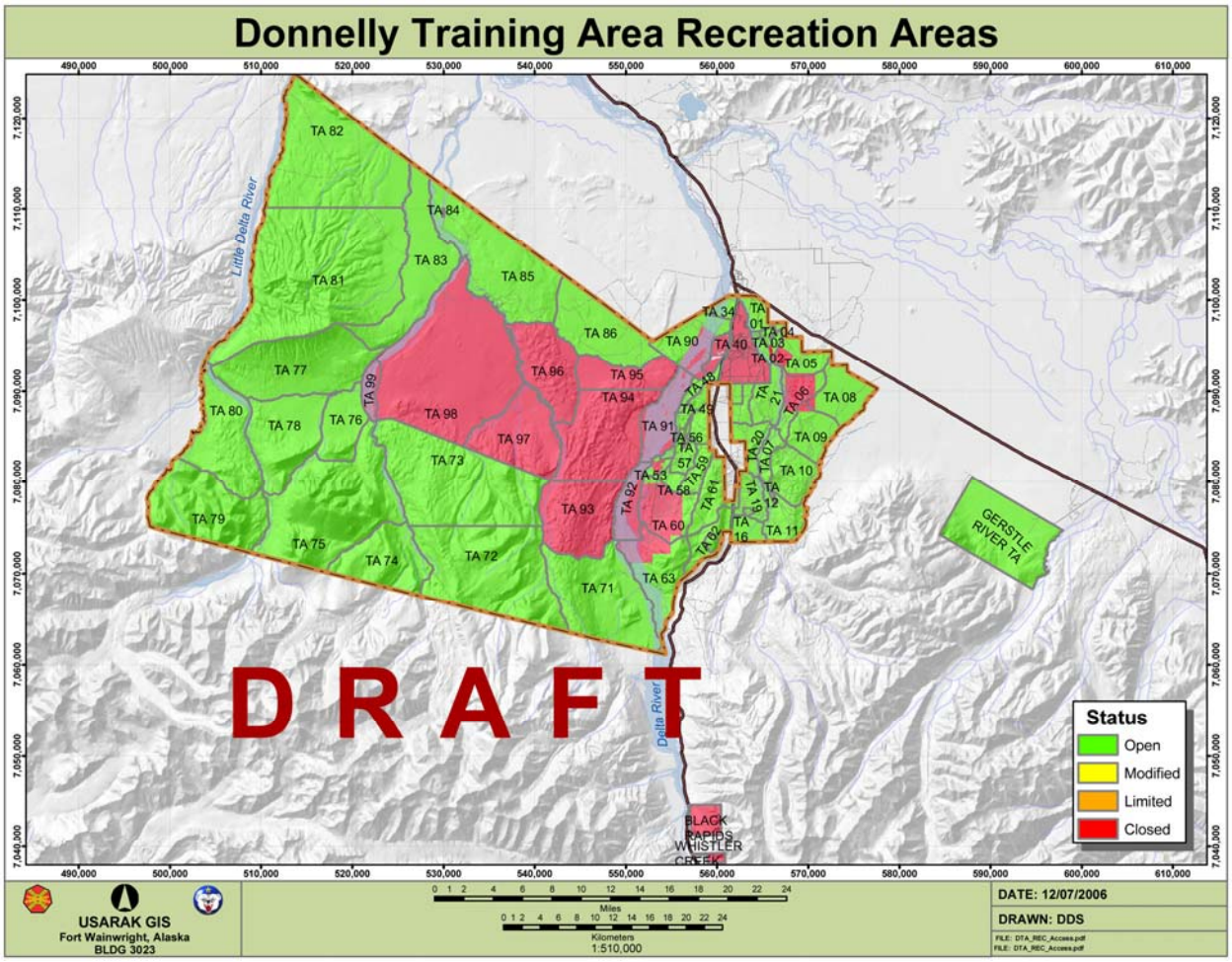
Natural resource management priority for Gerstle River Training Area is "*modified*". Fire suppression category for Gerstle River Training Area is "*limited*". Army controls vegetation management rights for Gerstle River Training Area. Gerstle River Training Area is "*open*" to hunting, trapping and fishing, except for the area immediately surrounding Blueberry Lake, which is "*closed*". Gerstle River Training Area is "*open*" for off-road recreational vehicles except for the area immediately surrounding Blueberry Lake.

Table PE-4. Gerstle River Training Area Ecosystem Management Prescriptions.

Ecosystem Management Sub-unit	Natural Resource Management Priorities	Fire Suppression Category	Vegetation Management	Hunting and Trapping	Fishing	Recreational Use Management
Training Area	Modified	Limited	Army	Open	Open	Open
Blueberry Lake	Limited	Limited	Army	Closed	Closed	Closed

Gerstle River Training Area is not an approved federal or state subsistence area. There is no subsistence preference for any subsistence user but any subsistence user may conduct approved subsistence activities after acquiring any required state licenses, USAG-AK recreation access permit, and checking in with USARTRAK. Figure P-11 shows the recreation use areas on Gerstle River Training Area.

Figure P-11. Gerstle River Training Area Recreation Use Areas.



USAG-AK will comply with all laws, regulations, and Executive Orders pertaining to natural resources management on Gerstle River Training Area. USAG-AK will complete ongoing projects and conduct full implementation of ecosystem management projects. USAG-AK will conserve physical resources by conducting Integrated Training Area Management, watershed management, and minerals management. USAG-AK will conserve biological resources by conducting wetland management, forest management, fish and wildlife management, endangered species management, pest management, and urban area management. USAG-AK will integrate social (human) resources into ecosystem management by conducting education, awareness and public outreach, conservation enforcement, outdoor recreation management, and cultural resources management. USAG-AK will support ecosystem management decision-making through implementation of National Environmental Policy Act, Geographic Information System, and other decision support systems, and integration with other land management programs such as Sustainable Range Program and Sustainment, Restoration and Modernization Program.

PE3.2 Projects

Ecosystem management projects for Gerstle River Training Area for 2007-2011 are shown below in Table PE-5.

Table PE-5. Gerstle River Training Area Ecosystem Management Projects.

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Forest Inventory / Monitoring	Forest Stand Mapping	x	x	x	x	x
High	Inventory and Monitoring	PMO Game Warden Coordination	x	x	x	x	x
High	Inventory and Monitoring	Recreational Impact Monitoring	x	x	x	x	x
High	Inventory and Monitoring	Trespass Cabin Monitor	x	x	x	x	x
High	Inventory/Monitoring	Breeding Bird Surveys	x	x	x	x	x
High	Inventory/Monitoring	Caribou population monitor; 20A/D	x	x	x	x	x
High	Inventory/Monitoring	Fisheries Planning Level Surveys	x	x	x	x	x
High	Inventory/Monitoring	Moose Population Surveys; 20A/B	x	x	x	x	x
High	Outreach	Fairbanks Newsminer Hunting Edition	x	x	x	x	x
High	Outreach	Outdoor Recreation Supplement	x	x	x	x	x
High	Outreach	Range Control coordination	x	x	x	x	x
High	Outreach	Recreation Access Permits	x	x	x	x	x
High	Outreach	Recreation User Group Meetings	x	x	x	x	x
High	Outreach	Update Information Kiosks	x	x	x	x	x
High	Outreach	USARTRAK Brochure	x	x	x	x	x
High	Recreational Activities	Off Road Vehicle Management	x	x	x	x	x
High	Suppression	Conduct fire suppression activities as necessary.	x	x	x	x	x
High	Survey and Monitoring	Conduct T&E Species Survey	x	x	x	x	x
High	Trespass Structure Abatement	Trespass Cabin and Camps Removal	x	x	x	x	x
High	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	x	x	x	x	x
High	Wildland Fire Monitoring	Collect fuel-loading information as part of the forest inventory.	x	x	x	x	x
High	Wildland Fire Monitoring	Delineate and maintain Geographic Information System data layers showing historical fires.	x	x	x	x	x
High	Wildland Fire Monitoring	Map all known cultural features on suppression maps and develop fire management recommendations for these features.		x			
High	Wildland Fire Monitoring	Map all known natural resources features and areas of concern from wildland fire suppression and management activities on suppression maps. Develop management strategies to avoid conflicts with these natural resource features and areas of concern.			x		

High	Wildland Fire Monitoring	Map all known non-sensitive structures on USAG-AK.				x	
High	Wildland Fire Monitoring	Map all military structures on suppression maps. Assess fire suppression options and recommendations for these structures.		x			
High	Wildland Fire Monitoring	Map past areas where ordnance has been used and develop pre-suppression plans on how to deal with wildland fire suppression in these areas.	x	x	x	x	x
High	Wildland Fire Monitoring	Research weather patterns influencing fire behavior and historical weather analysis for each land unit of USAG-AK.	x				
High	Wildland Fire Monitoring	Update fire history map of USAG-AK.			x		
High	Wildland Fire Monitoring	Update fire maps with military special use areas and fire management options for these areas.	x				
High	Wildland Fire Monitoring	Update fuels map of USAG-AK.			x		
High	Wildland Fire Planning	Develop Geographic Information System for military fire management office and for use on incidents with current data, maps, photos, suppression options, and restrictions.	x	x	x	x	x
High	Wildland Fire Planning	Develop plans and fuel treatment projects to reduce the threat of fires starting on military lands and impact areas and burning onto adjacent lands of high resource value.		x			
High	Wildland Fire Planning	Develop plans for proposed prescribed fires on USAG-AK.	x	x	x	x	x
High	Wildland Fire Planning	Develop standard operation procedures for each area unit of USAG-AK to assist firefighters and Incident Commanders in establishing priorities, making decisions, dealing with ordnance issues.	x	x	x	x	x
High	Wildland Fire Pre-Suppression	Identify and use fuel reduction treatments to reduce the threat of wildland fire at the urban/wildland interface, military structures, selected training areas, and cultural resources.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop and disseminate procedures for detection and reporting of fires.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop more effective means of calculating fire weather indices for localized training areas and implement a program of relaying fire danger ratings to training units.	x	x	x	x	x
Med	Habitat Management	Moose Habitat Evaluation		x		x	
Med	Inventory/Monitoring	Fauna Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Fish monitoring GRTA	x	x	x	x	x
Med	Inventory/Monitoring	Flora Planning Level Survey	x	x	x	x	x

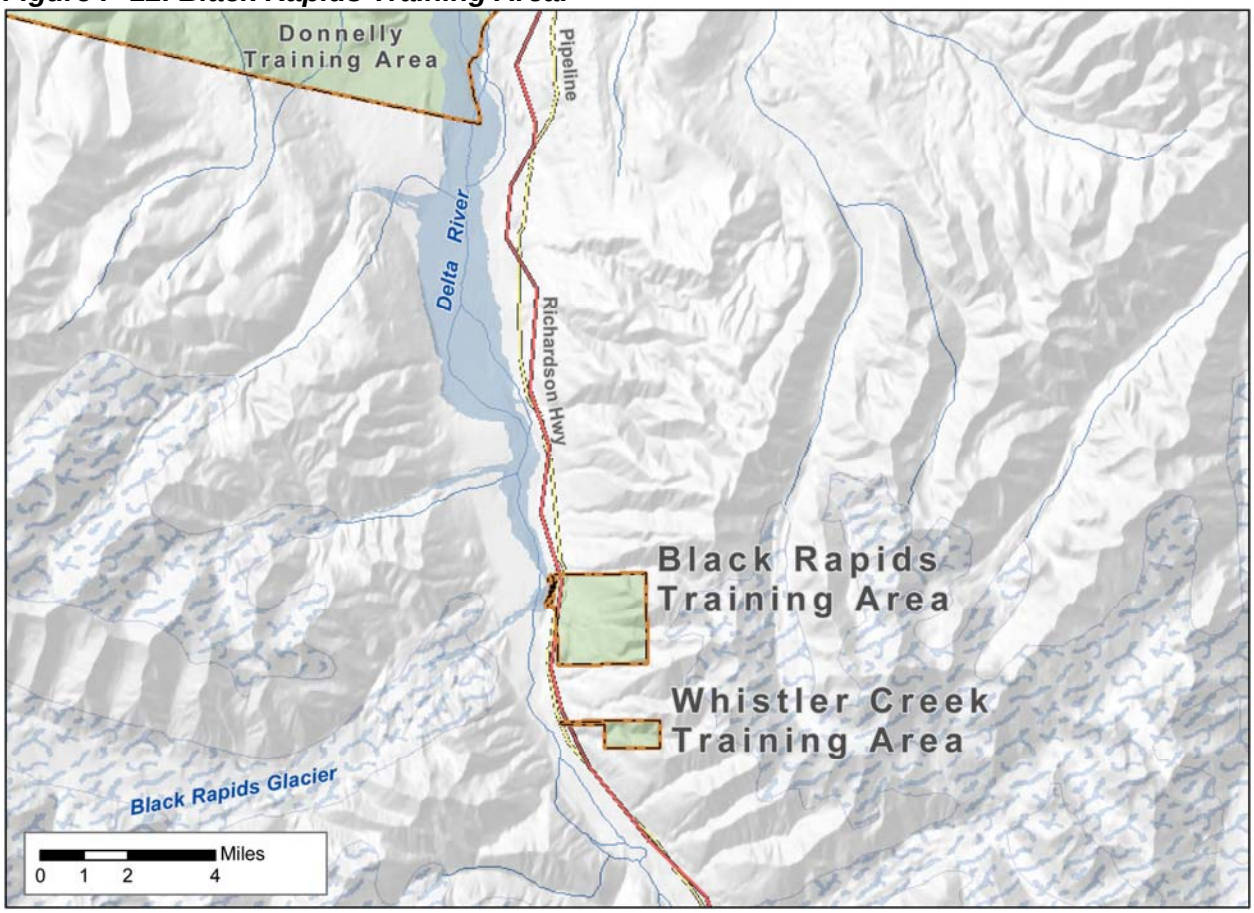
Med	Inventory/Monitoring	Monitor Habitat Work		x		x	
Med	Inventory/Monitoring	Small Mammal Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Soils Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Threatened & Endangered Species	x	x	x	x	x
Med	Inventory/Monitoring	Topography Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Vegetation Communities Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Planning Level Survey	x	x	x	x	x
Med	Outreach	Recreation Outreach at Public Events	x	x	x	x	x
Med	Population Management	Nuisance/injured Wildlife Issues	x	x	x	x	x
Med	Wildland Fire Planning	Develop pre-suppression plans for each of the area units of USAG-AK.		x			
Med	Forest Inventory / Monitoring	Continuous Forest Inventory	x	x	x	x	x
Med	Habitat Management	Alaska Department of Fish and Game Bison Range					
Low	Inventory and Monitoring	Map Winter Trails		x			
Low	Outreach	Interpretive Panels			x		
Low	Outreach	Recreation Surveys	x	x	x	x	x
Low	Outreach	Viewing Platform Material Update			x		
Low	Public Outreach	Wildlife Information /Brochures/presentations	x	x	x	x	x

PF. BLACK RAPIDS TRAINING AREA ECOLOGICAL MANAGEMENT UNIT

PF1. Location

The Black Rapids Training Area and Whistler Creek Rock Climbing Area are southeast of Fort Greely and Donnelly Training Area along the east side of the Richardson Highway. Black Rapids Training Area is shown in Figure P-12.

Figure P-12. Black Rapids Training Area.



PF2. Environment

PF2.1 Facilities

A training facility and office complex was built to house the Northern Warfare Training Center in the 1990s and is also supported by equipment maintenance facilities and storage buildings. A ski hill, accessed via rope tow, was also established at this time. A chalet and warming shelter are located on the slopes along with small rope tow operation structures. The area is used predominantly in winter by infantry to conduct skiing, climbing and cold weather rescue and survival training.

PF2.2 Physical Resources

Black Rapids Training Area totals 2,299 acres and was permanently withdrawn under Public Land Order 2622. Whistler Creek Rock Climbing Area and Black Rapids Rock Climbing Training Area totals 532 acres and were permanently withdrawn by Public Land Order 794 in 1958 and Public Land Order 1804 in 1959.

PF2.3 Biological Resources

PF2.3.1 Flora

The forest inventory is the only data existing for floral resources on Black Rapids Training Area. A forest inventory is an integral part in establishing a plan for managing forest resources. The Black Rapids Ecological Management Unit was inventoried by Directorate of Public Works Environmental Forestry Staff during the 2003 field season. Tree data was collected from permanent plots as part of an on going Forest Inventory and Analysis of U.S. Army Alaska (USAG-AK) lands.

Stand Delineation and Inventory
Stand timber types were delineated utilizing aerial photography to produce maps that demarcate land into forested and non-forested categories. This process was also used to help identify geographical coordinates for the plots and to establish permanent plots on the ground. Timber stands where further defined into types based on specific characteristics such as species composition, size, and spacing. These stand types are predefined by the Alaska Vegetation Classification system (Viereck et al. 1992). The USAG-AK inventory method further stratifies out stands with higher timber value, greater ecological importance, and greater potential for military training. Stand timber typing was confirmed on the ground during stand inventory. The fixed plot radius sampling method was used for tree data collection.

Land Classification
The Black Rapids Ecological Management Unit contains approximately 2,299 acres of forested and non-forested lands (Table PF-1). Forestlands in the project area occupy 8% of the land area or 183 acres. Non-forestland amounts to 92 % of the total project land area or 2,046 acres. The forested lands contain 60 acres of commercial forestland. Commercial forestlands are those lands containing sawtimber and poletimber size classes.

Table PF-1. Black Rapids Training Area Forest Land Classification

Forest Category	Commercial Forest Category	Forested Land Acreage	Total Acreage
Forested Lands	Commercial Forest	60 acres	183 acres
	Non-Commercial Forest Lands	123 acres	
Non-Forested Lands		0	2,046 acres
Total		183 acres	2,229 acres

Forest Land Area and Volume by Strata
The total volume by stratum is found in Table PF-2. The Black Rapids Ecological Management Unit has a total volume of 55,740 cubic feet of commercial timber. White spruce poletimber is found on approximately 60 acres and is the only commercial timber found in this area. There are approximately 276 stems per acre.

Table PF-2. Black Rapids Training Area Forest Timber Type

Forest Timber Type	Acres	Percent Forested Acres	Cubic Feet per Acre	Total cubic Feet	Percent Volume Cubic Feet	Average Stems per Acre
Poletimber						
(2) White Spruce	60	100.0%	929	55,740	100.0%	276
Grand Total:	**60**	**100.0%**		**55,740**	**100.0%**	

Estimated Annual Harvest
An estimate of the annual allowable harvest is a guide for future harvest activities. Calculations are based on the simple area cut method. This method divides the total productive forest area by the rotation age. The result of this method gives the acreage that can be harvested in a year. The acreage is multiplied by the weighted average volume per acre to determine the annual harvest.

Table PF-3. Black Rapids Training Area Estimated Annual Harvest.

Harvest Timber Type	Potential Harvest Land	Rotation Age	Regeneration Time	Total Rotation Length	Estimated Annual Harvest
White Spruce	60 acres	120 years	10 years	130 years	0.46 acres per year

PF3. Black Rapids Training Area Management Prescriptions

PF3.1 Prescriptions and Policy

PF3.1.1 Military Use

Black Rapids Training Area and Whistler Creek Rock Climbing Area are used exclusively by the Northern Warfare Training Center for mountain and winter training. There is no live fire training on Black Rapids Training Area or Whistler Creek Rock Climbing Area.

PF3.1.2 Access

There is no public access to Black Rapids Training Area. Public access is allowed in the Whistler Creek Rock Climbing Area for recreation, subject to safety restrictions and military security, when access does not impair the military mission, as determined by the installation commander.

PF3.1.3 Natural Resources Management

Natural resource management priority for Black Rapids Training Area is "*full*". Fire suppression category for Black Rapids is "*modified*". The Army retains vegetation management rights to both Black Rapids and Whistler Creek. Black Rapids is "*closed*" to hunting, trapping, fishing. Black Rapids is "*closed*" to off-road recreational vehicle use. Natural Resource management priority for Whistler Creek is "*modified*" and fire suppression category is "*limited*". Hunting, trapping and fishing is "*open*" in Whistler Creek and is also "*open*" for off-road recreational vehicles.

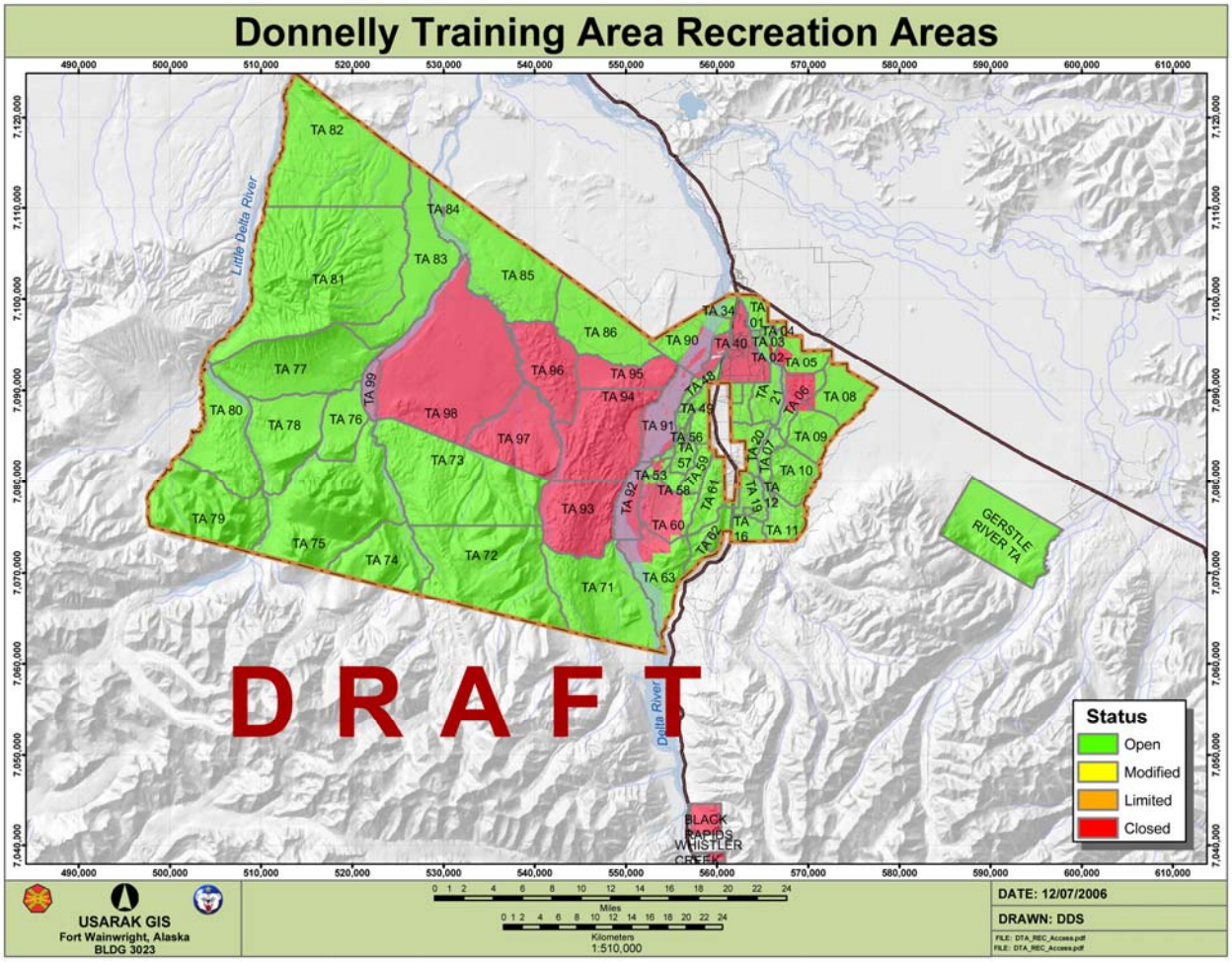
Table PF-4. Black Rapids Training Area Ecosystem Management Prescriptions.

Ecosystem Management	Natural Resource	Fire Suppression	Vegetation	Hunting and	Fishing	Recreational Use

Sub-unit	Management Priorities	Category	Management	Trapping		Management
Black Rapids Training Area	Full	Modified	Army	Closed	Closed	Closed
Whistler Creek Rock Climbing Area	Moderate	Limited	Army	Open	Open	Open

Black Rapids Training Area and Whistler Creek Rock Climbing Area are not approved federal or state subsistence areas. There is no subsistence preference for any subsistence user but any subsistence user may conduct approved subsistence activities in the Whistler Creek Rock Climbing Area after acquiring any required state licenses, USAG-AK recreation access permit, and checking in with USARTRAK. Figure P-13 shows the recreation use areas on Whistler Creek Rock Climbing Area.

Figure P-13. Black Rapids Training Area and Whistler Creek Recreation Use Areas.



USAG-AK will comply with all laws, regulations, and Executive Orders pertaining to natural resources management on Black Rapids Training Area. USAG-AK will complete ongoing projects and conduct full implementation of ecosystem management projects. USAG-AK will conserve physical resources by conducting Integrated Training Area Management, watershed management, and minerals management. USAG-AK will conserve biological resources by conducting wetland management, forest management, fish and wildlife management, endangered species management, pest management, and urban area management. USAG-AK will integrate social (human) resources into ecosystem management by

conducting education, awareness and public outreach, conservation enforcement, outdoor recreation management, and cultural resources management. USAG-AK will support ecosystem management decision-making through implementation of National Environmental Policy Act, Geographic Information System, and other decision support systems, and integration with other land management programs such as Sustainable Range Program and Sustainment, Restoration and Modernization Program.

PF3.2 Projects

Table PF-5. Black Rapids Training Area Ecosystem Management Projects.

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Forest Inventory / Monitoring	Forest Stand Mapping	x	x	x	x	x
High	Inventory and Monitoring	PMO Game Warden Coordination	x	x	x	x	x
High	Outreach	Range Control coordination	x	x	x	x	x
High	Suppression	Conduct fire suppression activities as necessary.	x	x	x	x	x
High	Survey and Monitoring	Conduct T&E Species Survey	x	x	x	x	x
High	Wildland Fire Monitoring	Collect fuel-loading information as part of the forest inventory.	x	x	x	x	x
High	Wildland Fire Monitoring	Delineate and maintain Geographic Information System data layers showing historical fires.	x	x	x	x	x
High	Wildland Fire Monitoring	Map all military structures on suppression maps. Assess fire suppression options and recommendations for these structures.		x			
High	Wildland Fire Monitoring	Research weather patterns influencing fire behavior and historical weather analysis for each land unit of USAG-AK.	x				
High	Wildland Fire Monitoring	Update fire history map of USAG-AK.			x		
High	Wildland Fire Monitoring	Update fire maps with military special use areas and fire management options for these areas.	x				
High	Wildland Fire Monitoring	Update fuels map of USAG-AK.			x		
High	Wildland Fire Planning	Develop standard operation procedures for each area unit of USAG-AK to assist firefighters and Incident Commanders in establishing priorities, making decisions, dealing with ordnance issues.	x	x	x	x	x
Med	Inventory/Monitoring	Fauna Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Flora Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Soils Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Topography Planning Level Survey	x	x	x	x	x

Med	Inventory/Monitoring	Vegetation Communities Planning Level Survey	**x**	**x**	**x**	**x**	**x**
Med	Inventory/Monitoring	Wetlands Planning Level Survey	**x**	**x**	**x**	**x**	**x**
Med	Population Management	Nuisance/injured Wildlife Issues	**x**	**x**	**x**	**x**	**x**
Med	Wildland Fire Planning	Develop pre-suppression plans for each of the area units of USAG-AK.		**x**			
Med	Forest Inventory / Monitoring	Continuous Forest Inventory	**x**	**x**	**x**	**x**	**x**

PG. FORT RICHARDSON ECOLOGICAL MANAGEMENT UNIT

PG1. Location

Fort Richardson is located in south-central Alaska, approximately seven miles northeast of downtown Anchorage. At 149˚ 40' west longitude and 61˚ 15' north latitude, Fort Richardson is situated between two prominent natural features—the Knik Arm of Cook Inlet to the north and the Chugiak Mountains to the east.

Figure P-14. Fort Richardson

PG2. Environment

PG2.1 Facilities

The cantonment area encompasses 5,760 developed acres located along the Glenn Highway near the center of the post. This area contains 568 buildings with 7,609,513 square feet of floor space. The post provides housing, facilities and activities that add up to good military living. There are community services, medical and dental facilities, excellent churches, schools, libraries, crafts shop, newspaper, theater, golf and ski courses, and cross country trails, along with a post exchange, commissary and a large physical fitness facility.

Fort Richardson's remaining 55,000 acres are comprised of maneuver and impact areas (U.S. Army Alaska Undated). The 44,071 acres of maneuver area include 42,898 acres of training area. The post has major ranges in addition to artillery and mortar firing points. These include small arms ranges, large ranges, landing zones, and drop zones.

In 1939, an Executive Order was issued that withdrew 36,570 acres of land from the public domain placing it under War Department jurisdiction. This land, along with small fee-based (private land) acquisitions, subsequent Executive Orders, Public Land Orders, make up the predominant land base of Fort Richardson today. A time line and explanation of the numerous Executive Orders and Public Land Orders can be found in Appendix E.

Between 1939 to 1945, approximately 151,180 acres of land were withdrawn for military use. Fort Richardson originally resided on land that Elmendorf Air Force Base currently occupies. In 1950, Fort Richardson was moved east to its current location, and 9,042 acres were transferred to the Air Force, which later became Elmendorf Air Force Base.

From 1945 to 1955, the military returned approximately 85,000 acres to the Department of the Interior. Many Executive Orders stipulated the return of these lands following the end of World War II. A letter from the Secretary of the Interior, dated Oct. 27, 1952, granted permission for the military to retain jurisdiction over withdrawn lands until they were not needed for military use. From 1955 to 1965, the Department of the Army released approximately 10,000 acres to various entities such as the U.S. Air Force, State of Alaska, and the Bureau of Land Management and acquired approximately 6,000 for Army use. From 1966 to the present, Fort Richardson's boundaries have remained fairly stable. Leases from the Bureau of Land Management have expanded the boundary to the east and in the south.

PG2.1.1 Range Facilities

Fort Richardson has 15 major training areas (TA). TA 16 is used for the Alaska National Guard facility. Former TA 15 was transferred to Elmendorf Airforce Base in August of 2004 . TAs 1, 2, 6-12, and 14 are subdivided using letter designations, giving Fort Richardson a total of 30 training areas.

U.S. Army Alaska Regulation 350-2, Table B-1, lists 32 small arms and crew-served ranges on Fort Richardson. These ranges include two demolition ranges (Demo II and Demo III, listed as a single range) that are similar to non-dudded impact areas. They also include nine mortar firing points (listed as a single range) located throughout the northern training area, and nine artillery firing points (listed as a single range), also throughout the northern training area. The list of ranges includes a skeet and trap range that is used primarily for recreation. In addition, the post has surface danger zones, which are the same as non-dudded impact areas associated with small arms ranges.

PG2.1.1.1 Firing Ranges

- Mahon Range
- Fieldfire Range
- Statler-Newton Small Arms Range for .38 and .45 caliber pistols
- Oates-McGee Range for M-60 firing at 500 to 1,000 feet
- Grezelka Range for M-16 and M-60 training and qualification
- Zero Range
- Record Range for M-16 qualification
- Pendeau Range for M-16 and M-14 training
- Grenade Range
- Shoot House Range
- Off-Duty Range
- 40 mm Range
- Davis Range Complex (1,333 acres) for live fire training; includes a squad battle course, a defensive trench system, ambush and defensive sites, and several live fire courses
- Biathlon Range (692 acres) used for training in Arctic combat; has three ski trails and an arms range for firing M16 and 22 caliber rifles
- Aerial Target Range for training in engagement techniques for aerial targets
- Demolition Range
- McLaughlin Range Complex (692 acres) used for live fire training of the LAW AT4 and Mark 19
- The Infantry Platoon Battle Course (1668 acres) provides a range where a dismounted infantry platoon can conduct mission-oriented training exercises

PG2.1.1.2 Other Range Facilities

- Eagle River Flats Impact Area for mortar and artillery firing from approximately 30 firing points on North Post.
- Malemute Drop Zone (214 acres, which is being expanded by 200-300 acres); used to support of strategic airborne operations; and can support a company size operation
- Landing Zones (about 25) for helicopter assaults.
- Another significant training facility is the Squad Obstacle Training Course, which consists of rope bridges and cliff rappelling sites.

PG2.1.2 Transportation System

Fort Richardson is bisected by the Glenn Highway (U.S. Highway 1), which provides primary access to the post. It is the most heavily used highway in the state, connecting south-central Alaska to the Matanuska Valley. It continues northeast past the Richardson Highway at Glennallen to intercept the Alaska Highway at Tok.

Northeast of Fort Richardson, a few miles south of Palmer, the Parks Highway (U.S. 3) intercepts the Glenn Highway and provides the only highway link directly north to Denali National Park and Fairbanks. Richardson Drive passes through the heart of the cantonment area, connecting Fort Richardson with Elmendorf Air Force Base.

The Alaska Railroad provides rail service to Fort Richardson. Its mainline crosses the post north of the cantonment area and a spur extends to a loading facility and an ammo storage complex. The railroad provides both freight and passenger service with access to Fairbanks and two unique port facilities: (1) the port of Whittier, and (2) Seward, which is a deep-water port at the southern terminus of the railroad. Here, intermodal traffic from Sea-Land Freight Service, Totem Ocean Trailer Express, Alaska Lynden Transport and other sources is transferred to and from ships.

The airfield at Elmendorf Air Force Base provides Fort Richardson's primary air link. Located adjacent to Fort Richardson and roughly 2.5 miles from the center of the cantonment area, the airfield can support any type of military aircraft including the C-5 Galaxy and the C-17 Globemaster III.

Bryant Army Air Field, located adjacent to the cantonment area and the Glenn Highway, has a main, hard-surfaced, north / south runway, which is 3,000 feet in length. It also has a hard-surfaced crosswind runway oriented east / west. Army Air Field is used primarily by the Alaska Army National Guard as a base for their fixed-wing and rotary aircraft. Large parking aprons and several hangars are located on the airdrome.

Ted Stevens Anchorage International Airport, 15 miles southwest of Fort Richardson, is the nearest commercial airport. It is the largest airport in Alaska for both passenger and air cargo operations. More than 30 carriers provide passenger service in the recently renovated airport. It is the largest air cargo handler and transfer site in the United States.

Anchorage lies near the head of Cook Inlet at the mouth of the Knik Arm, an important navigable waterway. Access to the Inlet was influential in siting for original settlements in the Anchorage area. USAG-AK operates a deep-water seaport and fuel terminal on Knik Arm, immediately north of downtown Anchorage.

PG2.1.3 Water Supply

Fort Richardson's water is supplied primarily by Ship Creek, which traverses Fort Richardson from east to west for approximately eight miles. Ship Creek "high dam", with a structural height of 50 feet, forms a reservoir that impounds approximately 5 million gallons of water at maximum capacity. The "high dam" and intake facilities are located on the post near the base of Ship Creek Canyon. All of the domestic water for Fort Richardson and Elmendorf Air Force Base comes from the reservoir. Anchorage also receives part of its water supply from Ship Creek. Water from the creek is excellent quality and exceeds drinking water standards set by the Environmental Protection Agency. A water treatment plant is located near the dam and is used for extraction of sediments and minor chemical processing with chlorine and fluoride. Fort Richardson also maintains three groundwater wells, each approximately 100 feet deep, as an emergency supplemental water supply to Ship Creek surface water. Water from the wells is virtually pollution-free due to protection of the deep aquifer by a dense confining substratum (Gossweiler 1984).

More information regarding Ship Creek and the Ship Creek Dam can be found in the publication *Chronology of Water Use and Water Rights on Ship Creek* (Quirk 1997).

The Ship Creek floodplain upstream of the Glenn Highway has received minimal disturbance in past years, however, a new golf course constructed in 1997 has reduced the riparian vegetation associated with the creek. More importantly, the "high dam", constructed in 1952, has, and continues to, severely affect the creek's hydrology and stream dynamics.

The portion of Ship Creek on Fort Richardson that is west of the Glenn Highway has been more severely impacted over the years. The creek bottom from Cottonwood Park to the Central Heat and Power Plant has been channelized and the north bank has been stabilized to prevent erosion. Near the power plant is a low dam and intake pond that supplies water for power plant operation. West of the Fort Richardson Fish Hatchery is a cooling pond, which empties into Ship Creek. The fish hatchery has several water wells that were drilled in the shallow aquifer near Ship Creek. The wells are used to supply fresh water for the raceways in the hatchery. A bridge carrying a steam line crosses Ship Creek about a half mile downstream from the power plant. The remainder of Ship Creek to the Elmendorf Air Force Base boundary is for the most part in a natural condition and has not been disturbed.

PG2.1.4 Projected Changes in Facilities

There are few projected changes in facilities that will have significant impacts on natural resources management at Fort Richardson. Most of these changes involve construction projects within the cantonment area on sites already developed and cleared of forests. Facility changes with potential impacts on natural resources include:

- Elmendorf Family Housing Area
- Digital Multi-Purpose Training Range
- Significant barracks upgrade

PG2.2 Physical Resources

PG2.2.1 Topography

Fort Richardson lies between the Turnagain Arm and the Knik Arm of the Cook Inlet in a roughly triangular-shaped lowland. To the east, the Chugach Mountains rise abruptly to elevations over 5,000 feet. From an elevation of 1,000 feet at the base of the mountains, the land declines into the Anchorage plain to the coast. The Anchorage plain is a glacial moraine that extends from the mountain front westward and northwestward. Steep bluffs, broken only by principal streams such as Eagle River, characterize the edge of the plain as it drops sharply to the sea (CH2M Hill 1994b).

PG2.2.2 Geology

Geology of the Fort Richardson area was shaped by the formation of the Chugach Mountains in the late Paleozoic and Mesozoic Eras and the subsequent flow of sediments into lowlands during the Tertiary period (Gossweiler 1984). The Chugach Mountains have a bedrock of metamorphic rocks of the McHugh complex composed of a mixture of metamorphose siltstone, lithic sandstone, arkose, and conglomerate sandstone (CH2M Hill 1994b). The lowland's bedrock is composed of sedimentary rocks of conglomerate sandstone, mudstone, and coal. It is connected with metamorphic rocks of the mountains along the vertical Border Ranges Fault that lies at the base of the Chugach Mountains (CH2M Hill 1994b).

Bedrock in lowlands rarely surfaces, because it is covered by thick deposits of unconsolidated material that accumulated during the Holocene Period, one million to ten thousand years ago (Gossweiler 1984). These surface deposits begin at the mountain front and thicken as they slope downward to Cook Inlet. Thickness varies from zero at the foot of the mountain range to 900 feet at Point Woronzof (CH2M Hill 1994b). The upper part of the deposits is composed of gravel and sand ranging from 30 to 100 feet thick. Underlying the gravel is Bootlegger Cove Clay, a 60 to 200 foot layer of clay and silt with interbeds of sand. Below the clay is a 100 to 200 foot layer of sand and gravel that provides the major groundwater aquifer for the area (CH2M Hill 1994b). Between the aquifer layer and the bedrock is a layer of poorly sorted glacial sediments (Gossweiler 1984).

Bootlegger Cove clay is nearly impermeable and serves as a confining layer between upper and lower gravel layers. It inhibits downward flow of pollutants from groundwater in upper layers and results in an artesian aquifer in the lower gravel layer. Water from this aquifer flows into the Knik and Turnagain Arms at an estimated rate of 75 million gallons per day (CH2M Hill 1994b).

The northern third of the Anchorage lowland consists of a complex of glacially deposited materials. These materials include morainal deposits of the Elmendorf Moraine, marking the margin of the former glacier occupying Knik Arm. Other glacial deposits consist of diamicton and other unsorted and poorly sorted till material and glacial alluvium, including glacial outwash gravel, kames, and kame terraces deposited at the edge of the former glacier (CH2M Hill 1994b).

Fort Richardson straddles both the alluvial fan of the Anchorage plain and the moraine and glacial alluvium complex near the shore of Knik Arm. The gravel alluvium of the Anchorage plain underlies the main cantonment. Well-bedded and well-sorted gravel and sands provide good foundation conditions and plentiful construction material. The confined gravel aquifer is 200 feet to 400 feet below the surface in this area of the post (Selkregg 1972). Groundwater flow in this confined aquifer is generally west to northwest (CH2M Hill 1994b).

Just north of the cantonment area is the southern edge of the Elmendorf Moraine, a long series of ridges running east-west across Fort Richardson and Elmendorf Air Force Base, roughly parallel to Knik Arm. Elevations of the moraine rise to more than 300 feet, especially in the west. The moraine is chiefly till, including diamicton and poorly sorted gravel. North of the Elmendorf Moraine is a complex of moraine and glacial alluvium deposits in the form of irregularly shaped hills (CH2M Hill 1994b).

The complex of hills just south of Eagle River Flats is part of this glacial alluvium deposit. Further north, on either side of Eagle River Flats, are more moraine deposits. These deposits are more subdued in topography than the Elmendorf Moraine (CH2M Hill 1994b).

PG2.2.2.1 Seismic Activity

Seismic activity in Alaska is greater than any other state in the Union. On Good Friday, March 27, 1964, southern Alaska experienced the strongest recorded earthquake in American history, estimated to be over 9.0 on the Richter scale. The quake's epicenter was approximately 80 miles east of Fort Richardson in Prince William Sound. Although the Anchorage area did not experience great loss of life, damage from the quake was considerable. Fissures in the Bootlegger Cove Clay led to land slides in business and residential areas of Anchorage that caused extensive property damage. Total damage to Fort Richardson was assessed at $17 million.

The Fort Richardson area is seismically active and has experienced at least nine major earthquakes in the last 85 years. The area has also experienced tremors and ash fall from volcanic eruptions of Mount Spurr, Mount St. Augustine, and Mount Redoubt since 1954. Two faults, the Border Ranges Fault and the Bruin Bay-Castle Mountain Fault, border Anchorage. The Border Ranges Fault bisects Fort Richardson, running

parallel to the base of the Chugach Mountains (Elmendorf Air Force Base 1994). Another fault, located in the Chugach Mountains, skirts the Ski Bowl area of the post.

PG2.2.2.2 Petroleum and Minerals

Leasing and permitting for petroleum and mineral extraction on Fort Richardson is handled by the Bureau of Land Management. Prior to issuance of a permit that allows these activities, the Army must concur and sign a statement of non-objection.

There has been no interest in oil and gas exploration on Fort Richardson because no oil-bearing basins are known to underlie the post. Potentially significant mineral and organic resources on the post include coal, gravel, sand, and peat. While coal is found on the post there have been no surveys to inventory the resource, nor is coal extraction likely to occur because there are vast known reserves north of Anchorage at Jonesville and on native-owned lands west of the village of Tyonek.

The most valuable and desirable mineral resource on Fort Richardson is gravel used in highway, utility, and building construction projects. The Alaska Department of Transportation has repeatedly requested permission to extract gravel from Fort Richardson for construction on Glenn Highway and other nearby highway projects in Anchorage. As a result of these requests, 20 or more sites have been approved for gravel mining. Many of these sites are located along the Glenn Highway in the gravel-rich Elmendorf Moraine.

There are other gravel quarries (e.g., Otter Lake and Artillery Road) where gravel is extracted and used for Fort Richardson construction projects. One commonly used pit is near Bryant Army Airfield. Public service utility projects (e.g., electrical transmission lines, water mains, sewer, natural gas and petroleum pipelines) that pass through Fort Richardson use gravel obtained from the post for their projects.

Small sources of sand can be found on the post. Two areas have been developed for extraction, one in the Ammo Storage area and another adjacent to McVeigh marsh. Both have been closed due to impacts in sensitive areas. Peat is found in wetlands on the post, and it has been extracted from several areas for use in landscaping applications.

PG2.2.3 Soils

The history of soil development in the Fort Richardson area began when the Cordilleran Ice Sheet covered south-central Alaska during the Wisconsin Glaciation, 10,000 to 15,000 years ago. Climates began to warm and ice sheets melted in the late Wisconsin Glacial Period due to changes in the Earth's orbit around the sun. Sediment cores from lakes on the Kenai Peninsula lowlands show that plant life returned to this area about 14,500 years ago (Elias 1995). The earliest vegetation to become established was herbaceous tundra dominated by sedges, grasses, sage, and plants in the composite family. By 13,700 years ago, the herbaceous tundra gave way to shrub tundra dominated by dwarf birch and heath plants. Deciduous forest became established by 10,300 years ago. Dwarf birch gave way to a mixture of cottonwood, balsam popular, aspen, and willow. Conifer trees appeared in the Kenai lowlands about 8,000 years ago. These first conifers were thought to be white and black spruce. Although no pollen records have been collected and analyzed in the Anchorage area, including Fort Richardson, the development and progression of the vegetative communities after the ice sheets melted are thought to closely follow the patterns found on the Kenai. Recent glacial studies indicate that the ice sheets on Fort Richardson melted about 1,000 to 1,200 years after the ones on the Kenai (Hunter et al. 1997).

Fort Richardson's soils are shallow, immature and deficient in the primary plant nutrients, especially nitrogen and phosphorous. In addition, they often exhibit low water retention capability, making them a primary limiting factor for vegetative growth during dry periods. In depressions and saturated areas, such

as wetlands, surface horizons may be covered with partially decomposed herbaceous vegetation called peat.

Major soil series occurring on Fort Richardson are taken from the Soil Conservation Service (now known as the Natural Resources Conservation Service) study (Soil Conservation Service, 1979). Update this section with results from 2000 Natural Resources Conservation Service survey.

Homestead series: Homestead silt loam is the most common type of soil on the post. It is a shallow, well-drained soil formed in loess over very gravelly drift on moraines and outwash plains. Terrain varies from level, to rolling, to strongly sloping. Permeability is moderate to moderately rapid. Runoff ranges from slow to very rapid, and the erosion hazard is slight to severe.

Purches series: This moderately well drained to somewhat poorly drained silt loam is found on muskeg borders and slight depressions in glacial moraines. It has a surface layer of black silt loam and a subsurface layer of gray silt loam. The subsoil is mottled dark brown and the substratum grayish brown. It was formed in glacial till. Terrain is smooth to moderately sloping. Permeability is moderate to moderately slow in the more compact till. Available water capacity is low, and erosion hazard is low to moderate.

Kasilof series: This excessively drained silt loam is found on outwash plains and stream terraces. It was formed in a thin mantle of loess over very gravelly alluvium. The surface layer is dark gray silt loam. Subsoil is dark brown gravelly loam, and the substratum, dark olive gray, very gravelly sand. Runoff is slow to rapid, and erosion hazard is slight to severe. This soil series is a potentially severe threat for flash flooding.

Jacobsen series: This very stony silt loam is poorly drained and found in small valleys, shallow depressions, and low-lying areas bordering muskegs. It was formed in very stony glacial till. A typical soil profile has a peaty surface mat covering a black, very stony silt loam layer. Stones and cobbles make up about 40 percent of the volume, and gravel makes up about 20 percent. The water table is normally less than two feet below the surface. Permeability is moderate, and erosion hazard slight.

Doroshin series: This soil series is comprised of peat over a substratum of dark greenish gray silt loam. It is poorly drained and found in muskeg borders and depressions in glacial moraines. Permeability is moderate. Runoff is very slow to moderate, and erosion hazard slight.

Salmatof series: This soil is comprised of dark reddish brown coarse peat materials. It is very poorly drained and occurs in broad basins and depressions. The water table is usually near the surface.

Tuomi series: This silt loam soil is well drained and occurs on low moraines. The soil consists of silt loam over sandy loam and has moderate permeability. Runoff is slow to medium, and hazard of erosion slight to moderate.

Slikok series: This soil is a mucky silt loam occurring in valley bottoms and low areas around lakes or muskegs. The soil has a peaty surface layer. Terrain is nearly level. The soil has a high water capacity and a moderate permeability. Surface runoff and erosion hazard are moderate.

Caswell series: This series consists of coarse silt loam formed in silty and sandy water laid sediments over gravelly sand. It occurs on low terraces and in broad depressions. Water capacity is moderate, and permeability moderate to rapid. Surface runoff is slow, and erosion hazard is slight. The water table is normally two to four feet below the surface.

Clam Gulch series: This series consists of deep, poorly drained silt loam that occurs in flood plains and in depressions in glacial moraines. It has dark silt over gray sediments that are high in clay. Water capacity is high, and the water table is often near the surface. Surface runoff is slow to rapid, and erosion hazard is slight to severe.

Chena series: This series consists of sandy-skeletal silt loam that is excessively drained. It occurs in alluvial fans and flood plains. The substratum contains 35 to 50 percent gravel and up to 10 percent cobbles. Permeability is moderate to rapid, and water capacity is low. Surface runoff is slow, and erosion hazard is slight.

Niklason series: This series is characterized by coarse silt loam occurring on flood plains and broad low-lying stream terraces. Soil is dark grayish brown silt loam and fine sand over gravelly sand. Water capacity is moderate to low, and permeability is moderate to rapid. Surface runoff is slow, and erosion hazard slight. This soil is susceptible to flooding, but is a good source of sand and gravel.

PG2.2.4 Water Resources

PG2.2.4.1 Surface Water

Fort Richardson's surface water resources are diverse and include numerous streams, lakes, ponds, and a saltwater tidal bay. The quality of surface water on Fort Richardson appears to have remained good throughout the Army's occupation of the area. There is no reason to suspect that these waters have either degraded (beyond localized, temporary sedimentation) or improved.

Water samples were collected from the Eagle River at three locations on two occasions. Sampling locations were Chugach State Park Campground, Bailey Bridge, and the take-out point above the Route Bravo Bridge (Horne Engineering Services Inc. 1996). The first sampling effort occurred on May 26, 1995, and the second in August, 1995. Since problems have not been found, there has been only limited monitoring of surface waters at other locations.

Most streams on Fort Richardson flow from headwaters in the Chugach Mountains to the Cook Inlet (saltwater), and traverse the post in a westerly direction. Eagle River is fed by a glacier. Flow volume of streams fluctuates dramatically from season to season. During the long period of freeze, usually from October to April, flow is limited to groundwater seepage from aquifers into streams. Snowmelt typically begins in April and reaches its peak in June; stream flow is greatest during the months of June and July. After July most of the snow has melted, but the stream flow during the months of August and September remains steady because it is augmented by rainfall (Gossweiler 1984).

Eagle River is the largest source of surface water on the post. It flows at an average rate of 519 cubic feet per second and drains approximately a 192 square mile watershed, characterized by both mountains and lowlands (CH2M Hill 1994b). The Eagle Glacier comprises 13 percent of the watershed and snow and ice melting from the glacier is a major source of flow during the summer months (Gossweiler 1984). River flow reaches its peak of more than 2,500 cubic feet per second during July and August. Periods of heavy rainfall or rapid melting from the glacier can generate water flow in excess of 3,600 cubic feet per second (CH2M Hill 1994b).

Upstream of Fort Richardson, the Eagle River passes through the community of Eagle River. From there the river flows into the northwestern portion of the post and through the Eagle River Flats tidal marsh before it empties into the Knik Arm of Cook Inlet (CH2M Hill 1994b). In winter, the Eagle River is a clear stream with excellent water quality. During spring–summer, however, there are significant levels of suspended sediment from runoff and glacial melt (Gossweiler 1984). Overall sediment loads, however, are fairly low in comparison with other glacially fed streams in Alaska (CH2M Hill 1994b).

Besides the water that comes via the Eagle River, Eagle River Flats is also fed by two small tributary streams, Otter Creek and Clunie Creek. Otter Creek is a perennial stream, which drains Otter Lake just north of the cantonment area, and then flows north into Eagle River Flats. Clunie Creek, an intermittent stream, drains Clunie Lake and other small ponds among the moraines on the northeast portion of the post as it flows west into Eagle River Flats (CH2M Hill 1994b).

On Fort Richardson, Ship Creek is second only to Eagle River in volume. It drains a watershed of 117 square miles, 90 of which are in the Chugach Mountains. From the mountains the creek flows west across a coastal plateau through Fort Richardson, Elmendorf Air Force Base and an industrial area of Anchorage before meeting Cook Inlet at the mouth of Knik Arm. Although there are no tributaries in these lowlands, the Anchorage area comprises 27 square miles of the creek's watershed.

Ship Creek traverses Fort Richardson from east to west for approximately eight miles. Entering the post, it initially flows through a three-mile canyon of white water beginning at an elevation of 1,100 feet above sea level. Emerging from the canyon at an elevation of approximately 500 feet, it continues across the forested coastal plain to the western boundary of the post at an elevation of 230 feet. Ship Creek and its floodplain above the Glenn Highway is the least disturbed portion of the creek on Fort Richardson.

The Fort Richardson dam on Ship Creek forms a sizable reservoir, which provides all the potable water for Fort Richardson and the Elmendorf Air Force Base and nearly half the water for the Municipality of Anchorage. Fort Richardson and Anchorage have separate water treatment plants and delivery systems. Fort Richardson also has several backup water wells fed by a shallow aquifer along Ship Creek south of the post's Central Heat and Power Plant. Additional information regarding Ship Creek and Ship Creek Dam can be found in *Chronology of Water Use and Water Rights on Ship Creek* (Quirk 1997).

Snowhawk Creek is a perennial tributary of Ship Creek flowing from its mountainous drainage basin. It drains a small cirque lake in the Chugach Mountains on the southern portion of the post and flows north through Snowhawk Valley into Ship Creek about six miles further downstream (Gossweiler 1984). Chester Creek and the North Fork of Campbell Creek are the only other perennial streams on the post. Chester Creek drains a small basin located on the southern portion of Fort Richardson on the western slope of the Chugach Mountains. It flows northwest until it leaves the post. Although it is a shallow creek, it usually has a constant flow of water (Gossweiler 1984).

The North Fork of Campbell Creek drains a lake in the Chugach Mountains eight miles southeast of the post. It passes through Fort Richardson flowing northwest from the southern boundary to the western boundary. The creek is particularly scenic, and its water is quite clear. A waterfall is located in the southwest corner of the post (Gossweiler 1984).

Fort Richardson has 12 named lakes and ponds and several unnamed water bodies. The combined area for the named lakes and ponds is 348 acres. Five relatively large lakes, Clunie, Otter, Gwen, Thompson, and Waldon, are managed for recreational fishing. Clunie Lake (116 acres) is the largest lake on the post. It is picturesque and situated in the northern, moraine area of Fort Richardson. It attains a maximum depth of approximately 33 feet and drains into Clunie Creek. Otter Lake covers 93 acres and is the post's second largest lake. It receives the most fishing pressure. It is fed by a small creek on its southern end and drains into Otter Creek on its northern end. It attains depths of 23 feet. Gwen Lake is small and shallow with an area of 10 acres and a maximum depth of 11 feet. It is located two miles north of the cantonment area along a well-maintained road. Due to its small size and lack of depth, it cannot support fish over winter. Thompson Lake is smaller but deeper than Gwen Lake. Its eight acres make it the smallest of the actively managed lakes on Fort Richardson. It attains a depth of 21 feet and can support fish over winter. Waldon Lake is approximately 50 acres. It is only about eight feet deep, therefore it may not support fish during

some winters. This lake is easily accessed. The other seven lakes and ponds on the post are: Chain Pond, Web Pond, Lake Kiowa, Dishno Pond, Cochise Lake, Diablo Pond, and Snowhawk Lake. Snowhawk Lake is located in the southeastern corner of Fort Richardson and is the largest and least accessible of the seven. None of these other lakes or ponds support a fishery, except Dishno Pond which is stocked annually with catchable-sized rainbow trout for flyfishers. About 80 percent of Campbell Lake lies within Fort Richardson (Gossweiler 1984).

Roughly 12 miles of shoreline along the Knik Arm of Cook Inlet form the northern border of Fort Richardson. Eagle Bay is located in the southern portion of this area, where Knik Arm merges with the Eagle River. Tidal activity in Eagle Bay has created an estuarine salt marsh encompassing Eagle River Flats impact area. Numerous ponds dot the marsh. Many of these are shallow mudflat ponds, less than 6 inches deep that often dry up during summer. Others are more permanent and achieve depths of over 4 feet. These deeper ponds often are fed by freshwater streams and springs.

In 1994, a comprehensive evaluation of Eagle River Flats was conducted to address water quality of these ponds (CH2M Hill 1994b). The salinity level varied from 1 to 46 parts per thousand (ppt). Salinity in most ponds was below 10 ppt. Tidal flooding of Eagle River Flats infuses ponds with saltwater and sediments from Eagle Bay. Elevation determines frequency of floods, varying from mean sea level (msl) to 18 feet above msl. Flooding may occur daily during high tides in areas less than 12 feet above msl. In areas from 12 feet to 13 feet above msl, flooding occurs only with the highest tide each month, and in areas above 13 feet, flooding occurs only during extremely high tides (CH2M Hill 1994).

PG2.2.4.2 Ground Water

Two freshwater aquifers underlie most of Fort Richardson. These aquifers flow west from the Chugach Mountains to the Cook Inlet and are recharged by groundwater originating from precipitation in the mountains. The two aquifers lie in different soil strata, and are separated by a 60 to 200-foot layer of impermeable Bootlegger Cove Clay. The upper, unconfined aquifer lies in a 30 to 100-foot layer of well-bedded and well-sorted gravel near the surface. This aquifer usually can be accessed at depths of less than 50 feet (CH2M Hill 1994b).

The lower, confined aquifer lies in a 100 to 200 foot-layer of sand and gravel. The impermeable clay above produces artesian conditions and protects the lower aquifer against seepage and pollutants from the surface, thus the water quality of this artesian aquifer is excellent. It is estimated that 75 million gallons of water originating from the mountains recharges the aquifer each day. This aquifer usually can be accessed from 200 feet to 400 feet below the surface. Wells drilled into the aquifer can produce up to 1,500 gallons of water per minute (CH2M Hill 1994b).

Industrial activities associated with Army occupation on Fort Richardson have had some minor effects on groundwater. These effects are associated with underground storage tanks, facilities where chemicals were stored, and places where chemicals were dumped. These areas are now being monitored intensively, and there has been no indication of deep groundwater pollution. Pollution has been minor, localized, and there has been no significant risk to human health. Recently, water quality has tended to improve as Army restoration projects mitigate earlier damage to the quality of groundwater.

PG2.2.5 Climate

By Alaskan standards, the Anchorage area has a moderate climate. Fort Richardson is in a transition zone between the northern continental climate of the Alaskan interior and the maritime climate of the Gulf of Alaska. The Alaska Range to the north and northwest of the post acts as a barrier to very cold air from the interior. The Kenai and Chugach Mountains to the south and east prevent the influx of maritime air from

the Gulf of Alaska. The waters of the Cook Inlet and the Knik Arm serve to moderate temperatures and provide moisture (Elmendorf Air Force Base 1994).

Fort Richardson has a long winter with subfreezing temperatures that usually lasts from mid-October to mid-April (see Table PG-1). High-pressure weather systems during this period may lead to successive days with temperatures below minus 35 degrees Fahrenheit (F). The spring is marked by the ice "break-up" starting in mid-April, and lasting until June, characterized by a rapid rise in temperature. Summer lasts from June to early September, and has a daily average temperature of 56 degrees F. Autumn on Fort Richardson is brief, lasting from about mid-September to mid-October.

According to a number of scientists, the effects of global warming are already taking a toll in Alaska. Damage to forests, loss of salmon habitat and widespread melting of permafrost are being attributed to a permanent and significant climate regime shift. Major changes in temperature, warming of rivers and extensive melting of permafrost have been clearly evidenced in both Alaska and Canada over the last 20 years.

Tree growth studies conducted by University of Alaska Professor, Glenn Juday, have found clear indication that normal cycles of forest growth changed dramatically starting in the early to mid 1970s. The studies also show that the forests have been experiencing stresses since then, often involving complex interactions of different effects of warming that have no precedent in the historical record. This could eventually lead to the boreal forest dying out and being replaced with grassland steppe vegetation that covered much of interior Alaska in the Pleistocene period ten thousand years ago. Melting of permafrost creates sinkholes and differential settling of the ground, which damages roads, building foundations, airports, and other man-made structures. Significant amounts of salmon spawning habitat may be lost due to stream warming.

Although thermokarst (melting of permafrost) is not a major problem in most parts of south-central Alaska due to only small isolated areas being underlain with permafrost, spruce bark beetle (*Dendroctonus rufipennis* [Kirby]) infestations have reached epidemic proportions during the 1990s. Warmer than average summers and other climatic conditions as well as large tracks of mature, even-aged, and unhealthy spruce forests have contributed to the beetle outbreak. Activity levels in south-central Alaska have increased to nearly a million acres of active infestation (Dr. Edward Holsten, personal communication). The damage is resulting in the catastrophic long-term loss of 60–80 percent of spruce trees larger than 9 inches in diameter. The infestations reduce forest diversity and increase fuel loading, which substantially increases forest fire danger in the affected areas.

Soils on Fort Richardson are subject to seasonal freezing. The average last date for a killing frost is May 15, and the average first date for a killing frost is September 8, providing a 115-day growing season (Elmendorf Air Force Base 1994). Average monthly temperatures for the Anchorage area are provided in Table PG-1. Permafrost on Fort Richardson is all but absent, probably occurring only as remnants from the last Ice Age, deep within peat deposits.

Prevailing winds come from the west in summer and from the north and northeast in winter. Average wind velocity is six miles per hour (mph). Channeling of south and southeasterly winds passing over the Chugach Mountains, during low-pressure systems called "chinooks", can lead to wind gusts up to 100 mph. These gusts can inflict significant property damage (Gossweiler 1984).

Approximately 40 percent of the 15-inch annual precipitation falls from mid-July to mid-September (Gossweiler 1984). The six months of winter account for another 40 percent of annual precipitation with an average of 72 inches of snowfall. Spring and autumn combine for a meager 3 inches of the annual precipitation (Elmendorf Air Force Base 1994).

Table PG-1. Fort Richardson Average Temperatures*

Month	Average High	Average Low	Mean	Extremes Maximum	Extremes Minimum
January	19	5	12	49	-38
February	25	10	18	58	-33
March	32	15	24	51	-24
April	43	28	35	65	-20
May	54	39	47	80	12
June	62	47	55	86	33
July	65	51	58	83	35
August	63	49	57	82	29
September	55	42	49	74	20
October	41	29	35	63	-6
November	27	15	21	57	-20
December	19	7	13	53	-34
Annual	42	26	35		

*Temperatures (Degrees Fahrenheit) by Month, March 1941-December 1991 for the Fort Richardson Area (Elmendorf Air Force Base 1994).

PG2.3 Biological Resources

PG2.3.1 Biodiversity

Biodiversity is difficult to quantitatively track with the exception of game species and a few other species of high interest. Although the land was degraded when the Army moved onto Fort Richardson, the extent of that degradation and associated damage to the biodiversity is unknown. Army occupation probably improved overall forest ecosystem biodiversity as timber was allowed to age with the exception of areas in the lowlands that were damaged and set back successionally.

It is difficult to determine whether the military mission has significantly affected biodiversity. Changes in ecosystems were in all likelihood very localized, and may have affected species abundance for relatively short periods, but probably did not affect overall species richness. This is particularly true when Fort Richardson is compared with other surrounding lowland areas. These areas were developed, and biological diversity was decreased significantly, a fate that probably would have happened to much of Fort Richardson's lands had they not been occupied by the Army.

Due to a lack of historical data on the flora and fauna of Fort Richardson, the discussion above is largely speculative. Implementation of this Integrated Natural Resource Management Plan will improve the capability of the Army to monitor biodiversity trends in future years.

PG2.3.2 Flora

PG2.3.2.1 Vegetative Profile

G. Tande, Alaska Natural Heritage Program, prepared an appendix, *Vegetation of Fort Richardson*, for the floristic inventory of the post (Lichvar et al. 1997). The following is excerpted from that appendix.

Fort Richardson falls within the Cook Inlet Lowlands Section of the Coastal Trough Humid Taiga Province of Bailey's Ecoregions of the United States (McNab et al. 1994). Forests in the Anchorage area closely resemble the Boreal Forest of Interior Alaska, although some understory and tree species occur that are typically found in the Coastal Spruce-Hemlock Forest. Fort Richardson's forests have been described as open, low-growing spruce and closed spruce-hardwood forests by Viereck and Little (1972), and as a lowland spruce-hardwood forest by the Joint Federal-State Land Use Planning Commission (Joint Federal-State Land Use Planning Commission for Alaska 1973). Packee (1994), in examining Alaska's forest vegetation zones, characterizes the region as an area where white spruce and Sitka spruce (*Picea sitchensis*) naturally hybridize; balsam poplar and black cottonwood *(Populus trichocarpa*) intergrade; and mountain hemlock *(Tsuga mertensiana*) may form the subalpine forest. Vegetation reflects the transitional nature of the climate between maritime and continental. This maritime climatic influence has resulted in a lower incidence of natural fire than is found in the spruce-hardwood forests of interior Alaska (Gabriel and Tande 1983).

Upland sites on Fort Richardson are dominated by paper birch, white spruce, and, on drier sites, quaking aspen. Cottonwood and poplar are common in areas bordering principal streams. Black spruce is the dominant tree in wetter areas and on some well-drained sites. Most bogs are treeless or support stands of stunted black spruce. Grasses, herbs, willows, and alders dominate the vegetation in a narrow band along the Inlet and at elevations above 1,500 feet on the Chugach Mountain slopes.

White spruce, mountain hemlock, and, to a lesser extent, balsam poplar, are the dominant treeline species in south-central Alaska (Viereck et al. 1992). At upper elevations, graminoid forb meadows, alder, and dwarf birch (*Betula glandulosa/nana*) thickets give way to low-growing alpine vegetation in the Chugach Mountains.

Fort Richardson Military Reservation is a topographically diverse area varying from mudflats inundated by the tides of Cook Inlet to mountain peaks of over 5,300 feet. Many different vegetation communities are represented, from coastal salt marsh and boreal forest types to high alpine tundra, talus slopes, shrublands, snowbeds, heaths, and meadows. The following five zones of vegetation and plant habitats were recognized for the purposes of the floristic inventory:

- **COASTAL HALOPHYTIC ZONE** influenced by salt water, principally including shoreline tidal flats and the 2,137-acre Eagle River Flats estuarine marsh on Cook Inlet.

- **LOWLAND INTERIOR FOREST ZONE** of boreal forest habitats below approximately 1,500 feet. Mesic to dry forest types include: white spruce; white spruce-paper birch; paper birch, white spruce-cottonwood, black cotton-wood-balsam poplar, and quaking aspen. Wetlands are predominantly black spruce tree bogs and treeless bogs with a variety of low shrub and graminoid forb communities. Alder shrub is a dominant type of the Lowland Interior Forest Zone.

- **SUBALPINE ZONE** of intermittent forest, shrub, and meadow habitats from approximately 1,500 feet to 2,500 feet elevation. Mesic to dry sites include white spruce, white spruce-paper birch, balsam poplar, and mountain hemlock. Forests are interspersed with alder shrub and grass forb meadows. Treeless bogs are occasionally present in the Subalpine Zone.

- **ALPINE ZONE** of mountain landscape habitats above treeline. Low shrubs and dwarf shrubs occupy wet and mesic to dry habitats. The latter include mesic to dry vegetated sites and dry non-vegetated sites such as rock talus and blockfields. Wetter habitats include late-melting snowfields and snowbeds.

- **ARTIFICIALLY CLEARED OR DISTURBED ZONE** of the cantonment area, utility corridors, roadsides, railroad right-of-ways, borrow pits, wood cutting areas, moose habitat areas, small arms ranges, firing points, landing zones, and other human-modified areas.

PG2.3.2.2 Floristic Inventory

A comprehensive floristic inventory of Fort Richardson was conducted in 1994 (Lichvar et al. 1997). The inventory included vascular plants, ferns and fern allies, the more common mosses, liverworts, and lichens. The University of Alaska, Fairbanks, assisted with the lichens, mosses, and liverworts. Fort Richardson has one set of archival herbarium mounts and one set of specimens laminated in plastic for use during fieldwork.

Plants were collected from six areas at 98 collecting sites. A total of 1,087 vascular plant collections were made. The inventory found 561 vascular species (588 taxa including subspecies and varieties), in 75 families and 246 genera. At least 75 species collected represented extensions in known ranges. Fort Richardson has about 30 percent of Alaska's vascular flora (Lichvar et al. 1997).

A total of 986 collections were made of cryptogams. The inventory found 239 species (256 taxa including subspecies and varieties), which represented 19 hepatics, 112 lichens, and 108 mosses (Lichvar et al. 1997).

Elmendorf Air Force Base (1994) lists vascular plants, mosses, and lichens found on the base during the 1982–1983 Resources Inventory. This list is generally applicable to Fort Richardson.

PG2.3.2.3 Threatened or Endangered, and Species-of-Concern Plants

A comprehensive survey of rare plants was included as part of the floristic inventory for Fort Richardson conducted in 1994. Only two plant species on the federal endangered species are known to occur in Alaska. Neither species' current or historic ranges include Fort Richardson. A report released in 1995 indicated that there are no federally listed endangered or threatened plant species on Fort Richardson (Lichvar et al. 1997). There is, however, one former category 2 candidate species, *Taraxacum carneocoloratum*, found in alpine areas of the Chugach Mountains. This plant has been discovered at an increasing number of sites in Alaska, and its candidate status may be reevaluated.

There are also 22 vascular plant species-of-concern that are known to occur on Fort Richardson. These plants are being tracked by the Alaska Natural Heritage Program because they are thought to be uncommon or rare in Alaska and/or uncommon or rare globally (Alaska Natural Heritage Program 2006). These species are listed below in Table PGX-X and are documented in the survey results of Lichvar et al. (1997). Many of these plants are alpine natives and this ecosystem is also the most vulnerable to the effects of military training. There are no legal ramifications from these listings; rather they are generated by the Heritage Program to help track the occurrence of these taxa across the state as more botanical work is conducted. The categories listed do not indicate known threats to these species, but they do represent the rather few collections known for each taxa in Alaska and the geographic distribution of those collections. All of these taxa are listed for management in the ecosystem management program for Fort Richardson.

Table PG-2. Fort Richardson Rare Plant Species.

Species	2006 Alaska Natural Heritage Program Rankings	
	Global*	State**
Aphragmus eschscholtzianus	G3	S3

Species	2006 Alaska Natural Heritage Program Rankings	
	Global*	State**
Carex deweyana	G5	S2?
Cassiope lycopodioides var.. cristapilosa	G4T2	S1
Douglasia alaskana	G3	S3
Draba ruaxes	G3	S3
Eleocharis kamtschatica	G4	S2S3
Eleocharis quinqueflora	G5	S1
Eriophorum viridcarinatum	G5	S2
Glyceria striata var. stricta	G5T5Q	S2
Myriophyllum verticillatum	G5	S3
Najas flexilis	G5	S1S2
Oxytropis huddelsonii	G3	S2S3
Papaver alboroseum	G3G4	S3
Phalaris arundinacea	G5	S3
Saxifraga adscendens ssp. oregonensis	G5T4T5	S2S3
Stellaria umbellate	G5	S2S3
Taraxacum carneocoloratum	G3Q	S3
Thlaspi arcticum	G3	S3
Viola selkirkii	G5?	S3
Zannichellia palustris	G5	S3

* Alaska Natural Heritage Program Rare Species Global Rankings

G3 Either very rare and local throughout its range or found locally in a restricted range (typically 21-100 occurrences)

G4 Apparently secure globally

G5 Demonstrably secure globally

G#G# Global rank of species uncertain; best described as a range between the two ranks
G#T# Global rank of species and global rank of the described variety or subspecies of the species
Q Taxonomically questionable
? Inexact

** Alaska Natural Heritage Program Rare Species State Rankings

S1 Critically imperiled in state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state (typically 5 or fewer occurrences, or very few remaining individuals or acres)

S2 Imperiled in state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state (typically 6 to 20 occurrences, or few remaining individuals or acres)

S3 Rare or uncommon in the state (typically 21-100 occurrences)

S4 Apparently secure in state, with many occurrences

S#S# State rank of species uncertain; best described as a range between the two ranks

PG2.3.2.4 Vegetation Mapping

Center for Ecological Management of Military Lands-Colorado State University initiated vegetation mapping on Fort Richardson in 1995. Mapping was done in two phases: remote sensing and ground truthing. Color aerial photos of the post taken in 1995, and other aerial imagery, were used to identify types and delineate clusters of vegetation. Land Condition Trend Analysis (now known as Range and Training Land Assessment) data was used to verify vegetation types on the ground. Finally, extensive ground truthing was completed in areas not covered by Land Condition Trend Analysis data. With the exception of detailed evaluations of Eagle River Flats in 1993–1994 (Racine et al., 1993, CH2M Hill 1994b) and a general forest cover type survey conducted in 1955 (Quirk 1990), no other maps illustrating vegetation cover on Fort Richardson have been produced. The vegetation map was completed in 1998.

PG2.3.2.5 Wetland

On Fort Richardson, there are freshwater and saltwater marshes, bogs, lakes and lake margins, and riparian areas. These wetlands may or may not qualify as jurisdictional wetlands (i.e. as defined in Section 404 of the Clean Water Act). Jurisdictional wetlands are determined by the Corps of Engineers on the basis of hydric soils, aquatic vegetation, and hydrology.

The post has estuarine, palustrine, riverine, marine, and lacustrine wetlands. Within Eagle River Flats Impact Area, there are 2,165 acres of wetlands.

National Wetlands Inventory mapping was completed for the post using 1978 aerial photographs. The National Wetlands Inventory maps, however, were determined to be inadequate for meeting the present needs of Fort Richardson. As a result, in the summer of 1995, Waterways Experiment Station completed an intensive field survey to revise the National Wetlands Inventory maps of the post (Lichvar and Specher 1996). These revised wetland maps provide greater accuracy in delineation of wetlands on Fort Richardson and are also useful to the Alaska District, Corps of Engineers for jurisdictional wetland determination. Lichvar from Waterways Experiment Station classified wetlands on Fort Richardson based on values, functions and size.

PG2.3.2.6 Forest Resources

The forests of Fort Richardson are slightly different from Fort Wainwright. Fort Richardson has a longer growing season, more rain, and less extreme winter temperatures. The forests have a longer fire return interval, the trees tend to live longer, and there is more occurrence of insect and disease in the trees. Forests include birch, aspen, and balsam poplar (black cottonwood) forests, mixed hardwood-white spruce, and white spruce forests on relatively well-drained, warm sites. Under natural conditions fire is an uncommon disturbance agent. Several human caused fires have been reported at Fort Richardson, mostly occurring as early spring burns. Fires occur in a wide range of sizes, often creating openings of hundreds to many thousands of acres. Large wildfires were reported to have occurred in the vicinity of Fort Richardson in the early 1900's. A variety of other disturbances can also occur, including storm breakage or windthrow, and insect and disease outbreaks. Currently the Anchorage Bowl is in the final stages of a spruce bark beetle epidemic. Nearly 100% of the white spruce over eight inches in diameter are now dead. This process is having an dramatic effect on forest stand structure at Fort Richardson. Hardwood stands are usually the first forest cover following disturbance, with spruce developing more slowly until mixed stands occur. Stands dominated by white spruce and balsam poplar (black cottonwood) are the oldest and least common forest type, generally growing only where no severe natural disturbance has occurred for 100 years or more. For the last several decades, wildland fire has been actively suppressed on Fort Richardson, which has helped decrease the natural disturbances. Human-caused disturbance starting in the early 1900s and fire suppression since the 1940s have resulted in a distribution of age classes that is heavy in the older forest conditions with fewer younger stands. It is important to maintain younger stands for timber recruitment and wildlife habitat. Older forests are more susceptible to severe wildland fire and to insect and disease damage. More species and age diversity will result from the careful application of fire management techniques and harvest activities where applicable. Due to the reduction of fire on the landscape and the limited use of prescribe fire at Fort Richardson it is important to use alternative disturbance agents to maintain biodiversity in a boreal system.

A forest inventory is an integral part in establishing a plan for managing forest resources. The Ft. Richardson Ecological Management Unit was inventoried by Directorate of Public Works Environmental Forestry Staff during the 2001 and 2002 field seasons. Tree data was collected from permanent plots as part of an on going Forest Inventory and Analysis of USAG-AK lands.

Stand Delineation and Inventory

Stand timber types were delineated utilizing aerial photography to produce maps that demarcate land into forested and non-forested categories. This process was also used to help identify geographical coordinates for the plots and to establish permanent plots on the ground. Timber stands where further defined into types based on specific characteristics such as species composition, size, and spacing. These stand types are predefined by the Alaska Vegetation Classification system (Viereck et al. 1992). The USAG-AK inventory method further stratifies out stands with higher timber value, greater ecological importance, and greater potential for military training. Stand timber typing was confirmed on the ground during stand inventory. The fixed plot radius sampling method was used for tree data collection.

Land Classification

The Fort Richardson Ecological Management Unit contains approximately 61,997acres of forest and non-forest lands (Table 1). Forestlands in the project area occupy 51% of the land area or 31,626 acres. Non-forestland amounts to 49% of the total project land area or 30,371 acres. The forested lands contain 30,878 acres of commercial forestland. Commercial forestlands are those lands containing sawtimber and poletimber size classes.

Table PG-3. Fort Richardson Forest Land Classification

Forest Category	Commercial Forest Category	Forested Land Acreage	Total Acreage
Forested Lands	Commercial Forest	30,878 acres	31,626 acres
	Non-Commercial Forest Lands	748 acres	
Non-Forested Lands		0	30,371 acres
Total		31,626 acres	61,997 acres

Forest Land Area and Volume by Strata

The total volume found in the various types or strata is found in table 2. The estimated total volume of timber in this area is 33,050,973 cubic feet. Of this amount, commercial saw and pole timber types represent 32,950,741 cubic feet. Reproduction, dwarf, and burned types account for the remaining 100,232 cubic feet.

The sawtimber type occupies 31.5% (9,969 acres) of the forested area and contains an estimated volume of 6,100,228 cubic feet. The white spruce-birch-aspen stratum makes up the majority of the sawtimber types with a volume of 6,072,144 cubic feet. This stratum also represents 30.8% (9,731 acres) of the forested lands. Poletimber types occupy 25.5% (8,055 acres) of the forestland, with a total volume of 8,344,605 cubic feet. The white spruce-birch-aspen stratum is the largest in this category for acreage and volume. It occupies 22.7% (7,182 acres) of forested area and accounts for a total volume of 7,648,830 cubic feet. The pole/saw types account for the majority of acreage and volume out of all the different strata's. They occupy 40.6% (12,854 acres) of forested lands and contain a volume of 18,505,908 cubic feet. The birch-aspen pole/saw strata accounts for the largest portion of volume and acreage among all the different types. It represents 35.3% (11,170 acres) of the forested land and contains a volume of 16,956,060 cubic feet. The dwarf/regeneration/burned stratum occupies 2.4% (748 acres) of the forestland area and has a volume of 100,232 cubic feet. This type does not contribute to the commercial volume estimates.

Each stratum has also been broken down into average stems per acre. White spruce sawtimber is the smallest in this category with an average of 34 stems per acre. The highest value in the poletimber type is the white spruce-birch-aspen stratum with 231 stems per acre. The highest values of stems per acre are found in the pole/saw types.

Table PG-4. Fort Richardson Forest Timber Type.

Forest Cover Type	Acres	Percent Forested Acres	Cubic Feet per Acre	Total Cubic Feet	Percent Volume Cubic Feet	Average Stems per Acre
Sawtimber						
(1) White Spruce	238	0.8%	118	28,084	0.1%	34
(8) White Spruce-Birch-Aspen	9,731	30.8%	624	6,072,144	18.4%	64
Subtotal	**9,969**	**31.5%**		**6,100,228**	**18.5%**	
Poletimber						
(2) White Spruce	646	2.0%	421	271,966	0.8%	102
(6) Balsam Poplar	227	0.7%	1,867	423,809	1.3%	193
(9) White Spruce-Birch-Aspen	7,182	22.7%	1,065	7,648,830	23.1%	231
Subtotal	**8,055**	**25.5%**		**8,344,605**	**25.2%**	
Poletimber / Sawtimber						
(4) Other	252	0.8%	712	179,424	0.5%	481
(7) Birch-Aspen	11,170	35.3%	1,518	16,956,060	51.3%	201
(10) Black and White Spruce-Birch-Aspen	1,432	4.5%	957	1,370,424	4.1%	246
Subtotal	**12,854**	**40.6%**		**18,505,908**	**56.0%**	
Dwarf/Regeneration/Burned						
(22) Other Coniferous	748	2.4%	134	100,232	0.3%	84
Subtotal:	748	2.4%		100,232	0.3%	
Grand Total	**31,626**	**100.0%**		**33,050,973**	**100.0%**	

Estimated Annual Harvest

An estimate of the annual allowable harvest is a guide for future harvest activities. Calculations are based on the simple area cut method. This method divides the total productive forest area by the rotation age. The result of this method gives the acreage that can be harvested in a year. The acreage is multiplied by the weighted average volume per acre to determine the annual harvest.

The following white spruce and hardwood harvest acreage represent saw, pole, and pole/saw timber types; the majority is in the pole/saw type.

Table PG-5. Fort Richardson Estimated Annual Harvest.

Harvest Timber Type	Potential Harvest Land	Rotation Age	Regeneration Time	Total Rotation Length	Estimated Annual Harvest
White Spruce	19,229 acres	120 years	10 years	130 years	148 acres per year
Hardwoods	11,397 acres	80 years	10 years	90 years	127 acres per year

PG2.3.3 Fauna

Due to diverse ecosystems and a relatively unobtrusive military mission, most species indigenous to south-central Alaska can be found on Fort Richardson. Two important wildlife components on the post are a highly productive moose population that has responded well to adequate habitat and specialized management practices, and a concentration of waterfowl attracted to the tidewater salt marsh.

PG2.3.3.1 Mammals

Moose: Moose (*Alces alces*) is a key species for wildlife management on Fort Richardson. They are the largest, most abundant, and most sought-after species among hunters and wildlife viewers (Gossweiler 1984, Bennett, 1982). Managing for moose will also benefit a variety of other wildlife species that share the same environmental conditions and variables.

A survey of the Fort Richardson moose herd is conducted annually using fixed-wing aircraft. This survey is usually flown in November, by the Alaska Department of Fish and Game and Directorate of Public Works Environmental Resources Department.

Over the past twenty years, the moose population that frequents Fort Richardson, Elmendorf Air Force Base, and Ship Creek (hereinafter referred to as the Fort Richardson moose herd) has remained relatively stable at a projected population of 525 to 650 animals (Quirk 1996). The nine-year average (1986–1994) calf : cow ratio was 39:100, and the bull : cow ratio was 48:100. The average number of bulls per 100 cows is substantially higher than normal due to the desire to maintain a greater number of bulls for urban viewing and photography. The average number of calves per 100 cows is at the high end of normal for moose herds throughout Alaska. Exceptionally high calf production occurred in 1986 and 1987 (58-60:100) with calf production in the 28-38:100 range during 1988–1994.

Although the Fort Richardson moose herd has been relatively stable over the years, there have been some sporadic declines during extreme winters with persistent and deep snow packs. Only one winter (1994–1995) with unusually heavy and persistent snowfall resulted in a large decrease in the moose population (26 percent). Alaska Department of Fish and Game believes that over browsing, associated with a herd above carrying capacity in the Anchorage area (including Fort Richardson), was the cause of the loss. Compounding the issues has been the steady and significant loss of moose habitat on Fort Richardson due to construction, drop zone enlargement, and land transfers. This loss of hundreds of acres has reduced the overall carrying capacity for moose. Additionally, heavy snows during the 1994–95 winter further exacerbated the situation.

During the past five years, annual hunter harvest of moose has averaged 40–45 animals per year. Table PG-6 shows results of moose survey data from 1986 through 1996.

Table PG-6. Fort Richardson Annual Moose Population, 1986 - 1996.

Year	Total	Cows	Calves	Bulls	Bulls/ 100 Cows	Calves/ 100 Cows
1986	474	230	137	107	47	60
1987	398	173	100	125	72	58
1988	455	256	80	119	46	31
1989	476	264	97	115	44	37
1990	339	172	60	107	62	35
1991	490	282	105	103	36	37

Year	Total	Cows	Calves	Bulls	Bulls/ 100 Cows	Calves/ 100 Cows
1992	355	214	67	74	35	31
1993	456	256	78	122	48	38
1994	401	239	67	95	40	28
1996	294	157	48	89	56	31
Avg.	413.8	224.3	83.9	105.6	48.6	38.6

The size of Fort Richardson's herd makes it the largest concentration of wintering moose in the Anchorage urban area. The long-term vitality of the herd is due, in part, to wildlife management practices by Fort Richardson and Alaska Department of Fish and Game since the mid-1960s. Fort Richardson has had limited success in improving moose browse and clearing and rehabilitating areas for preferred plant species. Likewise, Alaska Department of Fish and Game has taken great interest in promoting the population and improving recreational value of moose for the Anchorage area. USAG-AK and Alaska Department of Fish and Game manage moose cooperatively in accordance with a 1992 cooperative agreement drafted solely for the purpose of conserving the moose population. During recent discussions between USAG-AK and Alaska Department of Fish and Game personnel, the fall population objective of 600 moose was reduced to 500 to minimize the potential for a high rate of mortality due to over-browsing.

Other Big Game Species: Other big game species occur on the post but are not hunted. These include grizzly bear, black bear, and Dall sheep (Quirk 1994).

Small Game and Furbearers: Small game and furbearers found on Fort Richardson include coyote, wolf, lynx (*Lynx canadensis*), red squirrel (*Tamiasciurus hudsonicus*), snowshoe hare (*Lepus americanus*), hoary marmot (*Marmota caligata*), marten, beaver, river otter (*Lutra canadensis*), wolverine, red fox (*Vulpes vulpes*), porcupine (*Erethizon dorsatum*), and mink.

Cook and Seaton (1995) have prepared a Checklist of the *Mammals of Fort Richardson, Alaska*, which includes both confirmed and suspected species. The first post-wide small mammal survey was conducted in summer 1994 by the University of Alaska Museum. This survey used Land Condition Trend Analysis field plot locations as sampling locations. Results of the survey are included with the list of mammals currently known to occur on the post in Appendix F.

PG2.3.3.2 Birds

Several bird surveys on Fort Richardson have been conducted in recent years. Together, they provide a reasonably complete inventory of the species that use the post. A 1994 U.S. Fish and Wildlife Service raptor inventory on Fort Richardson (Schempf 1995) discovered six different types of raptors: bald eagle, golden eagle, northern harrier, red-tailed hawk, Harlan's hawk (dark phase of red-tailed hawk), and sharp-shinned hawk. Although no goshawks were found during this inventory, they are known to inhabit the dense forested areas of the post.

Game species include spruce grouse *(Dendragapus canadensis*), ptarmigan (*Lagopus spp.*), and numerous ducks and geese.

An intensive owl survey conducted by the U.S. Fish and Wildlife Service in 1997 (Browne and Andres 1997) identified three species: great-horned, saw-whet, and boreal.

Since 1994, an ongoing inventory and monitoring of landbirds has been conducted in conjunction with Range and Training Land Assessment, and the U.S. Fish & Wildlife Service has also been assisting USARAK with bird surveys. This project adopts study methods endorsed by Partners in Flight and has the following goals: identifying avian habitats, conducting a breeding bird survey, establishing certain intensive study sites for neotropical birds modeled after Monitoring Avian Productivity and Survivorship stations, and compiling an post-wide bird checklist (Roush and Andres 1994). A total of 40 bird plots have been established in conjunction with Range and Training Land Assessment, and two Monitoring Avian Productivity and Survivorship stations are currently being manned (Andres 1994). A progress report (Roush and Andres 1994) based on 341 hours of observation recorded 55 species.

Waterfowl and other birds associated with the Eagle River Flats wetlands have been the most thoroughly documented avian species on the post. Inventories associated with intensive evaluations of Eagle River Flats (CH2M Hill 1994b; Racine, et al. 1993) have identified 75 avian species, including 24 species of waterfowl, occurring in the tidal salt marsh. These studies also provided crucial information on avian habitat and behavior. Every field season, since 1990, USARAK has conducted ground and aerial surveys of birds occurring in Eagle River Flats, McVeigh Marsh, and post ponds and lakes (Fort Richardson 1994). These surveys are usually done from fixed-wing aircraft and focus particularly on determining the size of waterfowl populations (Quirk 1994). Refer to Appendix F for complete list of bird species found on Fort Richardson.

PG2.3.3.3 Fish

Ten species of fish are found in post lakes and waterways. Fort Richardson is part of the Anchorage Area Management Unit for fisheries administered by the Alaska Department of Fish and Game. The Alaska Department of Fish and Game periodically stocks rainbow trout, landlocked salmon *(Oncorhynchus* spp.), Arctic grayling, and arctic char in the five managed lakes (Alaska Department of Fish and Game 1995) and maintains records of fish harvested from post streams and rivers. Species of game fish occurring in these waterways include silver salmon, king salmon, red salmon (*Oncorhynchus nerka*), chum salmon, pink salmon (*Oncorhynchus gorbuscha*), and Dolly Varden *(Salvelinus malma*). Fort Richardson's only significant non-game fish are the three-spine stickleback (*Gasterosteus aculeatus*) and the slimy sculpin (*Cottus cognatus*). One other species recorded on Elmendorf Air Force Base, and probably found on Fort Richardson, is the nine-spine stickleback (*Pungitius pungitius*) (Roth, et al. 1983).

Gill-netting has been conducted occasionally in the five managed lakes to monitor fish populations since 1975 (Bennett 1982). Although these fish surveys are scheduled semi-annually for spring and fall, whether or not they are done is determined by the availability of personnel. The primary method for monitoring fish in rivers and streams is the annual angler harvest.

PG2.3.3.4 Reptiles and Amphibians

No reptiles are known to occur on Fort Richardson. One species of amphibian, the wood frog is found on the post. The frog is common in bogs, freshwater and saltwater marshes, and lake margins. In Eagle River Flats, it is an important prey species for migrating sandhill cranes (CH2M Hill, 1994b).

PG2.3.3.5 Special Status Fauna

The Cook Inlet beluga whale, a federally listed endangered species is found within the boundaries of Fort Richardson. Beluga whales (*Delphinapterus leucas*) have been sighted within Eagle River Flats as far as 1¼ miles up the Eagle River. They have been observed chasing salmon up drainages along the river bank (Quirk 1994). These, as well as all whales in United States waters, are protected under the Marine Mammals Act, but the newly listed staus of the beluga whale affords it even greater protection under the Endangered Species Act.

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A delisted species, the American peregrine falcon is known to pass through the area. Though not found during the recent raptor inventory (Schempf 1995), it was recorded during field studies at Eagle River Flats in May and August 1991–1992 (CH2M Hill 1994b). Another delisted species, the Arctic peregrine falcon, has not been observed but could also potentially occur on Fort Richardson.

Another federally delisted species, the bald eagle is common locally. Although its status does not apply in Alaska, it is afforded special protection by USAG-AK in accordance with the Bald Eagle Protection Act (Quirk et al. 1978). In the raptor inventory (Schempf 1995), bald eagles were the most frequently seen species.

Two other avian species, the trumpeter swan and the golden eagle are of special concern for wildlife management on Fort Richardson. As the world's largest waterfowl species, the trumpeter swan is a migrant on Fort Richardson, stopping in Eagle River Flats during both spring and fall migrations. The golden eagle is a resident of the alpine habitats of the post. (Quirk et al. 1978).

PG2.3.4 Special Interest Areas

Designation of special protection status for important or fragile natural areas is an effective management tool. In accordance with AR 200-3, areas that contain natural resources that warrant special conservation efforts will be identified during the inventory and classification process. After appropriate study and coordination, such areas may be managed as "Special Interest Areas" for their unique features. Per AR 200-3, this Integrated Natural Resource Management Plan "will address the special management necessary for these areas, and all current and future land-uses will consider the uniqueness of these areas and plan accordingly to ensure conservation of their resources".

Fort Richardson has areas with special natural features. They harbor sensitive or unique wildlife species, represent unique plant communities, or possess unusual geologic or topographical characteristics.

- Old Growth Forest
- Krummholz
- Alpine Tundra
- Eagle River Corridor
- Other Riparian Areas
- Lakes
- Eagle River Flats
- Glenn Highway Greenbelt
- McVeigh Marsh Waterfowl Refuge
- Otter Lake and Otter Creek Wildlife and Recreation Area
- Gwen Lake Wildlife and Recreation Area
- Clunie Lake Wildlife and Recreation Area
- Waldon Lake Wildlife and Recreation Area
- North Fork Campbell Creek Anadromous Fish Stream
- Chester Creek Anadromous Fish Stream

The following is a description of the currently identified special interest area on Fort Richardson along with restrictions and stipulations its use.

Ship Creek Special Interest Area: Ship Creek and its riparian habitat are important and sensitive areas on Fort Richardson, requiring protection to insure maintenance of its health and natural function. Water

quality on Ship Creek is of utmost importance because any deterioration on Army lands will affect downstream locations on Elmendorf Air Force Base and in the City of Anchorage. USAG-AK's goal is to maintain Ship Creek in a condition as pristine as possible and to repair portions that may become damaged. Further development, beyond that already approved for the golf course expansion, will not occur in the riparian area. Tree cutting will be prohibited. Clearing for the golf course will be limited to that absolutely necessary for course construction. Troops and other authorized users will continue to have "pass through" access.

PG2.4 Cultural Resources

Much of Fort Richardson has not been surveyed for cultural and historic resources. Generally, surveys have been site specific (e.g., Glenn Highway, Malemute Drop Zone, Snowhawk Lake, and Otter Lake) with the exception of Steele (1980) who conducted a low intensity archaeological survey of the entire post. The following information, with exception of Site Summit material, is from Bacon et al. (1986).

Only a relatively small portion of Fort Richardson is considered to be highly sensitive with regard to archaeological resources. These areas include the mouth of Eagle River, the shoreline of Knik Arm, upstream portions of the Ship Creek drainage, the Fossil Creek drainage, Elmendorf Moraine, the 40-90 mm Range, and Grezelka Range. The rest of the post is not considered sensitive.

Historically, the Anchorage area may have been inhabited intermittently for 9,000–10,000 years, although few sites associated with this early occupation have been found. Pacific Eskimos probably occupied the area, at least seasonally, as recently as 300 years ago. The Tanaina Athabaskan Natives initially occupied the area between 1650 and 1780, and there were several Tanaina villages in the Fort Richardson area. Eklutna is the only village still in existence. Most archeological sites on Fort Richardson were probably summer fish camps. It is possible that Russian artifacts could be located on Fort Richardson due to early Russian influence in the Kenai Peninsula and the Interior. A portion of the Iditarod Trail is on Army lands, although its exact location has not been pinpointed.

The seven known cultural resources sites (not including Site Summit) on Fort Richardson are all historic and adds only a few details to the already large body of knowledge on the history of Anchorage. The value of future archeological surveys on Fort Richardson lies in discovering new sites of varying time periods and cultural affiliations. It is likely that such sites exist. Bacon et al. (1986) indicates a priority for future archeological surveys. High priorities include Otter Lake, Gwen Lake, Clunie Lake, the mouth of Eagle River, and streams emptying into Knik Arm, which have not been surveyed, as well as searching for the Iditarod Trail near Otter Lake Recreation Area.

The abandoned Nike Hercules Missile Battery on Site Summit is an important Cold War historic property. It is the only remaining Nike site of the eight built in Alaska that still maintains its historic character as a functional missile battery. It was the last Nike Battery in the nation to be deactivated, in 1979.

A Legacy Resource Management Program grant by the Department of Defense funded a study to inventory, evaluate, develop interpretative materials, and nominate the Nike Hercules Missile Battery at Site Summit to the National Register of Historic Places. This work was completed and the Nike Site was listed by the Keeper of the National Park Service on July 8, 1996.

Phase II of the Legacy grant for the Nike Site provided funding to develop a feasibility study for the management of a cold war Nike Hercules Missile site. The study was completed in December 1997. Recommendations in the study will be used in developing the Fort Richardson Cultural Resources Management Plan.

Only 15 miles from downtown Anchorage, Site Summit rises about 4,000 feet above sea level, providing an incredible scenic view of Anchorage, the Susitna and Cook Inlet basins, and surrounding mountains. It has high potential for being a world-class historic and recreational area, offering insights into both the Cold War and alpine tundra. Site Summit is further described in a pamphlet prepared by the Alaska Office of History and Archeology (1996).

PG3. Fort Richardson Management Prescriptions

PG3.1 Fort Richardson North Post Sub-Unit

PG3.1.1 Prescriptions and Policy

Fort Richardson North Post sub-unit consists of all lands north of the Glenn Highway. This ecological management unit is broken down into three sub-units. The first sub-unit is North Post Training Areas sub-unit. This sub-unit contains eleven level to gently rolling training areas, which encompass Malemute and Neibhur Drop Zones, McLaughlin Range, two demolition ranges, twenty firing points, ammunition storage areas, all the buildings and improved grounds, Bryant Army Airfield, Otter Lake Recreation Area, Cottonwood Park. Eagle River Flats is a 2,165 acre estuarine salt marsh in the northwestern portion of Fort Richardson, used as the primary ordnance impact area for the post since the mid-1940s. It is also an important habitat for waterfowl, and a variety of other wildlife species.

PG3.1.1.1 Military Use

The North Post Training Area sub-unit is used for small arms, platoon- to brigade-sized exercises, company-sized live-fire exercises, road marches, and bivouacs. This sub-unit is primarily used for military training exercises, airborne drops, and winter bivouacs. The recommended time for military activities in low areas for mechanized vehicles is between freeze-up and spring break-up.

The cantonment can support small unit training, classroom training, individual training, non-fire range facilities, housing, and office facilities. Other compatible uses include improved grounds management, natural resources management, golfing, fishing, bird watching, hiking, skiing, camping, and new construction. Activities that are not compatible in the South Post Urban Areas are live-fire military training and off-road recreational vehicle use.

The Eagle River Flats is suitable for indirect fire weapon training and aerial gunnery exercises. The area is impacted by small arms and dud-producing munitions. This sub-unit has been classified as a high hazard impact area. Other compatible uses include remote monitoring of natural resources and military impacts. Military maneuver is prohibited in Eagle River Flats Impact Area. There is hazard of unexploded ordnance in this area. Commanders will ensure that safety personnel maintain surveillance of the area and have the officer-in-charge suspend firing immediately at the approach of an aircraft.

PG3.1.1.2 Access

Public access is allowed in the North Post Training Areas for recreation (subject to safety restrictions and military security) when access does not impair the military mission, as determined by the installation commander. Public access into urban areas is allowed subject to safety restrictions and military security, when access does not impair the military mission, as determined by the installation commander. Compatible uses generally include natural resource management, habitat improvement, mineral or vegetative resource extraction, bird watching, hiking, skiing, and sledding. In general, activities that are not compatible with urban areas are hunting, trapping, and fishing. USAG-AK Regulation 350-2, Chapter 5, describes impact areas on Fort Richardson. There is one major impact area, Eagle River Flats,

composed of 2,165 acres. Public access into dudded impact areas is prohibited because of the hazard of unexploded ordnance. Compatible uses include remote monitoring of natural resources and military impacts, and prescribed burning to reduce fire hazards and improve habitat. Activities that are not compatible with dudded impact areas include any ground-based natural resources management (unless area is cleared by qualified Explosive Ordnance Demolition personnel), any digging whatsoever, mineral extraction, commercial timber sales, hunting, fishing, trapping, bird watching, off-road recreational vehicles of any kind, dog mushing, airboats, camping, new construction, easements, and leases.

PG3.1.1.3 Natural Resources Management

Natural resource priorities for the Training Areas, Otter Lake, and Multi-Purpose Training Range are all "*full*". Natural resource priority for the cantonment area is "*intensiv*e" and is "*limited*" for Eagle River Flats Impact Area. Fire suppression category is "*full*" for the training areas, Otter Lake, and the Multi-Purpose Training Range and Infantry Platoon Battle Course. Fire suppression category is "critical" for the cantonment area and is "*limited*" for Eagle River Flats. The Army retains vegetation rights for all of Fort Richardson. Hunting, trapping and fishing are "*open*" in all training areas north of the cantonment, except for Malemute Drop Zone, Infantry Platoon Battle Course, Multi-Purpose Training Range, Eagle River Flats, and Training Areas 7B, 9A, 10A and 10B which are all "*closed*". Otter Lake is "*open*" to fishing but is "*closed*" to all hunting and trapping. Recreation Use Management category is "*modified*" in most of the trainings areas north of the cantonment, but is "*closed*" in the Multi-Purpose Training Range, Infantry Platoon Battle Course, Malemute Drop Zone and the southern half of Training Area 1B, and all of Training Areas 7B, 9A, 10A and 10B.

Table PG-7. Fort Richardson North Post Training Area Ecosystem Management Prescriptions.

Ecosystem Management Sub-unit	Natural Resource Management Priorities	Fire Suppression Category	Vegetation Management	Hunting and Trapping	Fishing	Recreational Use Management
Training Areas north of the Cantonment Area	Full	Full	Army	Open*, **	Open	Modified***
Otter Lake Recreation Area	Full	Full	Army	Closed	Open	Limited
Cantonment Area	Intensive	Critical	Army	Closed	Closed	Limited
Multi-Purpose Training Range and Infantry Platoon Battle Course	Full	Full	Army	Closed	Closed	Closed
Eagle River Flats Impact Area	Limited	Limited	Army	Closed	Closed	Closed

*Trapping is prohibited on Fort Richardson
**Training Area 9A, 10A and 10B are closed to hunting, fishing, and ORRV use.
*** The southern half of Training Area 1B, Training Areas 7A and 7B east of Poleline Rd and all of Training Areas 1A, 5, 8B, 9A, 10A and 10B are closed to ORRV use.

Fort Richardson is not an approved federal or state subsistence area. There is no subsistence preference for any subsistence user but any subsistence user may conduct approved subsistence activities after acquiring any required state licenses, USAG-AK recreation access permit, and checking in with USARTRAK. Figure P-15 shows the recreation use areas on Fort Richardson.

Figure P-15. Fort Richardson Recreation Use Areas.

USAG-AK will comply with all laws, regulations, and Executive Orders pertaining to natural resources management on Fort Richardson. USAG-AK will complete ongoing projects and conduct full implementation of ecosystem management projects. USAG-AK will conserve physical resources by conducting Integrated Training Area Management, watershed management, and minerals management. USAG-AK will conserve biological resources by conducting wetland management, forest management, fish and wildlife management, endangered species management, pest management, and urban area management. USAG-AK will integrate social (human) resources into ecosystem management by conducting education, awareness and public outreach, conservation enforcement, outdoor recreation management, and cultural resources management. USAG-AK will support ecosystem management decision-making through implementation of National Environmental Policy Act, Geographic Information System, and other decision support systems, and integration with other land management programs such as Sustainable Range Program and Sustainment, Restoration and Modernization Program.

PG3.1.2 Projects

Table PG-8 includes the ecosystem management projects for Fort Richardson North Post during 2007-2011.

Table PG-8. Fort Richardson North Post Ecosystem Management Projects.

Project Information			Year				
Priority	**Standard Project Category**	**Project Title**	**FY 07**	**FY 08**	**FY 09**	**FY 10**	**FY 11**
High	Erosion Control and Streambank Stabilization	Engineer Expressway Widening Phase 1-4	x	x	x	x	
High	Erosion Control and Streambank Stabilization	Fire Tower Ridge Road Widening Phase 1-3			x	x	x
High	Erosion Control and Streambank Stabilization	FRA TARP FY07	x	x	x	x	x
High	Fish and Wildlife Habitat Improvement	Moose Browse Survey	x	x	x	x	x
High	Forest Inventory / Monitoring	Forest Stand Mapping	x	x	x	x	x
High	Inventory and Monitoring	PMO Game Warden Coordination	x	x	x	x	x
High	Inventory and Monitoring	Recreational Impact Monitoring	x	x	x	x	x
High	Inventory/Monitoring	Aerial Moose Survey	x	x	x	x	x
High	Inventory/Monitoring	Beluga Whale Surveys (Eagle River Flats)	x	x	x	x	x
High	Inventory/Monitoring	Brown bear population estimation using non-invasive genetic methods	x	x	x	x	x
High	Inventory/Monitoring	Brown Bear Telemetry Survey	x				
High	Management	Erect signs designating boundaries of Special Interest Areas	x	x	x	x	x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Outreach	Implement FireWise program for private landowners adjacent to military lands.	x	x	x	x	x
High	Outreach	Outdoor Recreation Supplement	x	x	x	x	x
High	Outreach	Range Control coordination	x	x	x	x	x
High	Outreach	Recreation Access Permits	x	x	x	x	x
High	Outreach	Update Information Kiosks	x	x	x	x	x
High	Planning	FRA Nuisance Wildlife SOP	x				
High	Population Management	Nuisance/injured wildlife response	x	x	x	x	x
High	Recreational Activities	Moose Hunt Orientation	x	x	x	x	x
High	Recreational Activities	Moose Hunt Proficiency Shoot	x	x	x	x	x
High	Suppression	Conduct fire suppression activities as necessary.	x	x	x	x	x
High	Survey and Monitoring	Conduct T&E Species Survey	x	x	x	x	x
High	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	x	x	x	x	x
High	Wildland Fire Management	Develop program of providing assistance to training military units during periods of high fire danger.	x	x	x	x	x
High	Wildland Fire Monitoring	Collect fuel-loading information as part of the forest inventory.	x	x	x	x	x
High	Wildland Fire Monitoring	Delineate and maintain Geographic Information System data layers showing historical fires.	x	x	x	x	x
High	Wildland Fire Monitoring	Map all known cultural features on suppression maps and develop fire management recommendations for these features.		x			
High	Wildland Fire Monitoring	Map all known natural resources features and areas of concern from wildland fire suppression and management activities on suppression maps. Develop management strategies to avoid conflicts with these natural resource features and areas of concern.			x		
High	Wildland Fire Monitoring	Map all known non-sensitive structures on USAG-AK.				x	
High	Wildland Fire Monitoring	Map all military structures on suppression maps. Assess fire suppression options and recommendations for these structures.		x			
High	Wildland Fire Monitoring	Map past areas where ordnance has been used and develop pre-suppression plans on how to deal with wildland fire suppression in these areas.	x	x	x	x	x
High	Wildland Fire Monitoring	Research causes of fire ignitions on USAG-AK to identify areas of high fire occurrence				x	

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Wildland Fire Monitoring	Research weather patterns influencing fire behavior and historical weather analysis for each land unit of USAG-AK.	x				
High	Wildland Fire Monitoring	Update fire history map of USAG-AK.			x		
High	Wildland Fire Monitoring	Update fire maps with military special use areas and fire management options for these areas.	x				
High	Wildland Fire Monitoring	Update fuels map of USAG-AK.			x		
High	Wildland Fire Planning	Develop Geographic Information System for military fire management office and for use on incidents with current data, maps, photos, suppression options, and restrictions.	x	x	x	x	x
High	Wildland Fire Planning	Develop plans and fuel treatment projects to reduce the threat of fires starting on military lands and impact areas and burning onto adjacent lands of high resource value.		x			
High	Wildland Fire Planning	Develop plans for proposed prescribed fires on USAG-AK.	x	x	x	x	x
High	Wildland Fire Planning	Develop standard operation procedures for each area unit of USAG-AK to assist firefighters and Incident Commanders in establishing priorities, making decisions, dealing with ordnance issues.	x	x	x	x	x
High	Wildland Fire Planning	Identify and assess fuel management strategies for urban/wildland interface areas.	x	x	x	x	x
High	Wildland Fire Pre-Suppression	Identify and use fuel reduction treatments to reduce the threat of wildland fire at the urban/wildland interface, military structures, selected training areas, and cultural resources.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop and disseminate procedures for detection and reporting of fires.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop more effective means of calculating fire weather indices for localized training areas and implement a program of relaying fire danger ratings to training units.	x	x	x	x	x
Med	Erosion Control and Streambank Stabilization	Clunie Lake Road Widening Phase 1, 2 and 3				x	x
Med	Fish and Wildlife Habitat Improvement	Moose Habitat Enhancement	x	x	x	x	x
Med	Forest Improvement	Waldon Lake Training Area Timber and Maneuverability Improvement Project	x	x			
Med	Forest Inventory /	Forest Inventory	x	x	x	x	x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
	Monitoring						
Med	Forest Land Improvement	ISBC, IPBC and DMPTR	x	x	x	x	x
Med	Invasive Species Control	Pike Removal and Monitoring on FRA	x	x	x	x	x
Med	Invasive Species Control	Pike Telemetry in Otter Lake				x	
Med	Inventory/Monitoring	Bat Inventory and Roosting Survey	x				
Med	Inventory/Monitoring	Bat Monitor	x	x	x	x	x
Med	Inventory/Monitoring	Fauna Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Flora Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Moose Telemetry Survey	x	x	x		
Med	Inventory/Monitoring	Rusty Blackbird Nesting Survey	x	x	x	x	x
Med	Inventory/Monitoring	Small Mammal Survey		x	x		
Med	Inventory/Monitoring	Soils Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Topography Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Vegetation Communities Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Winter Track Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Wolf population estimation using non-invasive genetic methods	x	x	x	x	x
Med	Inventory/Monitoring	Wolverine population estimation using non-invasive genetic methods	x	x	x	x	x
Med	Inventory/Monitoring	Wood Frog Survey	x	x	x	x	x
Med	Population Management	Moose Harvest Data Collection	x	x	x	x	x
Med	Population Management	Small Game Harvest Data Collection	x	x	x	x	x
Med	Population Management	Tracking of Nuisance Wildlife Calls	x	x	x	x	x
Med	Wildland Fire Planning	Develop pre-suppression plans for each of the area units of USAG-AK.		x			
Low	Inventory/Monitoring	Ruffed Grouse Drumming Counts	x	x	x	x	x
Low	Inventory/Monitoring	Sandhill Crane Breeding Surveys	x	x	x	x	x

PG3.2 Fort Richardson South Post Sub-Unit

PG3.2.1 Prescription and Policy

Fort Richardson South Post ecological management unit is composed of all lands south of the Glenn Highway, and is broken down into three sub-units. The South Post Ranges sub-unit consists of two disjunct areas, and contains all of the small arms ranges, their surface danger zones, and all of the Davis Range and its surface danger zone.

The second sub-unit in the Fort Richardson South Post ecological management unit is the South Post Urban Areas sub-unit. This sub-unit is composed of several disjunct areas, including the golf course, the Range Control offices, the dam and gaging station on Ship Creek, and several other small urban sites.

The third sub-unit in this ecological management unit is the South Post Training Areas sub-unit. This sub-unit consists of all the remaining lands on the south post, which is largely mountainous terrain.

PG3.2.1.1 Military Use

The South Post Training Areas sub-unit is suitable for small arms, platoon- to company-sized exercises, and company-sized live-fire exercises. This sub-unit is primarily used for military training exercises, and occasionally for airborne drops. The South Post Ranges sub-unit is suitable for direct fire weapon training. This sub-unit is impacted by small arms and has been classified as a non-dudded impact area. Other compatible uses include live fire maneuver training, monitoring of natural resources and military impacts, and prescribed burning to reduce fire hazards and improve habitat. Other activities not compatible with South Post Ranges include digging in wetlands without a permit from the Army Corps of Engineers, hunting, fishing, trapping, bird watching, off-road recreational vehicles of any kind, dog mushing, airboats, camping, new construction, easements, and leases.

PG3.2.1.2 Access

Public access into the South Post Training Areas sub-unit is allowed for recreation, subject to safety restrictions and military security, when access does not impair the military mission, as determined by the installation commander. Public access into the Small Arms Range Complex is restricted to times when the ranges are not being used. Access is only allowed after checking with Range Control and gaining permission.

PG3.2.1.3 Natural Resources Management

Fort Richardson South Post is managed as "*full*" natural resources management priority, except for the golf course, which is managed as "*limited*". Fire suppression category is "*full*". The Army retains vegetation management authority. Training Areas 11E, 12 A, 12B, 13, 14A, 14B, and 14C are "open" to hunting and fishing, except for the areas west of bulldog trail in Training Areas 12A and 14A. The Small Arms complex, Infantry Platoon Battle Course, Biathlon Course, and Arctic Valley Training Area are closed to hunting, trapping, and fishing. Recreational use management category is "*limited*", which does not allow off-road recreational vehicles but does allow non-mechanized types of recreation.

Table PG-9. Fort Richardson South Post Ecosystem Management Prescriptions.

Ecosystem Management Sub-unit	Natural Resource Management Priorities	Fire Suppression Category	Vegetation Management	Hunting and Trapping	Fishing	Recreational Use Management
Training Areas	Full	Full	Army	Open*,**	Open*	Limited
Small Arms Complex	Full	Full	Army	Closed	Closed	Closed
Infantry Squad Battle Course	Full	Full	Army	Closed	Closed	Closed
Biathlon Course	Full	Full	Army	Closed	Closed	Closed
Arctic Valley	Full	Full	Army	Closed	Closed	Closed
Golf Course	Limited	Full	Army	Closed	Closed	Closed

*Closed to trapping.

**Training Areas 11A, 11B, 11C, 11D and Training Areas 12A and 14A west of Bulldog Trail are closed to hunting and fishing.

Fort Richardson is not an approved federal or state subsistence area. There is no subsistence preference for any subsistence user but any subsistence user may conduct approved subsistence activities after acquiring any required state licenses, USAG-AK recreation access permit, and checking in with USARTRAK.

USAG-AK will comply with all laws, regulations, and Executive Orders pertaining to natural resources management on Fort Richardson. USAG-AK will complete ongoing projects and conduct full implementation of ecosystem management projects. USAG-AK will conserve physical resources by conducting Integrated Training Area Management, watershed management, and minerals management. USAG-AK will conserve biological resources by conducting wetland management, forest management, fish and wildlife management, endangered species management, pest management, and urban area management. USAG-AK will integrate social (human) resources into ecosystem management by conducting education, awareness and public outreach, conservation enforcement, outdoor recreation management, and cultural resources management. USAG-AK will support ecosystem management decision-making through implementation of National Environmental Policy Act, Geographic Information System, and other decision support systems, and integration with other land management programs such as Sustainable Range Program and Sustainment, Restoration and Modernization Program.

PG3.2.2 Projects

Table PG-10 lists the ecosystem management projects for Fort Richardson South Post planned during 2007-2011.

Table PG-10. Fort Richardson South Post Ecosystem Management Projects.

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
High	Erosion Control and Streambank Stabilization	FRA TARP FY07	x	x	x	x	x
High	Fish and Wildlife Habitat Improvement	Moose Browse Survey	x	x	x	x	x
High	Forest Improvement	Ft. Richardson Small Arms Complex Fuel Break		x		x	
High	Forest Improvement	Grezelka Range Area Timber Stand Improvement		x		x	
High	Forest Inventory / Monitoring	Forest Stand Mapping	x	x	x	x	x
High	Forest Land Improvement	Grezelka Rx AK 316 2823 JM AA43	x	x	x	x	x
High	Inventory and Monitoring	PMO Game Warden Coordination	x	x	x	x	x
High	Inventory and Monitoring	Recreational Impact Monitoring	x	x	x	x	x
High	Inventory/Monitoring	Aerial Moose Survey	x	x	x	x	x
High	Inventory/Monitoring	Brown bear population estimation using non-invasive genetic methods	x	x	x	x	x
High	Inventory/Monitoring	Brown Bear Telemetry Survey	x				
High	Management	Erect signs designating boundaries of Special Interest Areas	x	x	x	x	x
High	Outreach	Annual Review and Input to ADFG	x	x	x	x	x

Project Information			Year				
Priority	Standard Project Category	Project Title	FY 07	FY 08	FY 09	FY 10	FY 11
		Fishing Regulations					
High	Outreach	Conservation Website	x	x	x	x	x
High	Outreach	Implement FireWise program for private landowners adjacent to military lands.	x	x	x	x	x
High	Outreach	Outdoor Recreation Supplement	x	x	x	x	x
High	Outreach	Range Control coordination	x	x	x	x	x
High	Outreach	Recreation Access Permits	x	x	x	x	x
High	Outreach	Update Information Kiosks	x	x	x	x	x
High	Planning	FRA Nuisance Wildlife SOP	x				
High	Population Management	Nuisance/injured wildlife response	x	x	x	x	x
High	Recreational Activities	Moose Hunt Orientation	x	x	x	x	x
High	Recreational Activities	Moose Hunt Proficiency Shoot	x	x	x	x	x
High	Suppression	Conduct fire suppression activities as necessary.	x	x	x	x	x
High	Survey and Monitoring	Conduct T&E Species Survey	x	x	x	x	x
High	Vegetation Management	Grezelka Fuels Management	x				
High	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	x	x	x	x	x
High	Wildland Fire Management	Develop program of providing assistance to training military units during periods of high fire danger.	x	x	x	x	x
High	Wildland Fire Monitoring	Collect fuel-loading information as part of the forest inventory.	x	x	x	x	x
High	Wildland Fire Monitoring	Delineate and maintain Geographic Information System data layers showing historical fires.	x	x	x	x	x
High	Wildland Fire Monitoring	Map all known cultural features on suppression maps and develop fire management recommendations for these features.		x			
High	Wildland Fire Monitoring	Map all known natural resources features and areas of concern from wildland fire suppression and management activities on suppression maps. Develop management strategies to avoid conflicts with these natural resource features and areas of concern.			x		
High	Wildland Fire Monitoring	Map all known non-sensitive structures on USAG-AK.				x	
High	Wildland Fire Monitoring	Map all military structures on suppression maps. Assess fire suppression options and recommendations for these structures.		x			
High	Wildland Fire Monitoring	Map past areas where ordnance has been used and develop pre-suppression plans on how to deal with wildland fire suppression in these areas.	x	x	x	x	x

Project Information			Year				
Priority	**Standard Project Category**	**Project Title**	**FY 07**	**FY 08**	**FY 09**	**FY 10**	**FY 11**
High	Wildland Fire Monitoring	Research causes of fire ignitions on USAG-AK to identify areas of high fire occurrence				x	
High	Wildland Fire Monitoring	Research weather patterns influencing fire behavior and historical weather analysis for each land unit of USAG-AK.	x				
High	Wildland Fire Monitoring	Update fire history map of USAG-AK.			x		
High	Wildland Fire Monitoring	Update fire maps with military special use areas and fire management options for these areas.	x				
High	Wildland Fire Monitoring	Update fuels map of USAG-AK.			x		
High	Wildland Fire Planning	Develop Geographic Information System for military fire management office and for use on incidents with current data, maps, photos, suppression options, and restrictions.	x	x	x	x	x
High	Wildland Fire Planning	Develop plans and fuel treatment projects to reduce the threat of fires starting on military lands and impact areas and burning onto adjacent lands of high resource value.		x			
High	Wildland Fire Planning	Develop plans for proposed prescribed fires on USAG-AK.	x	x	x	x	x
High	Wildland Fire Planning	Develop standard operation procedures for each area unit of USAG-AK to assist firefighters and Incident Commanders in establishing priorities, making decisions, dealing with ordnance issues.	x	x	x	x	x
High	Wildland Fire Planning	Identify and assess fuel management strategies for urban/wildland interface areas.	x	x	x	x	x
High	Wildland Fire Pre-Suppression	Identify and use fuel reduction treatments to reduce the threat of wildland fire at the urban/wildland interface, military structures, selected training areas, and cultural resources.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop and disseminate procedures for detection and reporting of fires.	x	x	x	x	x
High	Wildland Fire Pre-Suppression Activities	Develop more effective means of calculating fire weather indices for localized training areas and implement a program of relaying fire danger ratings to training units.	x	x	x	x	x
Med	Erosion Control and Streambank Stabilization	Bulldog Trail Widening Phase 2-5	x	x	x	x	x
Med	Erosion Control and Streambank Stabilization	M16 Record Range (widen service roads to 20 feet)	x				

Project Information			Year				
Priority	**Standard Project Category**	**Project Title**	**FY 07**	**FY 08**	**FY 09**	**FY 10**	**FY 11**
Med	Erosion Control and Streambank Stabilization	M16 Record Range Berm erosion control (144) berms	x				
Med	Fish and Wildlife Habitat Improvement	Moose Habitat Enhancement	x	x	x	x	x
Med	Forest Inventory / Monitoring	Forest Inventory	x	x	x	x	x
Med	Inventory/Monitoring	Bat Inventory and Roosting Survey	x				
Med	Inventory/Monitoring	Bat Monitor	x	x	x	x	x
Med	Inventory/Monitoring	Fauna Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Flora Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Moose Telemetry Survey	x	x	x		
Med	Inventory/Monitoring	Small Mammal Survey		x	x		
Med	Inventory/Monitoring	Soils Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Spawning salmon surveys on Campbell Creek	x	x	x	x	x
Med	Inventory/Monitoring	Spawning salmon surveys on Chester Creek	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Surface Water Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Topography Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Vegetation Communities Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Monitoring	x	x	x	x	x
Med	Inventory/Monitoring	Wetlands Planning Level Survey	x	x	x	x	x
Med	Inventory/Monitoring	Winter Track Surveys	x	x	x	x	x
Med	Inventory/Monitoring	Wolf population estimation using non-invasive genetic methods	x	x	x	x	x
Med	Inventory/Monitoring	Wolverine population estimation using non-invasive genetic methods	x	x	x	x	x
Med	Inventory/Monitoring	Wood Frog Survey	x	x	x	x	x
Med	Outreach	Write AK Post Stories	x	x	x	x	x
Med	Population Management	Moose Harvest Data Collection	x	x	x	x	x
Med	Population Management	Small Game Harvest Data Collection	x	x	x	x	x
Med	Population Management	Tracking of Nuisance Wildlife Calls	x	x	x	x	x
Med	Wildland Fire Planning	Develop pre-suppression plans for each of the area units of USAG-AK.		x			
Low	Forest Land Improvement	Malemute DZ AK 316 2823 JM AA43	x		x		x
Low	Inventory and Monitoring	Map Winter Trails		x			
Low	Inventory/Monitoring	Aerial Dall Sheep Survey	x	x	x	x	x
Low	Inventory/Monitoring	Ruffed Grouse Drumming Counts	x	x	x	x	x

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DEPARTMENT OF THE ARMY
UNITED STATES ARMY GARRISON, ALASKA

ENVIRONMENTAL ASSESSMENT

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR U.S. ARMY GARRISON ALASKA

FINAL
January 2007

ENVIRONMENTAL ASSESSMENT

UNITED STATES ARMY GARRISON, ALASKA
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

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FINAL FINDING OF NO SIGNIFICANT IMPACT

United States Army Garrison, Alaska Integrated Natural Resources Management Plan

The National Environmental Policy Act of 1969 requires federal agencies to consider potential environmental impacts prior to undertaking a course of action. Within the Department of the Army, the National Environmental Policy Act is implemented through regulations promulgated by the Council on Environmental Quality [40 CFR Parts 1500 – 1508], with supplemental guidance provided by Army National Environmental Policy Act regulations [32 CFR Part 651]. In accordance with National Environmental Policy Act, U.S. Army Garrison, Alaska (USAG-AK) has prepared an environmental assessment to consider the environmental effects of the proposed Integrated Natural Resources Management Plan for USAG-AK lands (Fort Wainwright and Fort Richardson).

Description of Action: The decision is whether to implement Alternative 1: Continue Current Integrated Natural Resources Management Plan without Updates (No Action); Alternative 2: Implement Updated Integrated Natural Resources Management Plan (Proposed Action); or Alternative 3: Suspend Integrated Natural Resources Management Plan.

Under Alternative 2, an off-road recreational vehicle policy sub-alternative must be chosen. These include Sub-Alternative A: Implement limited seasonal, spatial, water level, and weight restrictions on off-road recreational vehicles and motorized watercraft, Sub-Alternative B: Implement moderate seasonal, spatial, water level and weight restrictions, and Sub-Alternative C: Implement significant seasonal, spatial, water level and weight restrictions on off-road recreational vehicles and motorized watercraft.

As individual natural resource projects are initiated, this Environmental Assessment would be utilized as the foundation for NEPA analysis. Project-specific assessments would tier from it to account for site-specific conditions and impacts.

Procedure: Analysis of potential environmental impacts associated with each alternative action is set forth in the *United States Army Garrison, Alaska Integrated Natural Resources Management Plan Environmental Assessment.* The findings of this Environmental Assessment are incorporated into this decision document. Potential issues were determined to be relevant if they fell within the scope of the proposed action, if they suggested different actions, or if they influenced the decision on the proposed action. Early in the process, USAG-AK and agency stakeholders or experts were informed of the proposed action, and their comments were solicited. Solutions responsive to public concerns and questions were integrated into elements of the proposed action. Public review was conducted from December 17, 2006 through January 15, 2007. No public comments were received during the public comment period.

Discussion of Anticipated Environmental Impacts for Implementation of the U.S. Army Garrison, Alaska Proposed Integrated Natural Resources Management Plan: Under Alternative 1 (no action alternative), policies enacted under previous Integrated Natural Resources Management Plans would continue without any new standard procedures or new projects. Alternative 1 would provide minor to beneficial impacts to soils, vegetation, water, fish and wildlife, public access and recreation, cultural resources. Alternative 2 would put in place 16 new procedures and policies and five years of projects designed to support the military mission and conserve the environment. Sub-Alternative 2a would provide mostly beneficial impacts to soils, vegetation, water and fish and wildlife resources and minor to beneficial impacts to recreation and access, and cultural resources. Sub-alternative 2b would provide beneficial impacts to soils, vegetation, water and fish and wildlife resources, and cultural resources, but would provide moderate impacts to recreational users. Sub-alternative 2c would provide

beneficial impacts to soils, vegetation, water and fish and wildlife resources, and cultural resources, but would provide severe impacts to recreational users. Alternative 3 would stop all natural resource management and would result in severe negative impaets to all resources and publie aeeess and recreation and would result in the inability to sustain lands for military purposes. After consideration of potential environmental impacts, community concerns, and U.S. Army Alaska mission requirements, Alternative 2a: Implement Updated Integrated Natural Resources Management Plan including revised recreation use policy was found to offer the best course of action.

Mitigation Measures: Natural resources management actions are mitigation for other activities, including mitigation for the Army mission in Alaska, Army Transformation in Alaska, Alaska Land Withdrawal, and other aetions. Therefore, no additional mitigation measures are proposed.

Conclusion: In an attempt to balance the Army's training and readiness responsibilities and land stewardship obligations, USAG-AK has chosen Alternative 2: Implement Updated Integrated Natural Resources Management Plan as its preferred alternative and Sub-Alternative A: implement limited seasonal, water level, and weight restrictions on off-road recreational vehicles and motorized watercraft. Based on a review of the information contained in this Environmental Assessment, USAG-AK determined that implementation of the updated Integrated Natural Resources Management Plan, as set forth in Alternative 2, is not a major federal action that would signifieantly affect the quality of the environment within the meaning of Section 102(2)(C) of the National Environmental Poliey Act of 1969, as amended. Aecordingly, the preparation of an environmental impact statement for this proposed action is not required.

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LIST OF ACRONYMS

CFR	Code of Federal Regulations
NEPA	National Environmental Policy Act
USAG-AK	United States Army Garrison, Alaska
USARTRAK	U.S. Army Alaska Recreation Tracker

CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The Army recognizes that training to doctrinal standards under realistic combat conditions will affect the environment. Providing premiere and realistic training opportunities requires training lands to be in good environmental condition. Integrated Natural Resources Management Plans support the military mission by protecting and enhancing the training lands upon which the mission is critically dependent.

The Army's commitment to natural resource management is emphasized in Army Regulation 200-3 (*Natural Resources–Land, Forest, and Wildlife Management*), which, along with the Sikes Act (amended according to the Sikes Act Improvement Amendments of 1997), requires that Integrated Natural Resource Management Plans be developed and maintained for all Army installations. Integrated Natural Resource Management Plans are tools that help natural resource personnel implement ecosystem management on Army lands. They evaluate how an installation's natural resource program objectives fit within the framework of the military mission and integrate with the environmental program as a whole, outdoor recreation, the National Environmental Policy Act, cultural resources, surrounding communities, and neighboring lands.

The USAG-AK Integrated Natural Resource Management Plan outlines goals and objectives in five general areas: stewardship, military readiness, quality of life, compliance, and program integration. The main goal of the Integrated Natural Resource Management Plan is to support U.S. Army Alaska military activities while maintaining a functional, healthy ecosystem. Integrated Natural Resource Management Plans also describe recreational opportunities associated with natural resources, thus supporting the Army's commitment to both the quality of life and the communities of excellence programs.

1.2 PURPOSE AND NEED FOR ACTION

Natural resources are managed on Army lands to ensure a realistic training environment for military use while maintaining biodiversity and ecosystem functions. The Integrated Natural Resource Management Plan is an integral part of natural resource planning on Army lands in Alaska. Not only is the Integrated Natural Resource Management Plan required by the Sikes Act and Army regulations for all installations with significant natural resources, it also is a valuable tool for resource managers to guide their decisions regarding management. Development and implementation of policies and procedures described in the Integrated Natural Resource Management Plan ensure sustainability of Army lands. Failure to implement the Integrated Natural Resource Management Plan could result in loss of long-term sustainability of military lands, thus preventing the Army from being able to meet its training mission and from providing for biodiversity, ecosystem function, and recreational use.

Additionally, the Integrated Natural Resource Management Plan is needed to present natural resource goals, objectives, and policies that USAG-AK will use to manage military and nonmilitary use of Army lands in Alaska. The intent of the Integrated Natural Resource Management Plan is to openly express these goals, objectives, and policies to the public. Standard procedures and the off-road recreational vehicle policy are summarized below:

Standard Procedures
Standard operating procedures that provide consistency among management approaches, increase oversight, and streamline processes and procedures are needed to increase the efficiency of the natural

resource program. Establishing standard operating procedures will ensure standardization of technique and allow natural resource managers to more easily predict possible impacts and to determine efficacy of project procedures.

Off-Road Recreational Vehicle Policy

The need for a clarification of the recreational use policy on Army lands is necessary because pressure on training lands is increasing. Transformation and modularity have nearly doubled the number of soldiers stationed in Alaska. In addition, additional limitations on recreational use on State and federal lands are increasing the demand for recreational use of Army lands. Nowhere is this demand felt more acutely than on Tanana Flats Training Area. Army Regulation 200-3 states that "All land and water areas will be closed to off-road recreational use by motorized off-road recreational vehicles and watercraft except those areas and trails, which are determined suitable and specifically designated for such under the procedures established in the Integrated Natural Resources Management Plan".

The fen wetland ecosystem in Tanana Flats Training Area can certainly be considered to have natural characteristics of fragile and unique nature. The wetland ecosystem on Tanana Flats Training Area provides key habitat to fish and wildlife species. Off-road recreational vehicle and motorized watercraft use have high potential to disturb nesting or breeding of wildlife, especially those species protected under Endangered Species Act or Migratory Bird Treaty Act. While there are no species breeding or nesting in Tanana Flats Training Area that are on the federally endangered species list, there are numerous species in Tanana Flats Training Area protected by the Migratory Bird Treaty Act. There is enough evidence to suggest that off-road recreational vehicle or motorized watercraft use may cause excessive or irreversible damage to this unique and important wetland system to warrant certain limitations to recreational use that will allow long term recreational use to continue while minimizing the adverse affects on the environment.

Per Army Regulation 200-3, Army lands may be designated for one or more types of off-road recreational vehicle use in response to a demonstrated need providing there are sufficient suitable areas available. The Army desires to allow the maximum amount of recreational access and use while meeting the following objectives:

- Recreational use policy must not create short or long term impacts on the military mission.
- Recreational use policy must provide soldier and public safety.
- Recreational use policy must meet national security objectives.
- Recreational use policy must comply with all applicable laws and regulations.
- Recreational use policy must minimize damage to the environment.

Lands that may not be designated for one or more types of off-road recreational vehicle use are as follows:

- Areas restricted for security or safety purposes, such as explosive ordnance impact areas.
- Areas containing geological and soil conditions, flora or fauna, or other natural characteristics of fragile or unique nature, which would be subject to excessive or irreversible damage by use of off-road recreational vehicles.
- Areas where the use by a type or types of off-road recreational vehicles would cause unequivocal and irreversible damage or destruction as a result of such use, provided, however, that types of off-road recreational vehicles not causing such damage or destruction may be permitted to use such areas.
- Areas that are key fish and wildlife habitats, as identified under environmental consideration.

- Areas that contain archeological sites, historic sites, petroglyphs, pictographs, or areas set aside for their scenic value, and areas in which noise would adversely affect other uses or wildlife resources.
- Areas in or adjacent to outdoor recreation areas where noise or vehicle emissions would be an irritant to users of the outdoor recreation area.
- Noise sensitive areas such as housing, schools, churches, or areas where noise or vehicular emissions would be an irritant to inhabitants.
- Areas where off-road recreational vehicle use would disturb nesting or breeding of wildlife, especially those protected under Endangered Species Act or Migratory Bird Treaty Act.

1.3 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT AND DECISION TO BE MADE

The *National Environmental Policy Act of 1969*, CFR 1500-1508 and the *Environmental Analysis of Army Actions; Final Rule* [32 CFR Part 651 Fed. Reg. 29 March 02 (67FR15289-15332)] require the Army to assess the environmental impacts of the proposed action.

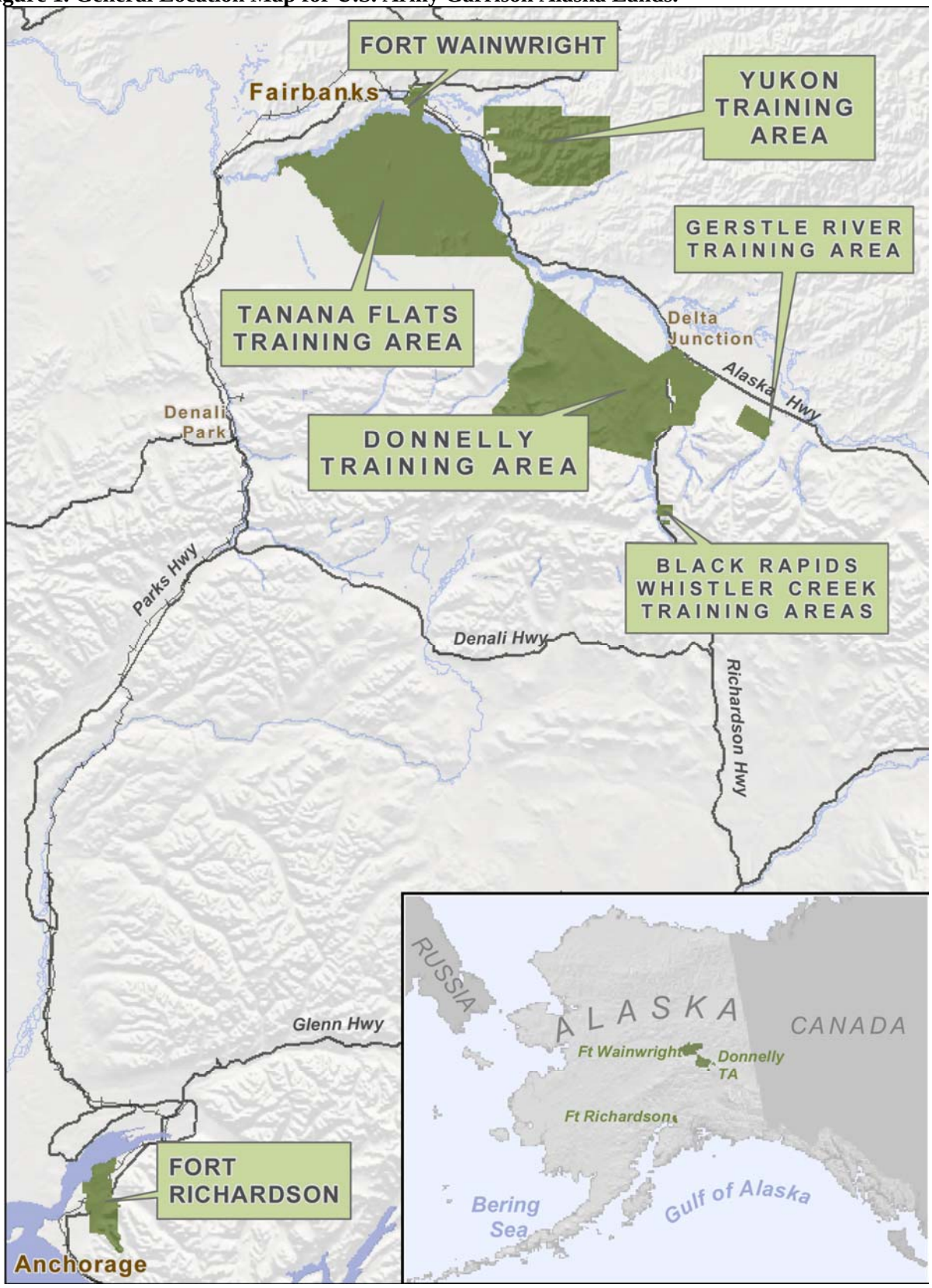
This Environmental Assessment will provide the decision-maker with the information necessary to evaluate the environmental, cultural, and socioeconomic impacts associated with the alternatives as directed by National Environmental Policy Act. The selection of an alternative will take into account technical, economic, and political feasibility; environmental and social issues; and the ability to meet objectives of the U.S. Army Alaska mission. The following alternatives have been evaluated for presentation to the decision-maker:

- Alternative 1: Continue Current Integrated Natural Resource Management Plan without Updates (No Action)
- Alternative 2: Implement Updated Integrated Natural Resource Management Plan (Proposed Action)
    - Sub-Alternative A: Implement limited seasonal, water level, and weight restrictions on off-road recreational vehicles and motorized watercraft (Preferred Alternative).
    - Sub-Alternative B: Implement moderate seasonal, spatial and weight restrictions on off-road recreational vehicles and motorized watercraft.
    - Sub-Alternative C: Implement significant seasonal, spatial and weight restrictions on off-road recreational vehicles and motorized watercraft.
- Alternative 3: Suspend Integrated Natural Resource Management Plan

1.3.1 USAG-AK Lands Covered by this Environmental Assessment

This Environmental Assessment applies to all natural resource management actions initiated and executed on USAG-AK lands. USAG-AK encompasses approximately 1.6 million acres of fee simple and public domain lands withdrawn for military use in interior and south central Alaska. USAG-AK is organized into two primary installations, Fort Wainwright and Fort Richardson. Fort Wainwright includes the Fort Wainwright Main Post, Tanana Flats Training Area, Yukon Training Area, Donnelly Training Area, Gerstle River Training Area, Black Rapids and Whistler Creek Training Area, and other small parcels. Fort Richardson consists of the Fort Richardson North Post, South Post and other small parcels.

Figure 1. General Location Map for U.S. Army Garrison Alaska Lands.



1.3.2 Issues Analyzed

The scope of this document includes potential environmental, cultural, and socioeconomic impacts of the proposed action. Resource categories analyzed for the proposed action and alternatives include soil resources, vegetation, wetlands, water resources, wildlife and fisheries, public access and recreation, and cultural resources. The discussion will include the environmental impacts of the alternatives; environmental effects (adverse or beneficial) should the proposed action be implemented including direct, indirect, long-term, and short-term impacts; any irreversible or irretrievable commitments of resources; and cumulative impacts.

Since public access and recreation is of great importance to the public, this topic is discussed in greater detail than the less controversial issues.

1.3.3 Issues Considered and Eliminated from Analysis

The following issues would not be affected by the proposed action and have been eliminated from further analysis:

- **Environmental Health and Safety Risks for Children**
  Executive Order 13045 (1994), *Protection of Children from Environmental Health Risks and Safety Risk*s, requires identification and assessment of environmental health and safety risks that may disproportionately affect children. In accordance with the mandates of Executive Order 13045, all Integrated Natural Resource Management Plan projects would be reviewed to ensure no dangerous or hazardous activities occur near schools or childcare facilities.

- **Environmental Justice**
  Executive Order 12898 (1994), *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Population*s, directs each federal agency to identify and address any disproportionately high and adverse environmental effects of its programs, policies, and activities on minority populations and low-income populations. There are no foreseeable environmental justice impacts resulting from the proposed action.
- **Hazardous Materials**
  Should contamination be discovered during implementation of Integrated Natural Resource Management Plan projects, appropriate soil remediation measures would be utilized. The methods would be agreed upon by the Army, Environmental Protection Agency, and the Alaska Department of Environmental Conservation. Standards spill prevention measures would be taken during construction. An Excavation Clearance Request (dig permit) must be obtained prior to any excavation activities. Any discovered contaminated soil or groundwater would not be removed from construction sites without written approval from an authorized USAG-AK representative. All operations involving hazardous waste would be accomplished in accordance with USAG-AK Pamphlet 200-1, Environmental Quality: Hazardous Waste, Used Oil, and Hazardous Materials Management, and Alaska Department of Environmental Conservation regulations.
- **Noise**
  Neither the proposed action nor its alternatives would change noise environment conditions. Short-term noise would be confined to the general site areas, primarily in the immediate vicinity of construction or forestry equipment. Impacts would be mitigated by limiting the hours during which construction equipment could be operated.
- **Socioeconomics**
  The estimated cost of fully implementing the proposed action is $43,729,905 over the 2007-2011 time period for Fort Richardson and Fort Wainwright. This would contribute approximately

$5,000,000 annually to the Fairbanks economy and $3,000,000 annually to the Anchorage economy. This would provide a beneficial impact through an increase of local commercial opportunities. However, considering military payroll, civilian payroll, and non-personnel expenditures, implementing the Integrated Natural Resource Management Plan would represent an insignificant increase in revenue to the local economies. The proposed action may result in the permanent or temporary hiring of additional personnel, but would not affect public facilities, utilities, or services.

1.4 INTERAGENCY COORDINATION

Scoping for the Integrated Natural Resource Management Plan is an ongoing process. The Integrated Natural Resource Management Plan is a living document that was originally prepared in 1998 and was revised in 2002. The Sikes Act requires interagency coordination between the Army, U.S. Fish and Wildlife Service and Alaska Department of Fish and Game. These agencies are all signatories on the Integrated Natural Resource Management Plan. Because almost all of USAG-AK lands are withdrawn from the public domain for military use, USAG-AK also invites Bureau of Land Management to be a signatory on this plan. The annual interactions and meetings with both the public and with these agencies during the 2002 update serve as scoping for this Environmental Assessment.

Other agencies and organizations represented in the ongoing scoping and review process include National Marine Fisheries Service, U.S. Forest Service, Natural Resources Conservation Service, and Alaska Department of Natural Resources Soil and Water Conservation Districts. Based on issues raised in previous public review in 2002, USAG-AK held scoping meetings in December 2005 and January 2006 with the Interior Alaska Airboat Association and Alaska tribes, including Native Village of Eklutna, Native Village of Tanacross, Eagle Village IRA Council, Northway Traditional Council, Native Village of Tetlin, Healy Lake Traditional Council, Dot Lake Village Council and Nenana Native Association.

1.5 OTHER ENVIRONMENTAL ANALYSES RELEVANT TO THE ACTION

Previously prepared Environmental Assessments and environmental impact statements that address ongoing actions, issues, or baseline data at USAG-AK are used as background information or are incorporated by reference into this Environmental Assessment as appropriate. Examples of such National Environmental Policy Act documentation are:

- *Final Legislative Environmental Impact Statement for Alaska Army Lands Withdrawal Renewal.* January 1999.
- *Final Environmental Impact Statement for Transformation of U.S. Army Alaska*, Vol. 1-2, February 2004.
- *U.S. Army Alaska Integrated Training Area Management Program Management Plan Environmental Assessment.* April 2005.
- *Final Environmental Impact Statement for the Construction and the Operation of a Battle Area Complex and a Combined Arms Collective Training Facility,* Vol. 1-2, June 2006.

The most recent National Environmental Policy Act documents and management plans can be found on USAG-AK's conservation website (www.usarak.army.mil/conservation).

1.6 ORGANIZATIONAL STRUCTURE OF THIS ENVIRONMENTAL ASSESSMENT

This Environmental Assessment was prepared in accordance with the Council on Environmental Quality

regulations (40 CFR Parts 1500-1508) and *Environmental Effects of Army Actions; Final Rule*. It contains Chapter 1: Purpose and Need for Action; Chapter 2: Description of Proposed Action and Alternatives; Chapter 3: Description of the Affected Environment and Environmental Consequences; Chapter 4: Preparers and Contributors; Chapter 5: References; and Chapter 6: Agencies and Individuals Contacted; and Appendices. Where appropriate, the chapters present separate information for Fort Richardson, Fort Wainwright (Main Post, Tanana Flats Training Area, and Yukon Training Area) and Donnelly Training Area (including Gerstle River and Black Rapids Training Area).

CHAPTER 2: DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 DETAILED DESCRIPTION OF THE ALTERNATIVES

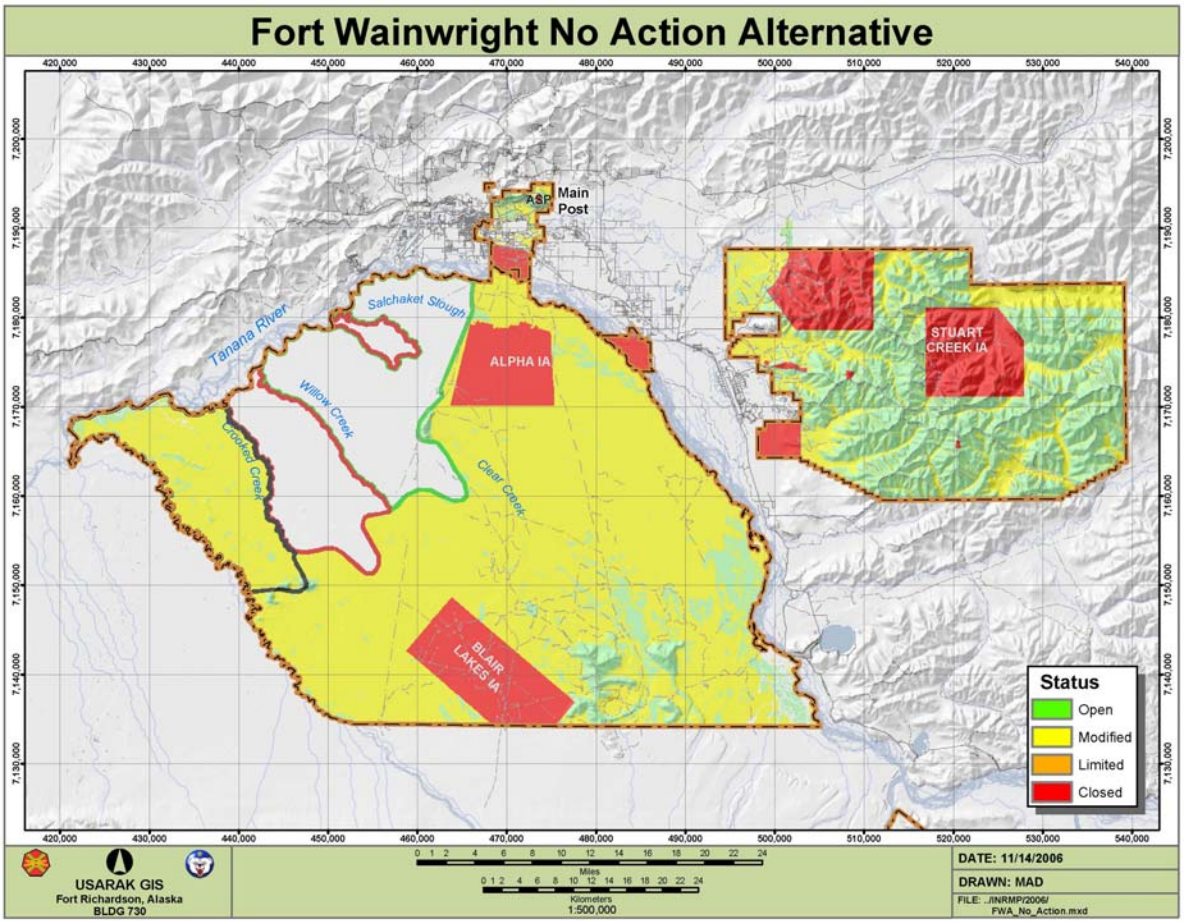
2.1.1 Alternative 1: Continue Current Integrated Natural Resources Management Plan without Updates (No Action)

Under the No Action Alternative, natural resources management on Fort Richardson, Fort Wainwright, and Donnelly Training Area (as outlined in the respective Integrated Natural Resource Management Plans written for the time period 2002-2006) would continue to be utilized on each installation. As a result, U.S. Army Alaska installations would be out of compliance with the Sikes Act and Army Regulation 200-3 which stipulates that installation natural resources management plans are to be reviewed annually and any major revisions of all parts of an Integrated Natural Resource Management Plan will be accomplished at least every 5 years. Projected Integrated Natural Resources Management Plan projects for the next five years include approximately 1,000 acres of vegetation management and 500 acres of trail upgrades and road and pad hardening (Appendix A). NEPA analysis and documentation is required under this alternative but has not been consistently fulfilled for Integrated Natural Resources Management Plan projects. Alternative 1 represents how the Integrated Natural Resources Management Plan is currently implemented at USAG-AK.

Under the No Action Alternative, no standard procedures would be implemented. Many of the procedures proposed in the 2007-2011 Integrated Natural Resource Management Plan are currently used to manage natural resources, but these procedures are not standardized. Use of these non-standardized procedures would continue under Alternative 1. Under the No Action Alternative, the Memorandum of Agreement (fish and wildlife cooperative plan) with U.S. Fish and Wildlife Service and Alaska Department of Fish and Game would not be updated. The current version would continue without the resolution of many outstanding issues. The Memorandum with Bureau of Land Management would also not be updated, which currently only applies to half of USAG-AK lands. The No Action Alternative would not enact a house log program or forest timber policy. With no Integrated Wildland Fire Management Plan, USAG-AK would remain out of compliance. New procedures to protect beluga whales and bison and their habitat would not be put into place. Under Alternative 1, prescribed burning as a method of improving habitat and reducing hazard fuel loading would continue, but standard procedures for prescribed burning (as detailed in Volume II, Annex C, Integrated Wildland Fire Management Plan and Volume III, Section SC3.2.1, Use of Prescribed Fire) would not be enacted.

Under the No Action Alternative, no recreational access policy would be created, with no new recreational use categories to communicate to the public safety and access issues. The No Action Alternative would continue the restriction of all activities (except for research) in the currently closed areas, including the lower fen study area and the areas between Willow Creek and Crooked Creek. All other areas outside of the closed study areas and impact areas would be primarily classified as shown in Figure 2.

Figure 2. Current Recreational Use Management Policy on Tanana Flats Training Area



Under the No Action Alternative, no new special interest areas would be created and none of the current areas, which afford no additional protection to species or their habitats, would be discontinued. The subsistence policy for USAG-AK lands would remain unclear. Finally, no new natural resource management projects would be implemented on USAG-AK lands.

2.1.2 Alternative 2: Implement Updated Integrated Natural Resources Management Plan (Proposed Action)

Under Alternative 2, natural resources management on Fort Richardson, Fort Wainwright, and Donnelly Training Area would be implemented as described in the 2007-2011 Integrated Natural Resources Management Plan. Actions proposed under this alternative include 16 actions in the 2007-2011 USAG-AK Integrated Natural Resource Management Plan that were not included or addressed in previous Integrated Natural Resource Management Plans and supporting NEPA documentation. These changes are listed in Table 1 as well as the standard procedures necessary to implement the action and the location of the action's description within the Integrated Natural Resource Management Plan.

Table 1. Changes to the Integrated Natural Resource Management Plan, Standard Procedures Used, and Location of Description.

Changes to the 2007-2011 Integrated Natural Resource Management Plan	Type of Action	Standard Procedures Used	Description Location
Format change	Administrative	None	Integrated Natural Resource Management Plan Vol. 1, Executive Summary
Standard Procedures	Standard operating procedures	See Table 2	Integrated Natural Resource Management Plan Vol. 3, Supplements
Separate Programmatic Environmental Assessment	Administrative	None	Integrated Natural Resource Management Plan Vol. 1, Executive Summary; This Environmental Assessment
Fish and Wildlife Cooperative Plan	Revision to clarify fish and wildlife protection, nuisance control, and off-road vehicle procedures	Survey and Monitoring, Fish and Wildlife Management, Institutional Controls	Integrated Natural Resource Management Plan Vol. 2, Annex A, Appendix AA.1
Natural and Cultural Resources Memorandum of Agreement	Revision to clarify authority for vegetation management between the Bureau of Land Management and USAG-AK	Ecosystem Management, Survey and Monitoring, Management, Institutional Controls	Integrated Natural Resource Management Plan Vol.2, Annex A, Appendix AA,2
Forest Timber Policy	Revision to clarify timber disposal procedures and require BMPs during timber sales, clearing, and construction	Watershed Management, Forestry and Wildfire Management	Integrated Natural Resource Management Plan Vol. 2, Annex C, C3.1.1
House Log Program	New program established	House Log Program	Integrated Natural Resource Management Plan Vol.2, Annex C, C3.1.2
Integrated Wildland Fire Management Plan	Existing plan integrated into Integrated Natural Resource Management Plan to meet new Army requirement	Forestry and Wildfire Management	Integrated Natural Resource Management Plan Vol. 2, Annex C, C2.2
Beluga Whales	Increased monitoring, habitat protection, live-fire restrictions	Survey and Monitoring, Fish and Wildlife Management	Integrated Natural Resource Management Plan Vol. 2, Annex D, D3.1.1
Bison	Clarification of existing procedures	Survey and Monitoring, Fish and Wildlife Management	Integrated Natural Resource Management Plan Vol. 2, Annex D, D3.1.2
Recreational Access	New check-in process	Installation access policy, USARTRAK	Integrated Natural Resource Management Plan Vol. 2, Annex E, E2.1

Changes to the 2007-2011 Integrated Natural Resource Management Plan	Type of Action	Standard Procedures Used	Description Location
Recreational Use Management Areas	Clarification of existing procedures	Off-Road Recreational Vehicle Policy	Integrated Natural Resource Management Plan Vol. 2, Annex E, E2.5.5.2
Tanana Flats Recreational Use Policy for Training Areas 202 and 203	Delineation of new recreation management area	Off-Road Recreational Vehicle Policy	Integrated Natural Resource Management Plan Vol. 2, Annex E, E3.1.2.2
Special Interest Areas	Clarification of existing procedure	Fish and Wildlife Management	Integrated Natural Resource Management Plan Vol. 2, Annex F, F3.1.3
Subsistence	Clarification of subsistence on Army land	Wildlife Harvest, Installation Access Policy	Integrated Natural Resource Management Plan Vol. 2, Annex E, E2.4
Ecosystem Management Prescriptions	Specific projects proposed for 2007-2011 planning period (see appendix)	All. See Table 2	Integrated Natural Resource Management Plan Vol. 4

Standard Procedures

Under Alternative 2, standard procedures would be implemented. Many of the procedures proposed in the 2007-2011 Integrated Natural Resource Management Plan are currently used to manage natural resources, but these procedures have not been standardized. Table 2 lists all the standard procedures that would be used to implement the 2007-2011 Integrated Natural Resource Management Plan. The impacts of some of these procedures were previously assessed in the *Integrated Training Area Management Program Management Plan Environmental Assessment* (USAG-AK 2005). Procedures not previously addressed in the Integrated Training Area Management Environmental Assessment, or procedures with impacts expected to be different than described in the Integrated Training Area Management Environmental Assessment, are assessed in this Environmental Assessment. The resources affected by each standard procedure are also listed in the table. A more detailed list of standard procedures and their impacts to the resource areas analyzed in this environmental assessment are found in Appendix C. The implementation of standard operating procedures and best management practices for the natural resource program would provide consistency among management approaches, increase oversight, and streamline processes and procedures to improve program efficiency. The management plan would provide the standardization necessary to allow natural resources to more easily predict possible impacts of projects and to determine efficacy of project procedures. As individual Integrated Natural Resources Management Plan projects are identified, this Environmental Assessment would be utilized as the foundation for NEPA analysis. A checklist (Appendix D) would be used to determine whether additional NEPA analysis is warranted. If it is warranted, project-specific assessments would tier from this Environmental Assessment to account for local conditions and impacts. An example of a tiered Record of Environmental Consideration can be found in Appendix E.

Under this alternative, the *USAG-AK 2007-2011 Integrated Natural Resources Management Plan* would facilitate the assessment of impacts for Integrated Natural Resources Management Plan project NEPA compliance. The implementation of standard operating procedures and best management practices would result in impacts being more predictable and assessment potentially more thorough. Documentation of the standard operating procedures and best management practices would help ensure future NEPA documents for Integrated Natural Resources Management Plan projects are more efficient and consistent. Information from the *USAG-AK 2007-2011 Integrated Natural Resources Management Plan* and this

Environmental Assessment could be incorporated by reference in successive NEPA documents. While this would be beneficial to institutional and administrative aspects of the natural resources management program, it would not noticeably affect environmental or social resources. The assessment of this alternative is focused on the analysis of the standard procedures that are listed in Table 2.

Table 2. Standard Procedures, Location of NEPA Analysis, and Resources Affected.

Standard Procedure[1]	Location of NEPA Analysis[2]	INRMP Location	Resource Affected and/or Extent[3]
Ecosystem Management	This Environmental Assessment	Volume I, Section 3.1; Volume III, Section SA	Soil, Vegetation, Water Resources, Wildlife and Fisheries, Public Access and Recreation, Cultural Resources
Survey and Monitoring	This Environmental Assessment	Volume III, Section SB	Soil, Vegetation, Water Resources, Wildlife and Fisheries
Resource Management			
Watershed Management			
Soils Management	USAG-AK 2005	Volume I, Section 3.2.2; Volume II, Annex B, Section SC2.1	Soil, Vegetation, Water Resources, Cultural Resources
Vegetation Management	USAG-AK 2005	Volume I, Section 3.2.4; Volume II, Annex B, Section SC2.2	Soil, Vegetation, Water Resources, Wildlife and Fisheries, Cultural Resources
Wetlands Management	USAG-AK 2005	Volume I, Section 3.2.5; Volume II, Annex B, Section SC2.3	Water Resources, Wildlife and Fisheries
Water Resources Management	USAG-AK 2005	Volume I, Section 3.2.3; Volume II, Annex B, Section SC2.4	Water Resources, Wildlife and Fisheries
Forestry and Wildland Fire Management			
Prescribed Burning	This Environmental Assessment	Volume I, Section 3.3.2; Volume II, Annex C, Section C.2.2; Volume III, Section 3.2.2	Soil, Vegetation, Water Resources, Wildlife and Fisheries, Cultural Resources, Air Quality (Prescribed burning up to 80,000 acres per burn or 800,000 cumulative acres)
Timber Sales	This Environmental Assessment	Volume I, Section 3.3.1; Volume II, Annex C, Section 2.1; Volume III, Section SC3.1	Soil, Vegetation, Water Resources, Wildlife and Fisheries, Cultural Resources (Sale area up to 250 acres or 750 cumulative acres)
Firewood/Personal Use	This Environmental Assessment	Volume I, Section 3.3.1; Volume II, Annex C, Section 2.1; Volume III, Section SC3.1	Soil, Vegetation, Water Resources, Wildlife and Fisheries, Cultural Resources (Use area up to 50 acres or 250 cumulative acres)
Reforestation	This Environmental Assessment	Volume I, Section 3.3.1; Volume II, Annex C, Section 2.1; Volume III, Section SC3.1	Soil, Vegetation, Water Resources, Wildlife and Fisheries, Cultural Resources

Standard Procedure[1]	Location of NEPA Analysis[2]	INRMP Location	Resource Affected and/or Extent[3]
Urban Forestry	This Environmental Assessment	Volume I, Section 3.3.1; Volume II, Annex C, Section 2.1; Volume III, Section SC3.1	Vegetation, Wildlife and Fisheries
Forest Health	This Environmental Assessment	Volume I, Section 3.3.1; Volume II, Annex C, Section 2.1; Volume III, Section SC3.1	Vegetation, Wildlife and Fisheries, Cultural Resources (Removal to control insects or disease up to 250 acres)
House Log Program	This Environmental Assessment	Volume I, Section 3.3.1; Volume II, Annex C, Section 2.1; Volume III, Section SC3.1	Soil, Vegetation, Water Resources, Wildlife and Fisheries (Use area up to 25 acres or 75 cumulative acres)
Wildfire Management (includes fuel breaks)	USAG-AK 2005	Volume I, Section 3.3.2; Volume II, Annex C, Section C.2.2; Volume III, Section 3.2	Soil, Vegetation, Water Resources, Wildlife and Fisheries, Cultural Resources (Fuel breaks up to 250 acres or 1,250 cumulative acres)
Fish and Wildlife Management			
Wildlife Harvest	This Environmental Assessment	Volume I, Section 3.4.3, Volume II, Annex D, Section 2.3.1.5, Volume III, Section SC4.2	Wildlife and Fisheries, Public Access and Recreation, Cultural Resources
Habitat Improvement	USAG-AK 2005	Volume I, Section 3.4.3, Volume II, Annex D, Section 2.3.2, Volume III, Section SC4.2	Wildlife and Fisheries, Vegetation, Water Resources
Fish Stocking	This Environmental Assessment	Volume I, Section 3.4.3, Volume II, Annex D, Section 2.3.1.1, Volume III, Section SC4.2	Wildlife and Fisheries
Fish Harvest	This Environmental Assessment	Volume I, Section 3.4.3, Volume II, Annex D, Section 2.3.1.5, Volume III, Section SC4.2	Wildlife and Fisheries, Public Access and Recreation
Pike Removal	This Environmental Assessment	Volume I, Section 3.4.3, Volume II, Annex D, Section 2.3.1.4, Volume III, Section SC4.2	Wildlife and Fisheries, Public Access and Recreation
Outdoor Recreation Management			
Trespass Structure Abatement Program	This Environmental Assessment	Volume III, Section SC5	Soil, Water Resources, Public Access and Recreation
Installation Access Policy	This Environmental Assessment	Volume I, Section 3.5.1; Volume III, Section SD4.1	Public Access and Recreation
USARTRAK	This Environmental Assessment	Volume II, Section 3.5.1; Volume III, Section SD4.1	Public Access and Recreation

Standard Procedure[1]	Location of NEPA Analysis[2]	INRMP Location	Resource Affected and/or Extent[3]
Land Use Policy	This Environmental Assessment	Volume III, Section SD4.2	Public Access and Recreation
Outreach	USAG-AK 2005	Volume I, Section 3.5.8; Volume III, Section SE	Soil, Vegetation, Water Resources, Wildlife and Fisheries, Public Access and Recreation, Cultural Resources

[1] The standard procedures are described in Integrated Natural Resource Management Plan Volume 3, Supplements.
[2] Cumulative = Life of Integrated Natural Resource Management Plan (2007-2011)
[3]Resources may be affected either beneficially or adversely.

Prescribed Fire
Under Alternative 2, standard procedures for prescribed burning as a method of improving habitat and reducing hazard fuel loading would be implemented. Standard procedures for prescribed burning (Volume II, Annex C, Integrated Wildland Fire Management Plan and Volume III, Section SC3.2.1, Use of Prescribed Fire) are already approved and used by the Bureau of Land Management Alaska Fire Service. These procedures are also followed by USAG-AK and are therefore included in the 2007-2011 Integrated Natural Resources Management Plan as a standard procedure.

Off-Road Recreational Vehicle Policy
The recreational use policy as proposed in the 2007-2011 Integrated Natural Resources Management Plan is shown below and applies to all sub-alternatives of Alternative 2. All land and water areas will be closed to off-road recreational use by motorized off-road recreational vehicles except those areas and trails, which are determined suitable and specifically designated for such under the procedures established in the Integrated Natural Resources Management Plan and analyzed in this Environmental Assessment. All areas that are determined open for recreational use may be closed temporarily during periods of military use. All users must daily check in through USARTRAK to determine if areas are open to recreational use. USAG-AK uses the following classification system to describe recreation areas on the installation.

***Open Use Area*:** Open to all types of off-road recreational vehicles. Open to all other recreational activities year round.

Frozen (6+ inches of snow cover)**:** No restrictions for any off-road recreational vehicles when soil is frozen.

Unfrozen summer conditions: During unfrozen conditions, off-road recreational vehicles over 1500 lbs (road vehicles, dune buggies, Argo's, small unit support vehicles etc.) must stay on existing roads and trails. No restrictions for off-road recreational vehicles under 1500 lbs (all terrain vehicles, snowmachines, dirt bikes etc.). Motorized watercraft must stay within existing open water channels.

Modified Use Area: Open to all types of off-road recreational vehicles. No restrictions for any off-road recreational vehicles when soil is frozen. All off-road recreational vehicles must stay on existing roads and trails during the summer. Motorized watercraft must stay within existing naturally occurring open water channels. Open to all other recreational activities year round.

Limited Use Area: Open to all non-motorized recreation (hunting, fishing, trapping, hiking, skiing, and berry picking, etc.) year round but are not open to any type of off-road recreational vehicle at any time. Motorized watercraft must stay within existing naturally occurring open water channels.

Special Use Management Area: An area managed for recreational use under specific rules that apply only to that area.

Closed Area: Closed to all recreational activities year round. Closed areas include, but are not limited to, Airfields, Tank Farm, Landfill, Small Arms Ranges, Impact Areas, Ammunition Storage Points, etc.

There are three sub-alternatives being considered for off-road recreational vehicle use as part of the proposed action. These sub-alternatives are described below and summarized in Table 3.

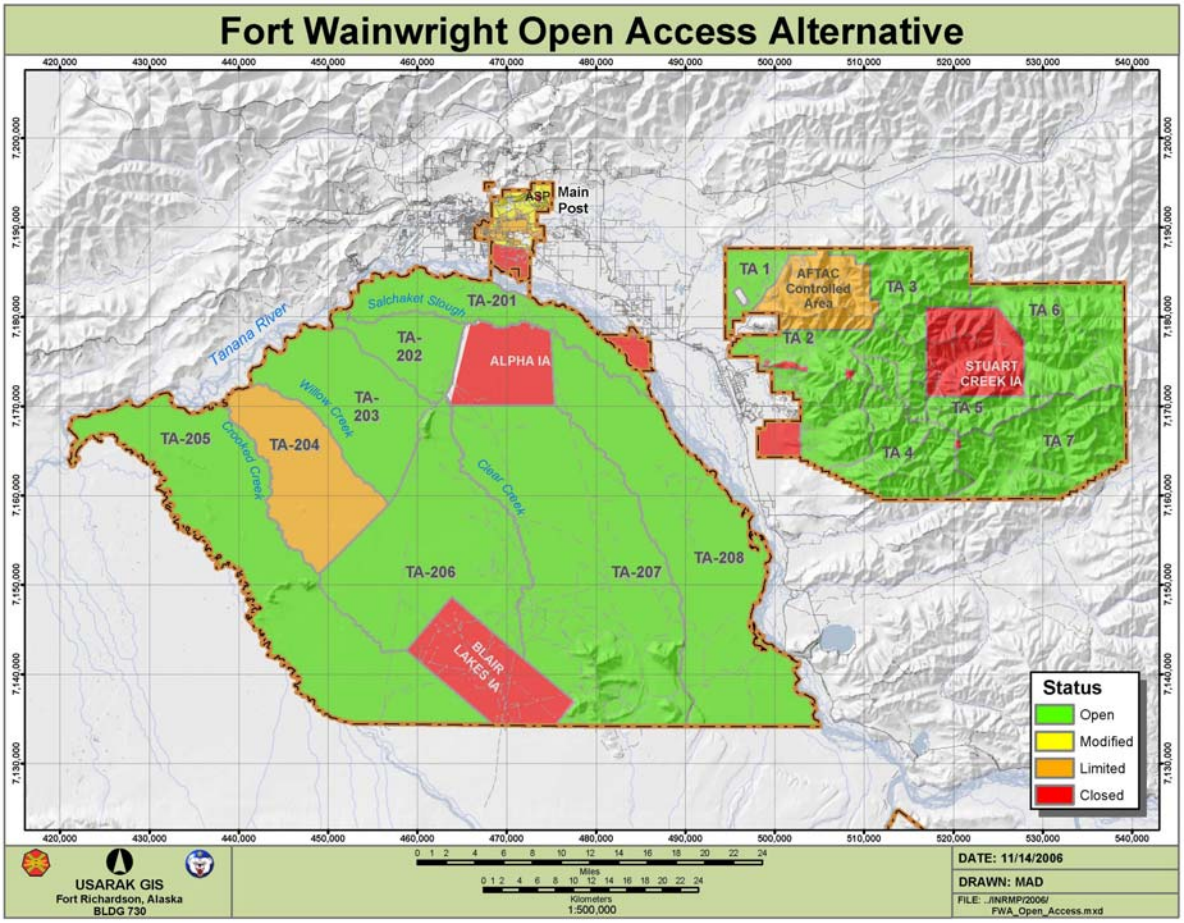
Table 3. Comparison of Tanana Flats Training Area Recreation Sub-Alternatives*

Sub-Alt	Spatial Restrictions	Motorized Seasonal Restrictions	Weight Restrictions	Fen Wetland Water Level Restrictions
A	-TA 204 "Limited" -Other TAs "Open" -Motorized watercraft restricted to open water channels.**	-TA 204: 1 Apr - 30 Oct -Other TAs: *** 1 Apr – 15 Jul	-Frozen: None -Unfrozen: ORRV < 1500lbs – None ORRV > 1500 lbs – Restricted to trails	-TA 202: 16 Jul-15 Aug -TA 203: 1 Apr-15 Aug*** -Other TAs: N/A
B	-TA 204 "Limited" -Other TAs "Modified" -Motorized watercraft restricted to natural open water channels.	-TA 204: 1 Apr - 30 Oct -Other TAs: 1 Apr – 15 Jul	-Frozen: ORRV < 1500lbs – None ORRV > 1500 lbs – Restricted to trails -Unfrozen: All ORRV Restricted to trails	-TA 202: 16 Jul-15 Aug -TA 203: 16 Jul-15 Aug -Other TAs: N/A
C	-All TAs "Limited" -Motorized watercraft restricted to navigable waters of US.	-No motorized recreation use at any time	-No motorized use of any weight	-No motorized watercraft outside of navigable waters of U.S.

*Impact areas closed at all times for all alternatives.
**No spatial restrictions to motorized watercraft in TA 202 and 203 from 16 August – 31 March.
***Primary airboat trails remain open in TA 203 1 May – 15 July dependant on water levels to allow access for bear hunting.

- Sub-Alternative A: Implement limited seasonal, water level, spatial and weight restrictions on off-road recreational vehicles and motorized watercraft (Preferred Alternative). Tanana Flats Training Area would be managed as an "*open use area*" except for the impact areas, which are always "*closed use areas*" as shown in Figure 3. Training Area 204 would be managed as a "limited use area" and would remain closed to all motorized vehicles from 1 April – 30 October. This alternative would also implement additional controls for Tanana Flats Training Areas 202 and 203 regarding motorized watercraft (see below for more details). This alternative would remove the restrictions put in place during the previous Integrated Natural Resources Management Plan.

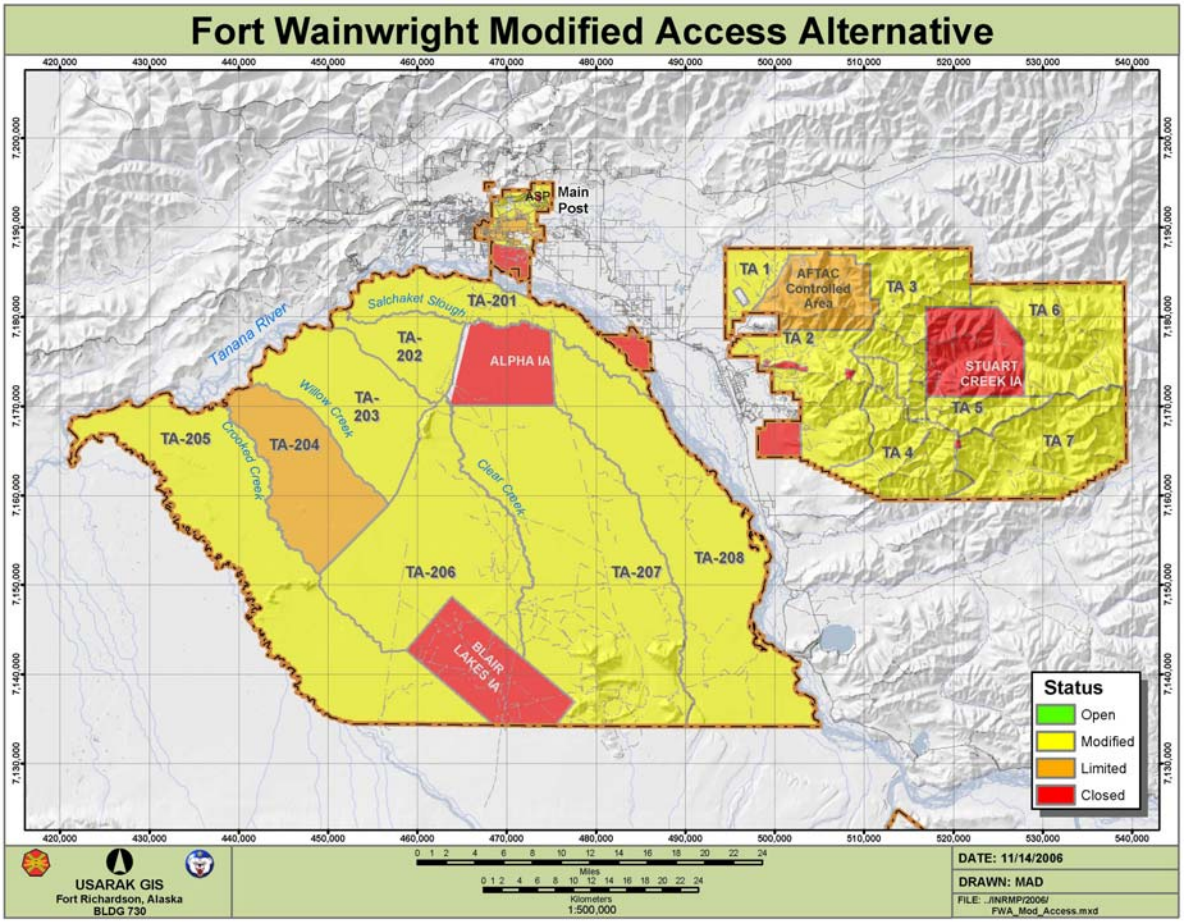
Figure 3. Proposed Recreational Use Policy on Tanana Flats Training Area.



Sub-Alternative A proposes to apply specifically tailored rules to newly created Tanana Flats Training Areas 202 and 203 (bordered by Salchaket Slough, Willow Creek, Tanana River and Bonnifield Trail). These training areas would be open to airboats and other motorized watercraft with no restrictions between 15 August and 1 April each year. Between 1 April and 15 July, training areas 202, 203 and 204 would be off limits to all off-road recreational vehicles, including airboats and other motorized watercraft. Between 15 July and 15 August, access into the lower fen (Training Area 202) and upper fen (Training Area 203) would be managed separately based on water levels. Access into all other training areas during this time would remain open. This Sub-Alternative does not affect rules and regulations for hunting, trapping or fishing. This Sub-Alternative would apply to all recreational users, but does not apply to military training or other official use.

- Sub-Alternative B: Implement moderate seasonal, water level, spatial and weight restrictions on off-road recreational vehicles and motorized watercraft. This alternative would be to impose greater limitations on off-road recreational vehicles and motorized recreational vehicles than currently exist. All areas outside of impact areas would be classified as “modified use areas” (no off –road recreational vehicle traffic) and impact areas are always closed to recreational use.

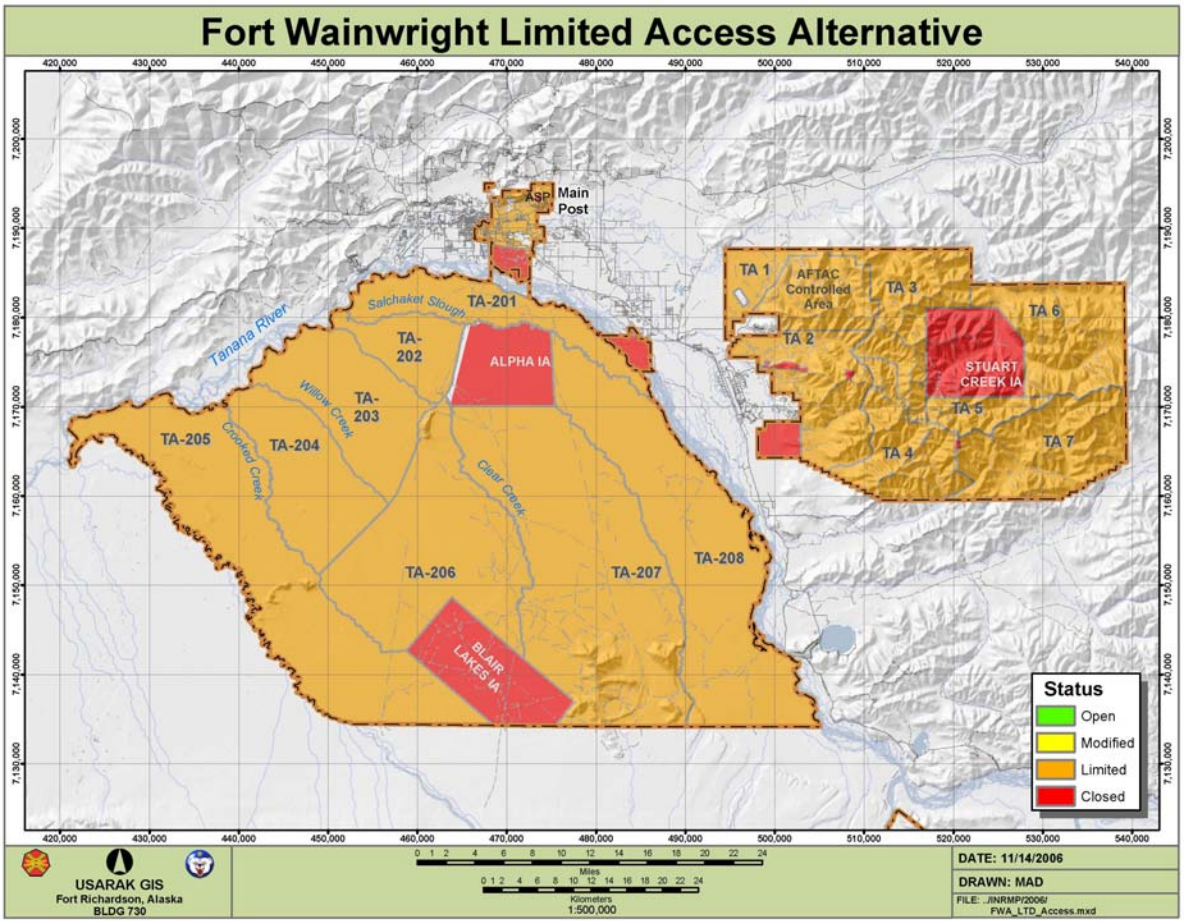
Figure 4. Modified Recreational Use Policy on Tanana Flats Training Area.



- Sub-Alternative B also proposes to apply specifically tailored rules to newly created Tanana Flats Training Areas 202 and 203 (bordered by Salchaket Slough, Willow Creek, Tanana River and Bonnifield Trail). These training areas would be open to airboats and other motorized watercraft with no restrictions between 15 August and 1 April each year. Between 1 April and 15 July, training areas 202, 203 and 204 would be off limits to all off-road recreational vehicles, including airboats and other motorized watercraft. Between 15 July and 15 August, access into the lower fen (Training Area 202) and upper fen (Training Area 203) would be managed separately based on water levels (Figure 4). Access into all other training areas during this time would remain open. This Sub-Alternative does not affect rules and regulations for hunting, trapping or fishing but the greater restrictions on off-road recreational vehicles could reduce the ability to access areas for hunting, trapping and fishing. This Sub-Alternative would apply to all recreational users, but does not apply to military training or other official use.

- Sub-Alternative C: Prohibit off-road recreational vehicles and motorized watercraft in Tanana Flats Training Area. This alternative would be to impose greater restrictions on motorized recreational vehicles than currently exist. All areas outside of impact areas would be classified as "limited use areas" (no off –road recreational vehicle traffic) and impact areas are always closed to recreational use (Figure 5). This Sub-Alternative does not affect rules and regulations for hunting, trapping or fishing but the prohibitions on off-road recreational vehicles would greatly reduce access for hunting, trapping and fishing.

Figure 5. Limited Recreational Use Policy on Tanana Flats Training Area.



2.1.3 Alternative 3: Suspend Integrated Natural Resources Management Plans

Under Alternative 3, Integrated Natural Resource Management Plans would not be implemented at Fort Richardson, Fort Wainwright, and Donnelly Training Area. Integrated natural resource management and a document outlining plans to implement it are required of all military installations by law. Although U.S. Army Alaska does not have the option to discontinue its use, Alternative 3 considers potential environmental impacts if the Integrated Natural Resource Management Plan were not utilized. This provides a useful tool in assessing the effectiveness of Integrated Natural Resource Management Plans in helping sustain continued use of Army training lands. Under this alternative, no natural resources management would be conducted, all natural resource policies would be discontinued, all natural resource programs would be stopped, and no natural resource projects would be conducted. No procedures to implement natural resource management would be used. This Alternative would place no controls at all on military or recreational use.

2.2 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

2.2.1 Summary of Impacts under Each Alternative

Table 4 contains a summary matrix of the alternatives comparing their environmental consequences for the specific resource categories. The table describes the range of environmental consequences of the proposed action and alternatives discussed in Chapter 3. The qualitative terms used in the matrix are generally defined as:

- None – No measurable impacts are expected to occur.
- Minor – Short-term but measurable adverse impacts are expected. Impacts may have slight impact to resource.
- Moderate – Noticeable adverse impacts that would have a measurable effect on resource and are not short-term.
- Severe – Adverse impacts would be obvious short and long term and would have serious consequences to resource. These impacts would be considered significant.
- Beneficial – Impacts would benefit resource.

Table 4. Summary of Environmental Consequences under Each Alternative.

Resource Categories	Alternative 1	Alternative 2	Alternative 3
Soil Resources	Beneficial	Beneficial	Moderate to Severe
Vegetation	Minor to Beneficial	Beneficial	Moderate to Severe
Water Resources	Minor to Beneficial	Beneficial	Moderate to Severe
Wildlife and Fisheries	Minor to Beneficial	Beneficial	Moderate to Severe
Public Access and Recreation	Minor to Moderate	Minor to Beneficial	Beneficial
Cultural Resources and Subsistence	Minor to Beneficial	Minor to Beneficial	Severe
Air Quality	None	Minor to Moderate	None

Table 5 represents the relative impacts resulting from each sub-alternative for Tanana Flats Training Area recreation policy.

Table 5. Summary of Environmental Consequences for Tanana Flats Recreation Policy.

Resource Categories	Alternative 2a	Alternative 2b	Alternative 2c
Soil Resources	Minor to Moderate	Minor to Beneficial	Beneficial
Vegetation	Minor to Moderate	Minor to Beneficial	Beneficial
Water Resources	Minor to Moderate	Minor to Beneficial	Beneficial
Wildlife and Fisheries	Minor to Moderate	Minor to Beneficial	Beneficial
Public Access and Recreation	Minor	Moderate	Severe
Cultural Resources and Subsistence	Minor to Moderate	Minor to Beneficial	Beneficial
Air Quality	None	None	None

2.2.2 Summary of Cumulative Impacts

Analysis of cumulative impacts is required for National Environmental Policy Act documents. Cumulative impacts result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can also result from individually minor but collectively significant actions taking place locally or regionally over a period of time. Impacts of these cumulative activities are discussed in Chapter 3 of this Environmental Assessment.

Activities resulting in cumulative impacts include cantonment and range improvement projects, training activities, and non-military activities such as recreation. The regions of influence for cumulative impacts are not expected to extend beyond the installation boundary. These actions are outlined in the following documents:

- *Final Environmental Impact Statement for Transformation of U.S. Army Alaska*, Vol. 1-2, February 2004.
- *Final Environmental Impact statement for the Construction and Operation of a Battle Area Complex and a Combined Arms Collective Training Facility within U.S. Army Training Lands in Alaska*, Vol. 1-2, June 2006.
- *Environmental Assessment: Conversion of the Airborne Task Force to an Airborne Brigade Combat Team.* Fort Richardson Alaska. September 2005.
- *Environmental Assessment: Integrated Training Area Management Plan*, U.S. Army Garrison, Alaska, April 2005.
- *Environmental Assessment: Power Projection Platform/Strategic Mobility Projects*. Fort Richardson, Alaska. November 2005.
- *Environmental Assessment: Construct Replacement and Infill Family Housing, 2005-2008*, Fort Richardson, Alaska.
- *Environmental Assessment: Installation Fencing Project*. Fort Richardson, Alaska. April 2004.
- *Environmental Assessment: Installation Fencing Project*. Fort Wainwright, Alaska. August 2004.

CHAPTER 3: DESCRIPTION OF THE AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment (existing conditions) and the environmental consequences for the proposed action and alternatives at Fort Richardson, Fort Wainwright, and Donnelly Training Area. Although Donnelly Training Area is sub-unit of Fort Wainwright, it is discussed separately due to its large size.

3.1 SOIL RESOURCES

3.1.1 Affected Environment

Fort Richardson

Glacial moraines, outwash, tidal flats, and peat bogs all provide a wide variety of parent material for soils at the installation (U.S. Army Alaska 2004). The soils are shallow, immature, and deficient in primary plant nutrients and water retention ability, making them a primary limiting factor for vegetative growth during dry periods. In depressions and saturated areas, such as wetlands, surface horizons may be covered with peat (U.S. Army Alaska 2002b). A soil survey of the Anchorage area conducted by the Natural Resources Conservation Service identified two distinct climatic zones along with their associated soil types (Moore 2002) – the lowlands surrounding Anchorage (including Fort Richardson) and the adjacent Chugach Mountains.

Permafrost is found in less than 1% of Fort Richardson. It occurs primarily in patches of forested bogs near Muldoon Road, with some permafrost persisting at high elevations. Although thermokarst has occurred in the forested bog areas, the effects of thermokarst have been negligible (<0.1% of the area over 200 to 300 years) (Jorgenson et al. 2002).

Fort Wainwright

The soils of Fort Wainwright are weakly developed as a result of the cold climate and youth of parent materials. Nearly all soils on Fort Wainwright have some organic layer, except where floods occurred or humans frequently disturbed the surface. Organic matter accumulation, oxidation and reduction of iron, and cryoturbation are the major soil-forming processes in the Fort Wainwright area (Swanson and Mungoven 2001). Engineering soil types found at Fort Wainwright consist dominantly of silt on the hills with wetter and more organic silty soils in the lower drainages (U.S. Army Alaska 2004).

Most of the soils on Main Post are Chena alluvium, formed in unconsolidated silt-gravel mixture. Soils at Tanana Flats Training Area are formed in various unconsolidated materials and are dominated by highly organic, wet, and cold soils (Rieger et al. 1979). The south slopes of the mountainous Yukon Training Area consist of well-drained silt loams, while north-facing slopes are shallow, gravelly, silt loams. Drainage bottoms and depressions consist of shallow gravelly, silt loam covered with a thick layer of peat (BLM and U.S. Army 1994).

On Main Post, permafrost occurs at variable depths with discontinuous permafrost lying just beneath the surface in some areas. Most of Tanana Flats Training Area is underlain by continuous or discontinuous permafrost. Permafrost lies within 20 inches of the surface and is nearly 128 feet thick in some places (U.S. Army Alaska 2002c). Tanana Flats is experiencing rapid and widespread thermokarst as a result of degrading permafrost. Eventually this will dramatically alter the structure and function of ecosystems in permafrost-dominated areas. Yukon Training Area is in the discontinuous permafrost zone of Alaska where perennially frozen ground is widespread. The thick layers of peat typical of both north slopes and drainage bottoms/depressions are underlain by permafrost, while south slopes are generally free of permafrost (BLM and U.S. Army 1994).

Donnelly Training Area

Soils in Donnelly Training Area are primarily derived from glacial activities, modified by streams and discontinuous permafrost, and in many places overlain by loess. Few soils in Donnelly Training Area have been mapped in detail, with the exception of areas near the Main Post cantonment area. The Natural Resources Conservation Service has identified 12 soil associations in the area (Rieger et al. 1979). Soils in the northern, west-central, and eastern portions of Donnelly Training Area West were identified as silt-loam associations, while Donnelly Training Area East was described as a shallow silt-loam over gravelly sand. Engineering soil types found at Donnelly Training Area are highly variable due to the diverse geomorphic landscape and sediments comprising it (U.S. Army Alaska 2004).

Soils at Gerstle River Training Area are described as poorly drained with mottled gray, gravelly silt or sandy loam beneath the thick surface mat of peat. Soils on the western portion of Black Rapids Training Area were developed in glacial till and most are poorly drained. Bedrock outcrops on peaks and ridges and loose rubble occur in many high areas. Well-drained soils have developed in very gravelly material at the foot of high ridges and on some south-facing slopes and hilly moraines at lower elevations. The eastern portion of the training area is classified only as rough mountainous land in a 1979 exploratory survey (Rieger et al. 1979).

Permafrost is highly patchy and irregular on Donnelly Training Area, particularly in morainal areas where abrupt changes in slope and aspect occur (Jorgenson et al. 2001). The highly variable sediment types, complicated topography, and micro-climatic variability make prediction of permafrost difficult. Isolated patches of permafrost are found in areas under sandy gravel from 2 to 40 feet below ground level, with thickness varying from 10 to 118 feet. A relatively large portion of the landscape has discontinuous permafrost, but existing and abandoned river channels, lakes, wetlands, and other low-lying areas are likely permafrost-free (Williams 1970). Gerstle River Training Area has a shallow permafrost table (below 10 to 20 inches) that occupies a broad outwash plain (Rieger et al. 1979). Permafrost conditions at Black Rapids Training Area are assumed to be similar to those of Donnelly Training Area.

3.1.2 Environmental Consequences

Alternative 1: Continue Current Integrated Natural Resources Management Plans without Updates (No Action)

Under this alternative, the current Integrated Natural Resource Management Plan would continue to be implemented without revision. The Integrated Training Area Management program (within the watershed management category) is a component of the Integrated Natural Resource Management Plan that would have the most impacts to soil resources. Impacts of Integrated Training Area Management projects were found to be minor to beneficial in a previous assessment (USAG-AK 2002). A complete description is available in the *Integrated Training Area Management Program Management Plan Environmental Assessment* (USAG-AK 2005). Impacts to soil resources from all Integrated Natural Resource Management Plan programs were found to be beneficial in the Environmental Assessment portion of the 2002-2006 Integrated Natural Resource Management Plans. No additional impacts to soil resources are expected to occur under this alternative.

Continuing the current off-road recreational vehicle policy, which includes continuing the recreational user impact study and the restriction of all activities in the closed areas of Tanana Flats Training Area would be beneficial to soil resources by preventing impacts from recreation.

Alternative 2: Implement Updated Integrated Natural Resources Management Plan (Proposed Action)

Under this alternative, the 2007-2011 Integrated Natural Resource Management Plan revision would be implemented. This includes current soil management projects described in the 2007-2011 Integrated Natural Resource Management Plan, plus those described in Section 2.1.2. Over 6,550 acres of erosion control and streambank restoration projects would be completed to rehabilitate and repair soils. The overall impacts to soil resources would be beneficial.

Standard procedures that would have beneficial impacts include ecosystem management, survey and monitoring, soils and vegetation management, reforestation. These procedures would benefit soils mainly by preventing erosion. The trespass structure abatement program would benefit soils because it involves the cleanup of trespass structures, which sometimes include hazardous waste.

Procedures with potential adverse impacts to soils include timber sales, firewood collection, house log program, wildfire management, forest health procedures or any other action that involves the removal of vegetation. Timber cutting and vegetation removal is estimated to affect 11,350 acres, and prescribed burning is estimated to affect 646,500 total acres for Fort Richardson, Fort Wainwright, and Donnelly Training Area in the five-year planning period (2007-2011). Fire provides both positive and negative impacts to the environment. Short term loss of vegetation from fire can increase the risk of soil erosion but can also infuse added nutrients to the soil. A majority of the prescribed burning would take place at Donnelly Training Area. These impacts are expected to be minor and temporary due to the use of best

management practices to stabilize the soil and reduce or prevent erosion. Standard procedures for prescribed burning (Volume II, Annex C, Integrated Wildland Fire Management Plan and Volume III, Section SC3.2.1, Use of Prescribed Fire) are already approved and used by the Bureau of Land Management Alaska Fire Service.

Sub-alternative A
This sub-alternative would remove restrictions put in place during the recreational impact study and implement a new recreation policy for Tanana Flats Training Area. Sub-Alternative A would manage Tanana Flats Training Area as an "*open use area*", open to all types of off-road recreational vehicles and recreational activities year round. There would be no restrictions for any off-road recreational vehicles when soil is frozen. During unfrozen conditions, off-road recreational vehicles over 1500 lbs (road vehicles, dune buggies, Argo's, small unit support vehicles etc.) must stay on existing roads and trails. No restrictions for off-road recreational vehicles under 1500 lbs (all terrain vehicles, snowmachines, dirt bikes etc.). Motorized watercraft must stay within existing open water channels except within Training Areas 202 and 203 after July 15 when water levels are sufficient to avoid damage to soils and vegetation. Sub-Alternative A would have minor to moderate impacts to soils because no changes to airboat use areas would occur except that airboats would be allowed back in areas closed during the recreation impact study. Water levels would be monitored and airboat use would not be allowed if water levels are too low. This would serve to prevent impacts to wetlands, to include wetland soils.

Sub-alternative B
This sub-alternative would remove restrictions put in place during the recreational impact study and implement a new recreation policy for Tanana Flats Training Area which would be managed as a "*modified use area*". This sub-alternative would be open to all types of off-road recreational vehicles with no restrictions for any off-road recreational vehicles when soil is frozen. All off-road recreational vehicles must stay on existing roads and trails during the summer. Motorized watercraft must stay within existing naturally occurring open water channels. Open to all other recreational activities year round. Minimal impacts to soils would result under Sub-alternative B due to moderate limitations on off-road recreational vehicles and airboats. Less recreational use would present fewer impacts to wetland soils.

Sub-alternative C
Under Sub-Alternative C, Tanana Flats Training Area would be managed as a "*limited use area*", which is open to all non-motorized recreation (hunting, fishing, trapping, hiking, skiing, and berry picking, etc.) year round but is not open to any type of off-road recreational vehicle at any time. Motorized watercraft must stay within existing naturally occurring open water channels. Sub-alternative C would result in the beneficial impacts to soils as all off-road recreational vehicle traffic and motorized watercraft would be restricted from entering Tanana Flats Training Area.

Alternative 3: Suspend Integrated Natural Resources Management Plans
Under this alternative, no components of the Integrated Natural Resource Management Plan would be implemented. Failure to implement the Integrated Natural Resource Management Plan could result in loss of sustainability over the long term, which would ultimately result in a negative impact to the Army mission. No controls at all on recreational use in Tanana Flats would have a moderate to severe impact on soil resources.

Cumulative Impacts
Past impacts to soil resources resulted from munitions, maneuvers, stream crossings, construction, and use of roads and trails. Impacts included permafrost melting and soil erosion, rutting, and compaction (U.S. Army Alaska 2004). In 1994, U.S. Army Alaska began efforts to counteract the cumulative effects of military training by establishing the Integrated Training Area Management program.

The greatest impacts to soil resources on installation lands are from military training activities, resulting in similar impacts from past activities described above. Although all current and planned construction activities have the potential for minor adverse impacts to soils through disturbance or removal, best management practices would minimize and mitigate these impacts. Overall, the long-term cumulative impacts to soils resulting from Integrated Natural Resource Management Plan projects proposed under the proposed action would be beneficial.

3.2 VEGETATION

3.2.1 Affected Environment

USAG-AK lands are within the polar domain of Bailey's (1995) ecoregion classification system, which is characterized by low temperatures, severe winters, and relatively low precipitation. These lands are also classified within the subarctic division, which is influenced by cold snowy climate. Dominant forests in the subarctic division are boreal subarctic forests, open lichen woodlands, and taiga.

The Aleutian Shield Fern (*Polystichum aleuticum)* is the only plant species currently listed as federally threatened or endangered in Alaska (USFWS 2004). This species is not found on Fort Richardson, Fort Wainwright, or Donnelly Training Area (U.S. Army Alaska 2002a,b,c).

Additional information can be found in the *Transformation of U.S. Army Alaska Final Environmental Impact Statement* (U.S. Army Alaska 2004).

Fort Richardson

Many different vegetative communities are present on Fort Richardson, from coastal salt marsh and boreal forest types to high alpine tundra, talus slopes, shrub lands, snow beds, heaths, and meadows. An ecological survey of Fort Richardson conducted by Jorgensen et al. (2002) indicates the installation is covered by forest (55.3%), scrub lands (23.7%), barren lands (5.5%), human disturbed lands (13.1%), bog and wetland (1.6%), meadow (0.7%) and water (0.5%). Forest types include white spruce, paper birch, and quaking aspen in upland sites; cottonwood and poplar along principle streams with black spruce in wetter areas; and white spruce, mountain hemlock, and balsam poplar along tree lines. A floristic inventory of Fort Richardson also conducted by Lichvar et al. (1997) included vascular plants, ferns and fern allies, the more common mosses, liverworts, and lichens. The inventory documented 561 vascular species (representing approximately 30% of Alaska's vascular flora types) and 239 non-vascular species. A complete inventory of flora found on Fort Richardson can be found in Fort Richardson's Integrated Natural Resource Management Plan (U.S. Army Alaska 2002b).

The Alaska Natural Heritage Program (2005) tracks rare vascular plant species in Alaska, approximately 21 of which are known to occur on Fort Richardson (U.S. Army Alaska 2002b). Some alpine and wetland areas contain plant species that are considered rare in Alaska or globally imperiled (Lichvar and Sprecher 1998b). USAG-AK also lists three types of vascular plants found on Fort Richardson as species of concern: *Viola selkirkii* is rare in Alaska, *Taraxacum carneocoloratum* is taxonomically questionable but is rare globally and in Alaska, and *Saxifraga adscendens oregonensis* whose status is secure globally but is considered to be rare and imperiled in Alaska. No legal protection is conferred by these listings.

Fort Wainwright

An ecological survey (Jorgensen et al. 1999) of Fort Wainwright (including Main Post, Tanana Flats Training Area and Yukon Training Area) identified 49 vegetation types and indicated the installation

consisted primarily of forest (53.4%), scrub lands (17.5%), tundra (<0.1%), barren lands (0.4%), meadows, bogs, and fens (22.6%), miscellaneous plant community complexes (5.4%), and water (0.8%). Tanana Flats Training Area alone consisted of 41.5% forest and Yukon Training Area, 83.3%. Alder and willow scrub communities are common at Main Post, Tanana Flats Training Area, and Yukon Training Area. Alpine tundra occurs above 2,500 feet in Yukon Training Area, with barren lands occurring at higher altitudes. Vegetation communities found at Fort Wainwright are also described in Racine et al. (1997). Due to the variable climate, as well as physiographic and geographic patterns throughout the region, a wide variety of forest types exist, including White Spruce, Paper Birch, Balsam Poplar, Black Spruce, Spruce/Hardwood, and Quaking Aspen.

A floristic inventory of Fort Wainwright Main Post, Tanana Flats Training Area, and Yukon Training Area identified 217 non-vascular species and 561 vascular species (plants, ferns and fern allies, common mosses, liverworts, and lichens) (Racine et al. 1997). The vascular species represent about 26% of Alaskan vascular plants, as identified by Hultén (1968).

At least 16 species of concern, as identified by the Alaska Natural Heritage Program (2005), are known to occur on Fort Wainwright (U.S. Army Alaska 2002c). USAG-AK has listed four plants of concern that are prioritized for Army posts in interior Alaska: *Apocynum androsaemifolium* is rare in Alaska, *Dodecatheon pulchellum pauciflorum* is taxonomically questionable but is imperiled in Alaska, *Festuca lenensis* is rare in Alaska and globally imperiled, and *Minuartia yukonensis* which is secure globally but is uncommon in Alaska.

Donnelly Training Area

An ecological survey (Jorgensen et al. 2001) reported vegetation cover as forest (29.0%), scrub lands (58.1%), tundra (4.4%), barren lands/partially vegetated (3.6%), human disturbed (0.6%), and water (4.3%). Forests cover at Donnelly Training Area is diverse and includes pure stands of spruce, hardwoods, and spruce/hardwood mixtures. The dominant types include white spruce, paper birch, quaking aspen, balsam poplar, black spruce, and spruce/hardwood. Scrub communities (typically composed of alder, willow, and dwarf birch) occur at high mountain elevations, in small stream-valley bottoms, and as pioneer vegetation on disturbed sites. Dense thickets of scrub communities exist along floodplains or disturbed sites such as gravel pits, road shoulders, rights-of-way, and military trails (U.S. Army Alaska 1980). Most barren areas on Donnelly Training Area are located on gravel bars along the Delta River, the Little Delta River Delta Creek, Jarvis Creek, and Granite Creek (Jorgensen et al. 2001). Barren lands also occur above tree line, along ridges, and adjacent to rivers and streams. Higher elevation sites along the southern portion of Donnelly Training Area support moist tundra, which grades into alpine tundra and then into barren land.

A floristic inventory of Donnelly Training Area (Racine et al. 2001) did not include all possible taxa on post but identified 497 vascular species, representing about 26% of Alaskan vascular plants, as identified by Hultén (1968). At least 18 species of rare vascular plants on Donnelly Training Area are being monitored by the Alaska Natural Heritage Program (2005). Two plant species of concern, *Carex sychnocephala and Dodecatheon pulchellum pauciflorum*, are ranked in USAG-AK's short list of species of concern for ecosystem management.

3.2.2 Environmental Consequences

Alternative 1: Continue Current Integrated Natural Resources Management Plans without Updates (No Action)

Under this alternative, the current Integrated Natural Resource Management Plan would continue to be implemented without revision. The Integrated Training Area Management program (within the watershed

management category) is a component of the Integrated Natural Resource Management Plan that would have the most impacts to vegetation. Impacts of Integrated Training Area Management projects were found to be minor to beneficial in a previous assessment. A complete description is available in the *Integrated Training Area Management Program Management Plan Environmental Assessment* (USAG-AK 2005). Impacts to vegetation from all Integrated Natural Resource Management Plan programs were found to be beneficial in the Environmental Assessment portion of the 2002-2006 Integrated Natural Resource Management Plans. No additional impacts to vegetation are expected to occur under this alternative.

Continuing the current outdoor recreation and use policy including continuing the study for another five years and continued restriction of closed areas in Tanana Flats Training Area would benefit vegetation by limiting recreational use and preventing impacts.

Alternative 2: Implement Updated Integrated Natural Resources Management Plan (Proposed Action)

Under this alternative, the 2007-2011 Integrated Natural Resource Management Plan revision would be implemented. This includes current vegetation management projects described 2002-2006 Integrated Natural Resource Management Plans, plus those described in Section 2.1.2. The overall impacts to vegetation would be beneficial.

Standard procedures that would have beneficial impacts to vegetation include ecosystem management, survey and monitoring, soils and vegetation management, reforestation. These procedures are beneficial because they are designed to stabilize soils, prevent erosion, and protect or enhance vegetation. Proposed vegetation removal is summarized in Table 6 below.

Table 6. Vegetation Removal Proposed in the 2007-2011 Integrated Natural Resource Management Plan.

Vegetation Removal	Average Acres Affected Per Project	Total Acres Affected During Integrated Natural Resource Management Plan Planning Period (2007-2011)	% USAG-AK Land Affected (2007-2011)[1]
Timber Sales	250	2,500	0.157
Firewood/Personal Use	50	750	0.047
Forest Health	250	2,475	0.156
House Log Program	25	650	0.041
Fuel Breaks	250	4,975	0.302
Fuel Reduction	7,500	52,000	3.270

[1]Fort Richardson and Fort Wainwright (including Donnelly Training Area) totals approximately 1,590,000 acres.

Prescribed burning is an effective and efficient means to reduce or prevent the accumulation of hazardous fuels, where permitted, and will be used as a recognized land management practice for natural resources management and fire protection. Even though vegetation would be altered or removed, forest health and wildfire management projects would benefit vegetation by controlling insects, disease, and reducing the threat of catastrophic wildfires. Vegetation removal and prescribed burning would be used to mimic natural disturbance regimes that have been disrupted after many years of wildfire suppression. These actions would reduce the threat of catastrophic wildfires that are difficult to control by reducing

accumulated fuel. Additionally, the removal of insect infected and diseased tress would benefit vegetation by slowing the spread of infection and reducing fire hazard. Fire provides both positive and negative impacts to the environment. Short term loss of vegetation from fire can increase the risk of soil erosion but can also infuse added nutrients to the soil. These impacts are expected to be minor and temporary due to the use of best management practices to stabilize the soil and reduce or prevent erosion.

The decision to use prescribed burning will be based on the safety hazard involved, the hazard that will develop if burning is not accomplished, the type of natural habitat involved, the impact on the areas total ecosystem, and applicable State and local regulations and coordination with the USAG-AK fire department (Army Regulation 200-3). When applied in a safe, carefully controlled situation, it is often the most cost-effective means of achieving management and natural resource objectives. Well placed prescribed burning units can help prevent large wildfires or slow their advance. Standard methods, safety procedures, burn plan requirements and air quality restrictions for prescribed burning (Volume II, Annex C, Integrated Wildland Fire Management Plan and Volume III, Section SC3.2.1, Use of Prescribed Fire) are summarized in the flowing paragraphs.

Because of the potential for unintended circumstances, extensive planning, coordination, and risk management must be completed prior to ignition of any prescribed burn. Prescribed burns also mimic the important ecosystem functions of wildfire while reducing risk to human environments and other resources. USAG-AK, in cooperation with the Alaska Fire Service, conducts prescribed burns on its installations to improve wildlife habitat, to decrease the potential for ignitions and fire escape from live firing, and to increase the size of military training areas. Prescribed burning on USAG-AK lands will only be executed by qualified individuals.

A Prescribed Fire Burn Plan will be completed for each management ignited prescribed fire. Prescribed Burn Plans describe expected results and the conditions necessary to achieve them as part of a vegetation management program. It shall include at a minimum: (1) a description of the burn unit's physical location, including a map, (2) identification of resource management objectives to be accomplished by the prescribed fire, (3) desired effects and tolerable deviations, (4) a fire prescription containing those key parameters needed to achieve desired results (i.e., acceptable fire behavior, acceptable limits of environmental elements) and provisions to record onsite conditions, (5) actions to minimize prescribed fire emissions, evaluate smoke dispersion, public notification, air quality monitoring, and exposure reduction precautions (6) provisions for weather data collection, acceptable parameters, and forecasts, (7) provisions for public safety and protection of sensitive features, (8) provisions for inter/intra agency pre-burn coordination and, where applicable, public involvement and burn day notification to appropriate individuals, agencies, and the public, (9) provisions for line construction, pretreatment, and holding actions to keep the fire within prescription, (10) identification of contingency actions to be taken if the fire exceeds prescription parameters and/or line holding capabilities and cannot be returned to prescription with project resources, and (11) a risk assessment that portrays an estimation of the probabilities and consequences of success/failure to the approving official. A safety plan and a "go, no-go" checklist are required.

The analysis in this Environmental Assessment covers prescribed fires considered basic or intermediate and includes prescribed fires up to 80,000 acres where the difficulty of achieving resource management objectives is not particularly high or complicated, and where the consequences of project failure are less serious and can be mitigated. This classification also includes prescribed fires where achieving resource management objectives is routine and the probable consequences of project failure are low.

Complex prescribed fire is defined as those where prescribed burning occurs under particularly challenging conditions and/or constraints. This classification includes prescribed fires over 80,000 acres

where the difficulty of achieving resource management objectives is high, or where the consequences of project failure may be serious. These complex prescribed burns would require separate NEPA documentation not tiered of off this Environmental Assessment

Employing these standard methods, safety procedures, burn plan requirements and air quality restrictions for prescribed burning described here and in Volume II, Annex C, Integrated Wildland Fire Management Plan and Volume III, Section SC3.2.1, Use of Prescribed Fire, the use of prescribed fire has long term beneficial impacts to vegetation, natural resources and human health and safety. Table 7 provides a summary of potential acreages burned during the INRMP 2007 – 2011 planning period.

Table 7. Potential Acreage of Prescribed Burns by Training Area

USARAK Training Lands	Prescribed Burns (acres per year)				
	2007	2008	2009	2010	2011
Fort Wainwright Main Post	500	500	500	500	500
Tanana Flats Training Area	34,700	34,700	34,700	34,700	34,700
Yukon Training Area	28,500	28,500	28,500	28,500	28,500
Donnelly East Training Area	10,000	10,000	10,000	10,000	10,000
Donnelly West Training Area	89,000	89,000	89,000	89,000	89,000
Gerstle River Training Area	0	0	0	0	0
Black Rapids Training Area	0	0	0	0	0
Fort Richardson	2,500	2,500	2,500	2,500	2,500

Sub-alternative A

This sub-alternative would remove restrictions put in place during the recreational impact study and implement a new recreation policy for Tanana Flats Training Area. Sub-Alternative A would manage Tanana Flats Training Area as an "*open use area*", open to all types of off-road recreational vehicles and recreational activities year round. There would be no restrictions for any off-road recreational vehicles when soil is frozen. During unfrozen conditions, off-road recreational vehicles over 1500 lbs (road vehicles, dune buggies, Argo's, small unit support vehicles etc.) must stay on existing roads and trails. There are no restrictions for off-road recreational vehicles under 1500 lbs (all terrain vehicles, snowmachines, dirt bikes etc.). Motorized watercraft must stay within existing open water channels except within Training Areas 202 and 203 after July 15 when water levels are sufficient to avoid damage to soils and vegetation. Sub-Alternative A would have minor to moderate impacts to soils because no changes to airboat use areas would occur except that airboats would be allowed back in areas closed during the recreation impact study. Water levels would be monitored and airboat use would not be allowed if water levels are too low. Early season restrictions on motorized watercraft in Training Areas 202, 203 and 204 allow regrowth of vegetation at a critical time tin the plants development. This would serve to limit widespread impacts to wetland vegetation.

Sub-alternative B

This sub-alternative would remove restrictions put in place during the recreational impact study and implement a new recreation policy for Tanana Flats Training Area which would be managed as a "*modified use area*". This sub-alternative would be open to all types of off-road recreational vehicles with no restrictions for any off-road recreational vehicles when soil is frozen. All off-road recreational vehicles must stay on existing roads and trails during the summer and motorized watercraft must stay within existing naturally occurring open water channels. This sub-alternative is open to all other recreational activities year round. Minimal impacts to vegetation would result under Sub-alternative B due to moderate limitations on off-road recreational vehicles and airboats. Less recreational use would present fewer impacts to wetland vegetation.

Sub-alternative C

Under Sub-Alternative C, Tanana Flats Training Area would be managed as a "*limited use area*", which is open to all non-motorized recreation (hunting, fishing, trapping, hiking, skiing, and berry picking, etc.) year round but is not open to any type of off-road recreational vehicle at any time. Motorized watercraft must stay within existing naturally occurring open water channels. Sub-alternative C would result in the beneficial impacts to vegetation as all off-road recreational vehicle traffic and motorized watercraft would be restricted from entering Tanana Flats Training Area.

Alternative 3: Suspend Integrated Natural Resources Management Plans

Under this alternative, no components of the Integrated Natural Resource Management Plan would be implemented. Failure to implement the Integrated Natural Resource Management Plan could result in loss of sustainability over the long term, which would ultimately result in a negative impact to the Army mission. No controls at all on recreational use in Tanana Flats would have moderate to severe impacts to vegetation. Damage to vegetation from military training and recreation would not be monitored and repaired under this alternative. USAG-AK lands would no longer be able to support the military mission. Additionally, the lack of wildlife management and forest health projects would create wildfire hazards.

Cumulative Impacts

Past impacts to vegetation resulted primarily from maneuver training exercises, construction of ranges, and construction of range and cantonment infrastructure. Impacts included clearing vegetation for roads, ranges, drop zones, landing strips, and camp sites. Constructed ranges have often required ongoing vegetation modification and some must remain free of high-standing vegetation, which prevents vegetation from progressing through successionary stages. Construction of designated roads has resulted in reduced off-road maneuver travel and vegetation disturbance (U.S. Army Alaska 2004). In 1994, U.S. Army Alaska began efforts to counteract the cumulative effects of military training by establishing the Integrated Training Area Management program.

The greatest impacts to vegetation on installation lands are from military training activities, resulting in similar impacts from past activities described above. The Integrated Training Area Management program was created to monitor, restore, and repair lands damaged by these activities in order to provide sustained use of military training lands while also achieving long-term environmental sustainability. Integrated Natural Resource Management Plan projects and activities also ensure military personnel are aware of requirements to minimize disturbances to vegetation. Although all current and planned construction activities have the potential for minor adverse impacts to vegetation through disturbance or removal, best management practices would minimize and mitigate these impacts. Overall, the long-term cumulative impacts to vegetation resulting from Integrated Natural Resource Management Plan activities under the proposed action would be beneficial.

3.3 WATER RESOURCES

This discussion of water resources includes wetland resources. Additional discussion of wetlands can be found in Sections 3.1, Soil Resources, and 3.2, Vegetation.

3.3.1 Affected Environment

Fort Richardson

Fort Richardson has 12 named lakes and ponds and several unnamed water bodies. The combined area for the named lakes and ponds is 359 acres. Five relatively large lakes, Clunie, Otter, Gwen, Thompson, and Waldon, are managed for recreational fishing. The waters on Fort Richardson are protected by freshwater use classes A, B and C, as assigned by the State of Alaska.

Ship Creek (from the Glenn Highway bridge to the mouth) is listed on the state's 303 (d) list of impaired waters due to excess fecal coliform bacteria, petroleum hydrocarbon, oil, and grease. A total maximum daily load for fecal coliform has been determined. According to Alaska Department of Environmental Conservation studies, most of the pollutants entered Ship Creek as non-point sources from surface water runoff and groundwater downstream of the post, where the watershed is increasingly urbanized. After compiling and reviewing the data, the state concluded that no cumulative or increasing water quality degradation was occurring in the lower portion of Ship Creek (Alaska Department of Environmental Conservation 1996). Water from Ship Creek is diverted for Fort Richardson, Elmendorf Air Force Base, and the Anchorage Municipality. Ship Creek leaves Fort Richardson at the border with Elmendorf Air Force Base.

Eagle River is a glacial waterway that ends at Eagle River Flats, a 2,165 acre estuarine tidal marsh. Eagle River Flats was removed from the state's list of impaired waters after extensive remediation efforts for white phosphorous were shown to be successful (Alaska Department of Environmental Conservation 2002). This site was placed on the national priorities list for investigation and cleanup of hazardous substances (U.S. Army Alaska 1998).

Industrial activities have had some effects on groundwater. Through monitoring, pollution was found to be associated with underground storage tanks, chemical storage facilities, and chemical dumpsites. Fort Richardson was identified as a CERCLA (Superfund) site. These areas are monitored intensively and no indication of deep groundwater pollution has been detected. Pollution has been minor and localized and no significant risks to human health were found. Water quality has improved recently due to Army restoration projects to mitigate previous damage to the groundwater quality (U.S. Army Alaska 2004).

Wetlands comprise approximately 8% (4,990 acres) of Fort Richardson (Lichvar and Sprecher 1998b). Wetland types on the post include estuarine, marine, palustrine, riverine, and lacustrine. They are classified as Coastal Halophytic Zone, Lowland Forest Wetlands, Lacustrine Wetlands, Alpine, and Subalpine Wetlands.

Fort Wainwright

Overall surface water quality on Fort Wainwright is good. The Chena River has been designated for Class A, B, and C uses. Iron concentrations, which stem from natural sources, exceed state secondary water standards. The Chena River portion that runs through Fairbanks and Fort Wainwright is listed on the state's 303 (d) list for impaired waters. The pollutants of concern are petroleum, hydrocarbons, and sediment. The pollutant source is listed as urban runoff. A total maximum daily load for petroleum and hydrocarbons is expected this year (2006).

Due to its remote location, surface water quality data are not collected for much of Tanana Flats Training Area. Data for the Wood and Tanana rivers upstream and downstream of the training area are used to

estimate water quality. However, since these streams are surface-water and spring-fed (not glacier-fed) it is expected that water quality would differ greatly between these rivers and the streams originating within the training area.

Due to lack of human development and activity on the training area, surface waters on Yukon Training Area are relatively pristine. Water bodies originating within Yukon Training Area flow into the Chena River. The waters meet all primary drinking water standards, and iron is the only parameter to exceed the Alaska state secondary drinking water standards. All of Yukon Training Area's surface waters have low rates of primary and secondary productivity and high water quality.

Groundwater in the Fort Wainwright area contains high levels of metals, especially iron. Elevated arsenic levels are prevalent in the upland areas. These are naturally occurring levels and are not related to human-caused pollution (U.S. Army Corps of Engineers 1994).

Industrial activity on Main Post has caused groundwater pollution associated with underground storage tanks, chemical storage facilities, and chemical dumpsites. These areas were identified and are monitored intensively. Pollution at the sites is localized, and monitoring indicates no deep groundwater pollution. Army restoration projects have mitigated damage to groundwater quality, and practices that led to contamination have been discontinued.

Approximately 42% (6,500 acres) of the Main Post is classified as wetlands, with palustrine, riverine, and lacustrine types (Lichvar and Sprecher 1998a). Bogs, fens, and marshes are distributed over the post.

Wetlands comprise about 74% (483,500 acres) of Tanana Flats Training Area (Lichvar and Sprecher 1998a). Most are classified as Lowland Wet Needleleaf Forest and Lowland Forest and Scrub Thermokarst Complexes.

On Yukon Training Area, wetland can be divided into marshes and shrub wetland. Shrub wetland, also known as bogs, muskeg, and low brush, are associated with slightly higher relief on the edges of marshes, and in poorly drained basins and depressions with cold, waterlogged soils.

Donnelly Training Area

Donnelly Training Area's surface waters are diverse and lie entirely within the Tanana River drainage basin. A majority of the larger streams flowing through the area, such as the Delta River and Jarvis Creek, are glacial.

The volume of surface water flow fluctuates dramatically by season. From October to May, flow is limited to groundwater seepage from aquifers into streams and many small streams freeze solid (zero discharge). Any additional streamflow is converted to winter ice overflow, or "aufeis." Aufeis is an ice sheet that forms on a floodplain in winter when channels freeze solid or are otherwise dammed. The additional water spreads out over the frozen surface and freezes. Aufeis can accumulate several meters in thickness and cover large areas of the floodplain in streams such as the Delta River and Jarvis Creek. Snowmelt typically begins in May and reaches its peak in June, coinciding with the peak melting of glaciers. Flows are greatest during June and July. After July, most of the snow has melted, and rainfall sustains a steady flow during August and September.

The State of Alaska has designated the streams on Donnelly Training Area for all use classes (Nancy Sonafrank, personnal communication 2005). Surface water quality values on Donnelly Training Area meet the state's primary drinking water standards. However, aluminum, iron, and manganese

concentrations were higher than the state's secondary standards (U.S. Army Alaska 2004). High iron concentrations are typical in streams that drain wetland areas high in organic matter (Anderson 1970).

Approximately 68% (431,940 acres) of Donnelly Training Area is wetlands (Lichvar 2000), with palustrine, riverine, and lacustrine types included. The palustrine shrub wetlands are the most common found on the training area. The Delta River glaciated lowlands, lower Delta Creek lowlands, and upper Delta Creek lowlands ecosections support most of the wetlands on Donnelly Training Area. Most wetlands are classified as Lowland Wet Low Scrub and Lowland Tussock Scrub and Bog Lowland Wet Forests.

3.3.2 Environmental Consequences

Alternative 1: Continue Current Integrated Natural Resources Management Plans without Updates (No Action)

Under this alternative, the current Integrated Natural Resource Management Plan would continue to be implemented without revision. The Integrated Training Area Management program (within the watershed management category) is a component of the Integrated Natural Resource Management Plan that would have the most impacts to water resources including wetlands. Impacts of Integrated Training Area Management projects were found to be minor to beneficial in a previous assessment. A complete description is available in the *Integrated Training Area Management Program Management Plan Environmental Assessment* (USAG-AK 2005). Impacts to water resources from all Integrated Natural Resource Management Plan programs were found to be beneficial in the Environmental Assessment portion of the 2002-2006 Integrated Natural Resource Management Plans. No additional impacts to water resources are expected to occur under this alternative.

Continuing the current outdoor recreation and use policy would benefit wetlands and surface water on Tanana Flats Training Area because of the continued restriction of all closed areas and continued study of recreation impacts for another five years.

Alternative 2: Implement Updated Integrated Natural Resources Management Plan (Proposed Action)

Under this alternative, the 2007-2011 Integrated Natural Resource Management Plan revision would be implemented. This includes current water resources and wetlands management projects described in the 2002-2006 Integrated Natural Resource Management Plan, plus those described in Section 2.1.2. The overall impacts to wetlands would be beneficial.

Standard procedures that would have beneficial impacts to water resources include ecosystem management, survey and monitoring, reforestation, and watershed management procedures that protect soil and vegetation to prevent sediment from entering waterways.

Procedures with potential adverse impacts to soils include timber sales, firewood collection, house log program, wildfire management, forest health procedures or any other action that involves the removal of vegetation and disturbance of soils. This impact is expected to be minor due to procedures in place to prevent or minimize these impacts including the use of best management practices described in the Integrated Training Area Management Environmental Assessment (USAG-AK 2005). Timber harvesting in wetlands would occur during winter to prevent wetland impacts. Trees would not be removed within 50 feet of streams. Within the next 50 feet, 50% of trees would be retained to protect surface waters from sedimentation.

Ecosystems in Alaska, particularly Interior Alaska, are dependant on periodic natural disturbances including fire. Fire provides both positive and negative impacts to the environment. Short term loss of vegetation from fire can decrease water quality but can also infuse added nutrients to the soil. These impacts are expected to be minor and temporary due to the use of best management practices to stabilize the soil and reduce or prevent erosion. Standard methods, safety procedures, and air quality restrictions for prescribed burning (Volume II, Annex C, Integrated Wildland Fire Management Plan and Volume III, Section SC3.2.1, Use of Prescribed Fire) are already approved and used by the Bureau of Land Management Alaska Fire Service.

Wildlife management procedures would benefit water resources by reducing the chances of large uncontrolled wildfire that can lead to erosion and reduced water quality.

Trespass structure abatement and removal would be beneficial to wetlands, especially when structures contain hazardous materials.

Sub-alternative A
This sub-alternative would remove restrictions put in place during the recreational impact study and implement a new recreation policy for Tanana Flats Training Area. Sub-Alternative A would manage Tanana Flats Training Area as an "*open use area*", open to all types of off-road recreational vehicles and recreational activities year round. There would be no restrictions for any off-road recreational vehicles when soil is frozen. During unfrozen conditions, off-road recreational vehicles over 1500 lbs (road vehicles, dune buggies, Argo's, small unit support vehicles etc.) must stay on existing roads and trails. No restrictions for off-road recreational vehicles under 1500 lbs (all terrain vehicles, snowmachines, dirt bikes etc.). Motorized watercraft must stay within existing open water channels except within Training Areas 202 and 203 after July 15 when water levels are sufficient to avoid damage to soils and vegetation. Sub-Alternative A would have minor to moderate impacts to wetlands because no changes to airboat use areas would occur except that airboats would be allowed back in areas closed during the recreation impact study. Water levels would be monitored and airboat use would not be allowed if water levels are too low. This would serve to limit widespread impacts to wetlands. Protecting natural and wildlife created dams would help to protect and maintain the natural hydrological systems in Tanana Flats Training Area.

Sub-alternative B
This sub-alternative would remove restrictions put in place during the recreational impact study and implement a new recreation policy for Tanana Flats Training Area which would be managed as a "*modified use area*". This sub-alternative would be open to all types of off-road recreational vehicles with no restrictions for any off-road recreational vehicles when soil is frozen. All off-road recreational vehicles must stay on existing roads and trails during the summer and motorized watercraft must stay within existing naturally occurring open water channels. This sub-alternative is open to all other recreational activities year round. Minor impacts to wetlands would result under Sub-alternative B due to moderate limitations on off-road recreational vehicles and airboats. Less recreational use would present fewer impacts to wetlands.

Sub-alternative C
Under Sub-Alternative C, Tanana Flats Training Area would be managed as a "*limited use area*", which is open to all non-motorized recreation (hunting, fishing, trapping, hiking, skiing, and berry picking, etc.) year round but is not open to any type of off-road recreational vehicle at any time. Motorized watercraft must stay within existing naturally occurring open water channels. Sub-alternative C would result in the beneficial impacts to wetlands as all off-road recreational vehicle traffic and motorized watercraft would be restricted from entering Tanana Flats Training Area.

Alternative 3: Suspend Integrated Natural Resources Management Plans

Under this alternative, no components of the Integrated Natural Resource Management Plan would be implemented. Failure to implement the Integrated Natural Resource Management Plan could result in loss of sustainability over the long term, which would ultimately result in a negative impact to the Army mission. No controls at all on recreational use in Tanana Flats would have moderate to severe impacts to vegetation. Damage to wetlands from military training and recreation would not be monitored and repaired under this alternative. USAG-AK lands would no longer be able to support the military mission. This action would have severe adverse impacts to water quality. In particular, discontinuing watershed management projects would have negative impacts to water resources by not allowing for monitoring, maintenance, or repair of damage; not integrating training with environmental protection; and not educating soldiers about procedures for training near waterways. This would result in sediment in waterways from uncontrolled erosion.

Cumulative Impacts

The region of influence for water resource impacts resulting from the proposed action would be limited to USAG-AK lands and areas immediately adjacent. Past impacts to water resources include sedimentation, explosive munitions training, and localized contamination (U.S. Army Alaska 2004). Current and future construction, training, and non-military activities may all impact water resources. Integrated Natural Resource Management Plan projects would monitor and repair the impacts caused by training and recreation. Additionally, best management practices exist to mitigate construction impacts to water quality. Integrated Natural Resource Management Plan activities would therefore contribute long-term beneficial cumulative impacts to water resources.

3.4 WILDLIFE AND FISHERIES

3.4.1 Affected Environment

Wildlife and fisheries management on USAG-AK lands has traditionally supported recreational and subsistence use, maintenance of populations and habitats, and preservation of biological diversity. Wildlife and fish populations and their habitats are managed cooperatively by USAG-AK, the Alaska Department of Fish and Game, and the U.S. Fish and Wildlife Service.

No federal or state listed threatened or endangered species have been found on USAG-AK lands (U.S. Army Alaska 2002a,b,c). The State of Alaska maintains a list of sensitive species, endangered species, and species of special concern for wildlife. Table 8 lists wildlife species of concern found on USAG-AK lands. These state listed species are not afforded legislative protection (Alaska Department of Fish and Game 1998). More information on wildlife and fisheries can be found in the *Transformation of U.S. Army Alaska Final Environmental Impact Statement* (U.S. Army Alaska 2004).

Table 8. State of Alaska Listing of Species of Concern Found on USAG-AK Lands.

Common Name	Scientific Name	USAG-AK Lands
American peregrine falcon[1]	*Falco pereginus anatum*	Fort Richardson, Occasional Fort Wainwright, Donnelly Training Area
Northern goshawk (southeast population)	*Accipter gentiles laingi*	Occasional Fort Richardson
Olive-sided flycatcher[2]	*Contopus cooperi*	Fort Richardson, Fort Wainwright, Donnelly Training Area
Gray-cheeked thrush	*Catharus minimus*	Fort Richardson, Fort Wainwright, Donnelly Training Area
Townsend's warbler	*Dendroica townsendii*	Fort Richardson, Fort Wainwright, Donnelly Training Area

Common Name	Scientific Name	USAG-AK Lands
Blackpoll warbler	*Dendroica striata*	Fort Richardson, Fort Wainwright, Donnelly Training Area
Brown bear (Kenai Peninsula population)	*Ursus arctos horribilis*	Possible Fort Richardson
Harbor seal	*Phoca vitulina*	Occasional Fort Richardson
Beluga whale (Cook Inlet population)	*Delphinapterus leucas*	Occasional Fort Richardson

Source: Alaska Department of Fish and Game 1998.
[1]Downlisted from the Alaska Endangered Species List.
[2]Category 2 Candidate Species Under Federal Endangered Species Act.

Fort Richardson

Mammals

Large mammals on Fort Richardson include black bear, grizzly bear, moose, and Dall sheep. Small game and furbearers found on Fort Richardson include coyote, lynx, red squirrel, snowshoe hare, hoary marmot, pine marten, beaver, river otter, wolverine, red fox, porcupine, mink, beaver, muskrat, and ermine or short-tailed weasel.

Two wolf packs inhabit the east side of the Glenn Highway and another pack probably occupies the west side, near Eagle River Flats (Kellie Peirce, personal communication 2002). The Ship Creek pack occupies the eastern portion of Fort Richardson, and the Eagle River Flats pack occupies the western portion.

In recent years, beluga whales have been sighted within Eagle River Flats, as far as 1¼ miles up the Eagle River and in Cook Inlet adjacent to Elmendorf Air Force Base. Beluga whales have also been observed pursuing salmon along rivers (Quirk 1994). Harbor seals and orca whales are sighted occasionally.

Avian Species

Surveys have identified 75 species of birds in the tidal salt marsh, including 24 species of waterfowl (U.S. Army Alaska 2004). Additionally, approximately 40 species of passerines and neotropical migratory birds and 6 species of raptors are found at Fort Richardson (Gossweiler 1984; CH2M Hill 1994; Andres et al. 2001; U.S. Army Alaska 2002b; Schempf 1995).

Three species on the list of Priority Species for Conservation are confirmed to be on Fort Richardson (Boreal Partners in Flight Working Group 1999). These include the Northern shrike, varied thrush, and blackpoll warbler. The golden-crowned sparrow, also a priority species, is found on Fort Richardson.

Reptiles and Amphibians

One species of amphibian, the wood frog, is commonly found in bogs, freshwater and saltwater marshes, and lake margins on post. Wood frogs are important prey species for sandhill cranes (CH2M Hill 1994). No reptiles occur on Fort Richardson.

Fisheries

Ten species of fish are found in Fort Richardson's lakes and waterways. Four lakes on Fort Richardson (Clunie, Gwen, Otter, and Walden) are stocked under the Fort Richardson Army Base Subdistrict Plan (Alaska Department of Fish and Game 2002). In addition, chinook and coho salmon are stocked in Ship Creek under the Alaska Department of Fish and Game Enhancement Plan (Alaska Department of Fish and Game 2002)

Wild populations of game fish include king salmon, chum salmon, silver salmon, red salmon, pink

salmon, and Dolly Varden. Fort Richardson's only significant nongame fish are the three-spine stickleback and the slimy sculpin.

Fort Wainwright

Mammals

Large mammals on Fort Wainwright include black bear, grizzly bear, moose, and caribou. Tanana Flats Training Area is particularly important for moose and supports the state's largest population. Caribou have historically used Yukon Training Area and Tanana Flats Training Area, but populations have declined over the years, possibly due to predation and severe winters (U.S. Army Alaska 2004).

Fifteen species of furbearers inhabit Tanana Flats Training Area and Yukon Training Area. These include wolverines, coyotes, lynx, red fox, pine marten, wolves, snowshoe hare, and red squirrel. Other species include muskrat, beaver, and four species of weasel. River otter exist, but they are not common (U.S. Army Alaska 2004).

Known small mammals include five vole species, two lemming species, two species of mice, and four species of shrew. The little brown bat is found in wooded areas and in abandoned buildings. Introduced mammals such as the house mouse, Norway rat, and woodchuck also exist in the cantonment area of Main Post.

Avian Species

Spruce grouse, ruffed grouse, and ptarmigan are common in the region. Grouse hunting is popular at Yukon Training Area and they are also harvested on Main Post. The variety of nongame birds on lands associated with Fort Wainwright includes at least 58 passerines. Benson (1999) observed 61 species of birds during a 1998 survey at Tanana Flats Training Area.

Although no threatened, endangered, or species of special concern were observed, several Priority Species for Conservation (Boreal Partners in Flight Working Group 1999) were observed. In addition, six species of woodpecker, the rock dove, Rufous hummingbird, and belted kingfisher have been observed on these lands.

At least 25 species of waterfowl and 20 species of raptors use Fort Wainwright (BLM and U.S. Army 1994). Twenty-six species of shorebirds, three gull species, and the Arctic tern have also been observed (U.S. Army Alaska 1999). Four species of loon and two types of grebes have been observed to use waterways on Fort Wainwright and associated lands (U.S. Army Alaska 1999).

Reptiles and Amphibians

The wood frog is the only amphibian species found at Fort Wainwright. No reptiles exist on Fort Wainwright.

Fisheries

Most ponds or lakes on Fort Wainwright do not support fish populations during winter. However, a stocking program provides recreational fishing opportunities for the public during summer. Stocked lakes include River Road Pond, Monterey Lake, Weigh Station Ponds 1 and 2, and Manchu Lake.

The Tanana River supports seasonal populations of Arctic grayling, king salmon, chum salmon, sheefish, humpback whitefish, round whitefish, Arctic lamprey, least cisco, Alaska blackfish, burbot, longnose sucker, northern pike, slimy sculpin, and lake chub.

The Chena and Salcha rivers support Arctic grayling, king salmon, chum salmon, sheefish, humpback whitefish, round whitefish, Arctic lamprey, least cisco, Alaska blackfish, burbot, longnose sucker, northern pike, slimy sculpin, and lake chub. These rivers and clear-running tributaries are important spawning areas for summer chum and king salmon. Horseshoe Lake, located in the northwest corner of the Yukon Training Area, supports a native population of northern pike (BLM and U.S. Army 1994).

Donnelly Training Area

Mammals

Large mammals on Donnelly Training Area include black bear, grizzly bear, moose, Dall sheep, caribou, and bison. Donnelly Training Area typically has three or four wolf packs, although the structure, distribution, and numbers of packs in a given area are highly variable. Other furbearers on the training area include lynx, beaver, river otter, pine marten, muskrat, mink, coyotes, red fox wolverine and four species of weasel. Anderson et al. (2000) conducted a small mammal survey at Donnelly Training Area. Eleven species of small mammals were found in this study.

Avian Species

Several upland game species are found on Donnelly Training Area, including three species of both ptarmigan and grouse. Twenty-eight species of ducks and geese use lands and waterways on the training area. Approximately 300,000 sandhill cranes, a large portion of the world's population, migrate through Donnelly Training Area from late April through mid-May.

Anderson et al. (2000) reported sightings of black-backed woodpecker, gray-cheeked thrush, varied thrush, bohemian waxwing, Townsend's warbler, blackpoll warbler, Smith's longspur, and rusty blackbird. The dark-eyed junco, savanna sparrow, Wilson's warbler, and orange-crowned warbler were observed most frequently.

A variety of other bird species are found on Donnelly Training Area including three loon, two grebe, three gull, one tern, one dove, one hummingbird, one kingfisher, and six woodpecker.

Reptiles and Amphibians

Wood frogs are the only amphibians on Donnelly Training Area. No reptiles exist on Donnelly Training Area.

Fisheries

Donnelly Training Area West is within the Fairbanks Management Area for fisheries and Donnelly Training Area East is within the Delta Junction Management Area. Sixteen lakes on Donnelly Training Area, ranging from three to 320 acres, are stocked. Naturally occurring populations of lake chub, northern pike, sculpin, and the northern longnose sucker are found in lakes at Donnelly Training Area (BLM and U.S. Army 1994).

Major streams on Donnelly Training Area are generally silt laden and do not support fisheries. Jarvis Creek and the Delta River are glacially fed and flow from the north side of the Alaska Range to the Tanana River. Downstream of Donnelly Training Area, the Tanana River provides year-round habitat for some species, overwintering habitat for others, and supports migratory species. The mouth of the Delta River is important to chum salmon. Grayling migrate through these glacial streams to clear tributaries to spawn, and a few clear streams provide summer habitat for grayling (Parker 2004).

3.4.2 Environmental Consequences

Alternative 1: Continue Current Integrated Natural Resources Management Plans without Updates (No Action)

Under this alternative, the current Integrated Natural Resource Management Plan would continue to be implemented without revision. Impacts to wildlife and fisheries from Integrated Natural Resource Management Plan programs were found to be beneficial in the Environmental Assessment portion of the 2002-2006 Integrated Natural Resource Management Plans. No additional impacts to wildlife and fisheries are expected to occur under this alternative.

The continued current outdoor recreation and use policy and five year recreational impacts study on Tanana Flats Training Area would be beneficial to wildlife and fisheries because recreational use would be limited.

Alternative 2: Implement Updated Integrated Natural Resources Management Plan (Proposed Action)

Under this alternative, the 2007-2011 Integrated Natural Resource Management Plan revision would be implemented. This includes current wildlife and fisheries management projects described in the 2002-2006 Integrated Natural Resource Management Plan, plus those described in Section 2.1.2. The overall impacts under this alternative would be beneficial.

Standard procedures that would benefit wildlife and fisheries through habitat improvements include ecosystem management, survey and monitoring, watershed management procedures, reforestation, and urban forestry.

Hunting, fishing, and trapping on Army lands are regulated by state statute under the authority of the Alaska Department of Fish and Game. USAG-AK wildlife and fish harvest procedures benefit fish and wildlife by managing harvests for sustained growth and reproduction to ensure optimum harvest levels and protection of all species. Fish stocking and pike removal benefit fisheries by promoting populations of desirable fish species.

Forestry and wildfire management procedures would have minor temporary impacts to wildlife. Ecosystems in Alaska, particularly Interior Alaska, are dependant on periodic natural disturbances including fire. Even though vegetation would be altered or removed, forest health and wildfire management projects would benefit vegetation by controlling insects, disease, and reducing the threat of catastrophic wildfires. Vegetation removal and prescribed burning would be used to mimic natural disturbance regimes that have been disrupted after many years of wildfire suppression. Fire provides both positive and negative impacts to the environment. Vegetation removal and prescribed burns would disturb wildlife during the duration of forestry activities. Once vegetation is removed, habitat fragmentation may adversely affect large predators (especially wolverine and grizzly bear), caribou, and certain raptors or neotropical migratory birds. Species preferring forest openings, edge habitat, diversity in vegetation cover, and early successional species would benefit. Reducing the threat of large scale uncontrolled fires through wildfire management would benefit wildlife by protecting habitat. Standard methods, safety procedures, and air quality restrictions for prescribed burning (Volume II, Annex C, Integrated Wildland Fire Management Plan and Volume III, Section SC3.2.1, Use of Prescribed Fire) are already approved and used by the Bureau of Land Management Alaska Fire Service..

Sub-alternative A

This sub-alternative would remove restrictions put in place during the recreational impact study and implement a new recreation policy for Tanana Flats Training Area. Sub-Alternative A would manage

Tanana Flats Training Area as an "*open use area*", open to all types of off-road recreational vehicles and recreational activities year round. There would be no restrictions for any off-road recreational vehicles when soil is frozen. During unfrozen conditions, off-road recreational vehicles over 1500 lbs (road vehicles, dune buggies, Argo's, small unit support vehicles etc.) must stay on existing roads and trails. No restrictions for off-road recreational vehicles under 1500 lbs (all terrain vehicles, snowmachines, dirt bikes etc.). Motorized watercraft must stay within existing open water channels except within Training Areas 202 and 203 after July 15 when water levels are sufficient to avoid damage to soils and vegetation. Sub-Alternative A would have minor to moderate impacts to wildlife and fisheries, as early season restrictions would protect migration and nesting. Water levels would be monitored and airboat use would not be allowed if water levels are too low which would serve to limit damage to wildlife habitat. Protecting natural and wildlife created dams would help to protect and maintain the natural hydrological systems in Tanana Flats Training Area. After July 15th, species would be temporarily disturbed during recreational use.

Sub-alternative B

This sub-alternative would remove restrictions put in place during the recreational impact study and implement a new recreation policy for Tanana Flats Training Area which would be managed as a "*modified use area*". This sub-alternative would be open to all types of off-road recreational vehicles with no restrictions for any off-road recreational vehicles when soil is frozen. All off-road recreational vehicles must stay on existing roads and trails during the summer and motorized watercraft must stay within existing naturally occurring open water channels. This sub-alternative is open to all other recreational activities year round. This sub-alternative would have minor to beneficial impacts to wildlife and fisheries, as early season restrictions would protect migration and nesting. Minor impacts to fisheries and wildlife would result under Sub-alternative B due to moderate limitations on off-road recreational vehicles and airboats. Less recreational use would present fewer impacts to wildlife and fisheries and their associated habitat.

Sub-alternative C

Under Sub-Alternative C, Tanana Flats Training Area would be managed as a "*limited use area*", which is open to all non-motorized recreation (hunting, fishing, trapping, hiking, skiing, and berry picking, etc.) year round but is not open to any type of off-road recreational vehicle at any time. Motorized watercraft must stay within existing naturally occurring open water channels. Sub-alternative C would result in the beneficial impacts to fisheries and wildlife and their associated habitat as all off-road recreational vehicle traffic and motorized watercraft would be restricted from entering Tanana Flats Training Area.

Alternative 3: Suspend Integrated Natural Resources Management Plans

Under this alternative, no components of the Integrated Natural Resource Management Plan would be implemented. Failure to implement the Integrated Natural Resource Management Plan could result in loss of sustainability over the long term, which would ultimately result in a negative impact to the Army mission. No controls at all on recreational use in Tanana Flats would have moderate to severe impacts to vegetation. Impacts to fisheries and wildlife habitats from military training and recreation would not be monitored and repaired under this alternative. USAG-AK lands would no longer be able to support the military mission. This action would have severe adverse impacts to water quality. In particular, discontinuing watershed management projects would have negative impacts to fisheries and wildlife habitats by not allowing for monitoring, maintenance, or repair of damage; not integrating training with environmental protection; and not educating soldiers about procedures for minimizing disturbance. Training land rehabilitation, maintenance, and range improvements would cease despite continued use of land for Army training. In the absence of Integrated Natural Resource Management Plan projects, the benefits for improving and monitoring habitat and wildlife would cease. Elimination of outreach and awareness programs would cause moderate adverse impacts due to unintended or negligent military

activity. Similarly, fish and wildlife would be impacted by no longer protecting sensitive habitats from being damaged, including wetland and riparian areas.

Cumulative Impacts

Past activities on USAG-AK lands have adversely impacted wildlife and fisheries through gradual habitat loss, exposure to toxic materials, and noise (U.S. Army Alaska 2004). Current and new construction projects would have additional adverse impacts on wildlife and fisheries. However, activities under the proposed action would add beneficial long-term effects to the overall cumulative impacts on this resource through habitat improvement projects such as revegetation, vegetation management, wetlands reclamation, streambank stabilization, and other stream habitat improvement activities. Monitoring the impacts of training activities and adapting management actions to accommodate changing conditions would also have a beneficial cumulative impact.

3.5 PUBLIC ACCESS AND RECREATION

3.5.1 Affected Environment

U.S. Army Alaska's primary mission is to maintain and enhance the combat readiness of its soldiers. USAG-AK also recognizes the responsibility to allow public access to military lands in compliance with the Sikes Act, which requires public access to military installations to the extent that such use is consistent with the military mission and the protection of fish and wildlife resources. Public access is subject to requirements deemed necessary to ensure safety and military security.

Military lands in Alaska provide desirable areas for recreational activities. They contain many stocked lakes and significant game populations in relatively close proximity to the more highly populated areas in Alaska. These lands include the immediate post lands and adjoining lands under military control for training. Recreational uses include hunting, fishing, trapping, off-road recreational vehicle use, hiking, boating, picnicking, berry picking, bird-watching, skiing, and dog sledding.

Fort Richardson, Fort Wainwright, and Donnelly Training Area have four primary categories of recreation use areas: Open Use, Modified Use, Limited Use, and Off-Limits areas. All recreational categories are subject to periodic change or restrictions. The categories are defined in the 2007-2011 Integrated Natural Resource Management Plan. Additional information regarding public access and recreation on USAG-AK lands including access policies and the USARTRAK call-in system can be found in the 2007-2011 Integrated Natural Resource Management Plan and in *Transformation of U.S. Army Alaska Final Environmental Impact Statement* (U.S. Army Alaska 2004).

Fort Richardson

At Fort Richardson, moose is the most favored game species and salmon the number one fish species. Other outdoor activities include hiking, camping, small game hunting, berry picking, woodcutting, and dog sledding. Road access onto Fort Richardson is possible primarily from the Glenn Highway, the main gate, or along Arctic Valley Road. The post is also accessible via Richardson Drive from Elmendorf Air Force Base. Additionally, USAG-AK allows Eagle River rafting traffic to enter Fort Richardson lands. Paved and unimproved roads cover much of the northern and central portions of the post. Two Off-Road Recreational Vehicle access trails exist on post and connect green spaces near the cantonment area to more remote locations. Trails also connect the post to Chugach State Park and the Municipality of Anchorage's Far North Bicentennial Park, which share Fort Richardson's southern boundary.

Fort Wainwright

Hunting and fishing are the main recreational activities occurring on Fort Wainwright lands. Data show that 21% of the interior Alaska moose harvest occurs on military lands, while 2.3% of the Interior caribou harvest and 2.1% of the sheep harvest are also on military-controlled lands (ADFG 2001). The most popular fish species are salmon and trout. Other recreational activities include hiking, camping, small game hunting, berry picking, and dog sledding.

Access is allowed on many parts of Fort Wainwright Main Post. Roads and trails are both plentiful, and the open spaces remaining in the Fort Wainwright cantonment area are important contributors to recreation opportunities for post inhabitants. The core cantonment area consists of landscaped yards, office buildings, ball fields and open fields. Hunting and Off-Road Recreational Vehicle use is not permitted in the cantonment area.

Access to Tanana Flats Training Area is more difficult than to other parts of Fort Wainwright. Tanana Flats Training Area is bordered by the Tanana and Wood rivers and there are no bridges into the training area. Ground vehicles can access Tanana Flats Training Area in winter on constructed ice bridges. Summer access is by boat or plane only. Most of the training area is wetlands and largely categorized as a Modified Use area. Yukon Training Area is readily accessible from the ground. Access is primarily available via Manchu Road through Eielson Air Force Base. Additional access is possible via Johnson Road, which connects to the Richardson Highway.

Off-Road Recreational Vehicle Use in Tanana Flats Training Area

The amount of airboat use in Tanana Flats Training Area has increased almost 20% since 1989 (263 km of permanent trails in 1989 to 314 km in 1999). In 1989, the total length of trails was 263 km, of which 37% (99 km) were heavily used main trails, 54% (143 km) were less-used secondary trails, and 8% (22 km) were trails on existing streams. By 1995, the total length of airboat trails had increased by 15%, to 303 km. During that period, trails were extended toward the southeast into the Tanana Flats, from 17 km from the Tanana River access points in 1989 to 26 km by 1995 (Racine et. al. 1998). By 1999, total length of trails in northwest Tanana Flats Training Area had expanded to 314 km. These 314 km trails impact approximately 161 acres of sensitive wetlands, 78 acres of which are permanently damaged by main trails (U.S. Army Alaska 2001), which do not recover within a few years like abandoned secondary trails (Racine et. al.1998).

Most airboat traffic into the fens occurs after July 15th annually. Over 83.2% of airboat traffic during 2003 and 2004 occurred after July 15 (ABR, Inc. 2005). Noise monitors were placed at four locations (Little Rusty, Upper Rusty, Tree Trail, Willow Creek) to measure the distribution and timing of airboat use. Over 62% of airboat passes occurred at the tree trail entrance to the fens and 32% (2003) and 24% (2004) of the traffic went into the closed area of the study (ABR, Inc. 2005).

Airboats are well suited for use on the shallow Chena and Tanana Rivers, as well as on a unique system of floating mat fens in Tanana Flats Training Area (Racine et. al. 1998). Evidence based on a 1989 study on the environmental impacts of airboats on the Tanana Flats suggested that the floating mats should be fairly resistant to airboat damage (Racine et. al 1990). However, further evidence, as outlined in a more detailed 1995 study appearing in *Arctic*, showed that “the vegetation and soils of floating mat fens in the Tanana Flats have been severely damaged along main airboat trails: there are over 100 km of trails with open-water, stream-like channels on which all of the emergent vegetation and about 50% of the underlying mat have been destroyed” (Racine et. al. 1998).

The number of airboats in Alaska has grown since 1989 and likely will continue to increase. The number of areas available for airboat use in state has decreased since 1989. Spatial distribution of trails in Tanana Flats Training Area is likely to increase in the future as users increase and available areas decrease.

Airboats produce a greater amount of noise than any other off-road recreational vehicle. Noise is the number one complaint about airboats from non-airboat recreational users. Recreational users have reported to have heard an airboat approaching while it was still over one mile away. It is clear that commanders may not designate Off-Road Recreational Vehicle areas near noise sensitive areas such as housing, schools, churches, or areas where noise or vehicular emissions would be an irritant to inhabitants. Balancing noise concerns in non-sensitive areas between user groups is more difficult.

In interior Alaska, the U.S. Fish and Wildlife Service has designated primary migratory bird breeding and nesting season to be between May 1 and July 15. Airboats on Tanana Flats Training Area are primarily used from May through July for general recreation and August through October for hunting. Early season restrictions could serve to protect wildlife species during breeding and nesting while allowing access for hunting. Hunter access and success is very important for the State of Alaska to manage the moose herd in 20A. An additional solution would be to stop expansion of current airboat area, but continue to allow use of existing airboat trails for hunting access.

Donnelly Training Area

Recreational opportunities at Donnelly Training Area are similar to those found on Fort Wainwright. In addition to ground access and roads, much of Donnelly Training Area is available to Off-Road Recreational Vehicles and aerial access. Off-Road Recreational Vehicle and winter trails exist across both the eastern and western training areas. The 33-Mile Loop Road is one of the more popular trail systems on Donnelly Training Area East. Donnelly Training Area West is accessible in winter when the Delta River is frozen over, or by air or boat in summer.

Donnelly Training Area East is primarily managed as Open Use. The exception is Jarvis Creek and some isolated wetland areas that are considered Limited Use areas. As portions of Donnelly Training Area West are primarily designated as impact area, most of the central training area is Off-Limits. Modified and Open Use areas exist to the north and south, along the northern boundary of the training area and the foothills of the Alaska Range.

3.5.2 Environmental Consequences

Alternative 1: Continue Current Integrated Natural Resources Management Plans without Updates (No Action)

Under this alternative, the current Integrated Natural Resource Management Plan would continue to be implemented without revision. Outdoor recreation management is a component of the Integrated Natural Resource Management Plan that would have the most impacts to public access and recreation. Impacts from all Integrated Natural Resource Management Plan programs were found to be beneficial in the Environmental Assessment portion of the 2002-2006 Integrated Natural Resource Management Plans. No additional impacts to public access and recreation are expected to occur under this alternative.

Since the purpose of other Integrated Natural Resource Management Plan projects such as (soil, vegetation, wetlands, and water resources management) is to minimize the impacts of Army training on USAG-AK lands, Integrated Natural Resource Management Plan projects would enhance the quality of Army lands for public recreation. Specifically, the impact of Integrated Training Area Management projects has been assessed and is available in the *Integrated Training Area Management Program Management Plan Environmental Assessment* (USAG-AK 2005). Recreational activities may be temporarily restricted in some areas where projects would be conducted. However, these access closures would be temporary, localized, and have minor adverse effects on public access and recreation. Access for public recreation would be improved through maneuver trail upgrades and maintenance.

The current outdoor recreation and use policy and recreational use study at Tanana Flats Training Area would continue under this alternative for another five years. Areas currently off-limits to motorized recreation would remain closed having moderate impacts to recreation.

Alternative 2: Implement Updated Integrated Natural Resources Management Plan (Proposed Action)

Under this alternative, the 2007-2011 Integrated Natural Resource Management Plan revision would be implemented. This includes current recreation management projects described in the 2002-2006 Integrated Natural Resource Management Plan, plus those described in Section 2.1.2. Overall, Integrated Natural Resource Management Plan projects benefit recreation by providing users with improved aesthetics and quality of natural resource-based recreation. Minor impacts would result from temporary closures.

Watershed management procedures may result in minor temporary access closures resulting in minor impacts to recreation. Forestry and wildfire management procedures may result in temporary closures and have aesthetic impacts. The firewood and house log programs provide additional opportunities for public access of timber resources.

Fish and wildlife management procedures would benefit recreation by improving hunting, fishing, and wildlife viewing opportunities. Use of the USARTRAK call-in system and installation access policy would benefit public access and recreation by streamlining the reporting process for USAG-AK and the check-in process for the user.

The land use policy at Fort Richardson would not greatly impact public access and recreation. Existing recreational opportunities would remain available. New uses by the public may be made available as long as they are temporary, non-commercial, low-impact uses that are consistent with training and the military mission. These new uses will be evaluated on a case-by-case basis.

The new off-road recreational vehicle policy would benefit public access and recreation by clarifying when off-road recreational vehicles may or may not be used. Minor negative impacts would occur when off-road recreational vehicles are restricted from certain areas. The subsistence policy allows for the harvest of subsistence resources, but this policy does not differ from hunting, fishing, and access policies for the general public.

Sub-Alternative A

This sub-alternative would remove restrictions put in place during the recreational impact study and implement a new recreation policy for Tanana Flats Training Area. Sub-Alternative A would manage Tanana Flats Training Area as an "*open use area*", open to all types of off-road recreational vehicles and recreational activities year round. There would be no restrictions for any off-road recreational vehicles when soil is frozen. During unfrozen conditions, off-road recreational vehicles over 1500 lbs (road vehicles, dune buggies, Argo's, small unit support vehicles etc.) must stay on existing roads and trails. No restrictions for off-road recreational vehicles under 1500 lbs (all terrain vehicles, snowmachines, dirt bikes etc.). Motorized watercraft must stay within existing open water channels except within Training Areas 202 and 203 after July 15 when water levels are sufficient to avoid damage to soils and vegetation. Sub-Alternative A would have minor impacts to recreational use. Early season restrictions may affect bear hunting. Opening up Training Areas 202 and 203 after July 15th (July 16th to August 15th based on water level) would not impact moose hunting.

Sub-Alternative B

This sub-alternative would remove restrictions put in place during the recreational impact study and implement a new recreation policy for Tanana Flats Training Area which would be managed as a "*modified use area*". This sub-alternative would be open to all types of off-road recreational vehicles with no restrictions for any off-road recreational vehicles when soil is frozen. All off-road recreational vehicles must stay on existing roads and trails during the summer and motorized watercraft must stay within existing naturally occurring open water channels. This sub-alternative is open to all other recreational activities year round. This sub-alternative would have moderate impacts to recreation and would cause moderate impacts to moose hunting.

Sub-alternative C
Under Sub-Alternative C, Tanana Flats Training Area would be managed as a "*limited use area*", which is open to all non-motorized recreation (hunting, fishing, trapping, hiking, skiing, and berry picking, etc.) year round but is not open to any type of off-road recreational vehicle at any time. Motorized watercraft must stay within existing naturally occurring open water channels. Sub-alternative C would result in the severe impacts to recreational use as all off-road recreational vehicle traffic and motorized watercraft would be restricted from entering Tanana Flats Training Area. Moose and bear hunting would be severely impacted.

Alternative 3: Suspend Integrated Natural Resources Management Plans
Under Alternative 3, all components of the Integrated Natural Resource Management Plan program would discontinue operation. Failure to implement the Integrated Natural Resource Management Plan could result in loss of sustainability over the long term, which would ultimately result in a negative impact to the Army mission. No controls at all on recreational use in Tanana Flats would have short term beneficial impacts to recreational use, but could cause moderate to severe impacts in the long run. USAG-AK lands would no longer be able to support the military mission. This action would have severe adverse impacts to water quality. Training land rehabilitation, maintenance, and range improvements would cease despite continued use of land for Army training. In the absence of Integrated Natural Resource Management Plan projects, the benefits for improving and monitoring habitat and wildlife would cease. Elimination of outreach and awareness programs would cause moderate adverse impacts due to unintended or negligent military activity.

Cumulative Impacts
Past military activities have had adverse impacts to public access and recreation through permanent closure of some areas (such as impact areas) and temporary closures of lands for training. However, construction of roads and trails on Army properties have led to beneficial impacts by improving public accessibility to USAG-AK lands for recreational purposes (U.S. Army Alaska 2004).

All current and planned construction activities have the potential to adversely impact public access and recreation. Construction activities typically result in temporary closures of certain areas for the duration of construction projects. Integrated Natural Resource Management Plan projects would contribute little to cumulative impacts on public access and recreation. Actions involving access closures would result in minor impacts, while actions involving maintenance would improve access.

The largest impacts to public access and recreation result from military training activities. In comparison, the overall cumulative impact of Integrated Natural Resource Management Plan activities to public access and recreation under the proposed action would be minor adverse to beneficial.

3.6 CULTURAL RESOURCES

3.6.1 Affected Environment

Cultural resources include features and objects dating to the prehistoric and historic periods that are found or are likely to be found as defined by the National Historic Preservation Act of 1966 (as amended). Management of cultural resources on federal lands depends on eligibility of resources for inclusion in the National Register of Historic Places. Additionally, properties of traditional and religious importance relating to Alaska Native villages may be determined eligible for listing in the National Register of Historic Places. Such sites may also be considered sacred sites and are generally referred to as traditional cultural properties. Traditional Cultural Properties are expected to closely relate to traditional subsistence, cultural, and religious practices on lands managed by USAG-AK.

Subsistence has been legally defined to include the customary and traditional uses of fish, plant materials and game for Alaska's rural residents. Food is one of the most important subsistence uses of wild resources. However, there are other important uses of subsistence products, such as clothing, fuel, transportation, construction, home goods, sharing, customary trade, ceremony, arts and crafts. Harvesting of non-game resources, such as edible or medicinal plants, is determined by public access (when and where). There are no federal restrictions on the season, take, and eligibility of rural residents for non-game resources. Additional sections in this Environmental Assessment related to subsistence include Section 3.5, Wildlife and Fisheries, and Section 3.6, Public Access and Recreation.

Additional information on cultural resources and subsistence on USAG-AK lands can be found in the *Transformation of U.S. Army Alaska Final Environmental Impact Statement* (U.S. Army Alaska 2004) and the *Final Environmental Impact Statement for the Construction and Operation of a Battle Area Complex and Combined Arms Collective Training Facility* (U.S. Army Alaska 2006).

Fort Richardson

Cultural Resources

Archeological surveys suggest the existence of several prehistoric sites, most likely contained within the moraine features scattered across Fort Richardson. Several potential locations of both historical and ethnographic significance exist, including portions of the Iditarod Historic Trail.

Historic building surveys on Fort Richardson have addressed only the Nike Site Summit and select Cold War-era buildings. As a result of these surveys' findings, the Nike Site Summit was nominated and approved for inclusion in the NHRP as a historic district.

Subsistence

Fort Richardson lies within the traditional lands of the Dena'ina, Athabaskans. The closest Dena'ina village to Fort Richardson is the Native Village of Eklutna, located approximately 25 miles north of the cantonment area and post entrance. The Native Village of Knik and many other communities from further up Knik Arm traditionally traveled to the Anchorage area with the June king salmon runs. It is known that many communities in the Cook Inlet region traditionally used a wide variety of subsistence resources that are present today on Fort Richardson. It is hoped that a better understanding of subsistence use and traditional use areas on Fort Richardson will be gained through ongoing coordination efforts.

The Federal Subsistence Board delineated a Fort Richardson and Elmendorf Air Force Base Management Area (consisting of Fort Richardson and Elmendorf military reservations). Under the "special provisions" for Management Unit 14, the Fort Richardson and Elmendorf Management Area is closed to subsistence taking of wildlife per the 2004-2005 Subsistence Management Regulations. Subsistence take under the customary and traditional use determinations are permitted for areas in Management Unit 14C other than

Fort Richardson and Elmendorf Air Force Base. Hunting and fishing on For Richardson is permitted under State of Alaska general hunting and fishing regulations.

Fort Wainwright

Cultural Resources

Archaeological surveys conducted on Fort Wainwright located six archaeological sites on Main Post. Only one site has been evaluated for eligibility for National Register of Historic Places listing and it was determined not eligible. The remaining five sites have not been evaluated.

The entire Fort Wainwright Main Post has been inventoried and evaluated for eligibility for inclusion in the National Register of Historic Places under the World War II and the Cold War historic contexts. Under the World War II context, Ladd Field, which has been designated a National Historic Landmark, includes 38 buildings and structures.

Under the Cold War context, Main Post has been identified and determined eligible for inclusion, but has not been formally nominated for listing. A study of Ladd Air Force Base's historic context was completed in 2000 (Price 2000). All buildings on Fort Wainwright were evaluated under the Cold War context. This resulted in the identification of the Ladd Air Force Base Historic District, which includes 71 buildings and structures.

Seven surveys conducted in the Yukon Training Area identified fifteen archaeological sites. Thirteen of the sites are not eligible for listing in the NHRP because they were located in highly disturbed areas. Two sites have not been evaluated for eligibility.

No building surveys have been conducted in Tanana Flats Training Area. Based on studies conducted by U.S. Army Alaska, no historic buildings are expected to exist on the training area (Neely 2001; Neely 2002; Price 2002).

Two surveys conducted on Yukon Training Area revealed eight archaeological sites. Six of the sites are not eligible for listing in the NHRP because they were located in highly disturbed areas. Two sites have not been evaluated for eligibility.

Two Nike Missile sites existed on Yukon Training Area, Site Mike and Site Peter. Each site consisted of a Battery Control Area and a Launch Area. Due to clean-up activities in the late 1980s and early 1990s, these sites no longer have historic integrity and are not eligible for inclusion in the NHRP (Denfeld 1988, 1994).

An early mining study indicates that no significant mining activities occurred on Yukon Training Area (Neely 2001). The Pine Creek mining complex in the northeastern corner of Yukon Training Area was listed as a potential historic property (Higgs et al. 1999); however, based on the early mining study (Neely 2001), it is ineligible for listing in the NHRP. No other historic buildings are expected to exist on Yukon Training Area.

Subsistence

While the Federal Subsistence Management Board does not manage Fort Wainwright for subsistence [50 CFR 100.3(d)], USAG-AK recognizes the areas importance to the subsistence way of life. Fort Wainwright training areas fall within the traditional lands of Tanana and Tanacross Athabaskans. Traditional settlement patterns focused on a widely mobile and seasonal lifestyle, with the fall caribou and moose hunt playing a pivotal role in subsistence preparations for the winter while summer activities were focused on fish camps, berry/root collecting and sheep hunting (McKennan 1981). Fish and moose

continue to play a primary role in Interior communities near Fort Wainwright training area lands, including Gerstle River and Black Rapids training areas (Martin 1983, Marcotte 1991, personal communication with tribal representatives from the Interior 2000 and 2001). Plant gathering continues to be a focus in the spring, summer and fall, with residents from Dot Lake, for example, traveling as far as Donnelly Dome, Delta Junction and Eielson Air Force Base to collect berries, roots, and plant resources (Martin 1983). Due to the size and relatively remote location of Fort Wainwright, natural resources and wildlife populations important for subsistence are fairly well preserved.

Donnelly Training Area

Cultural Resources

Twenty-three archaeological investigations have been conducted on Donnelly Training Area to date. Three hundred twenty sites were identified, with 13 of these comprising two archaeological districts. Sixty-six sites have been evaluated for National Register of Historic PLaces listing, 25 of which are eligible. These investigations have covered 45,810 acres (approximately 8%) of Donnelly Training Area. The majority of the archaeological surveys conducted in Donnelly Training Area have been limited to Donnelly Training Area East, which makes up only 25% the training area. Because of its remote setting, the archaeology of Donnelly Training Area West is poorly understood and represents a gap in the understanding of the area's prehistory.

A study on early trails identified a number of historic trails on Donnelly Training Area (Neely 2002). This study, however, only identified the Donnelly-Washburn Winter Cut-Off Trail as having potential eligibility for inclusion in the National Register of Historic Places.

It is expected that traditional cultural properties will be identified on Donnelly Training Area and will consist of sites and landmarks that reflect the seasonality of subsistence activities. USAG-AK and the U.S. Air Force 611th CES have an ongoing project, contracted to Tanana Chiefs Conference, Inc., to identify and evaluate Traditional Cultural Properties that may be present on military managed lands in the interior of Alaska, including Donnelly Training Area. No information has been provided to date on USAG-AK managed lands. A final report is expected at the end of 2005.

Subsistence

While the Federal Subsistence Management Board does not manage Donnelly Training Area for subsistence [50 CFR 100.3(d)], USAG-AK recognizes the areas importance to the subsistence way of life. Regional populations with recognized subsistence interests on USAG-AK lands include Healy Lake Traditional Council, Dot Lake Village Council, Native Village of Tanacross, Native Village of Tetlin, Northway Traditional Council, Delta Junction, Big Delta, Deltana, and Dry Creek. Data gathering on subsistence activities on (and around) USAG-AK lands is currently ongoing.

Immediately south of Donnelly Training Area East, and running along the length of the Richardson Highway to the town of Glennallen, are vast tracks of federal land that is managed to allow a subsistence harvest preference for large game animals. The close proximity of these lands to a major public highway also offers ready access to game and plant resources.

3.6.2 Environmental Consequences

Alternative 1: Continue Current Integrated Natural Resources Management Plans without Updates (No Action)

Under this alternative, the current Integrated Natural Resource Management Plan would continue to be implemented without revision. The Integrated Training Area Management program (within the watershed management category) is a component of the Integrated Natural Resource Management Plan that would

have the most impacts to cultural resources. Impacts of Integrated Training Area Management projects were found to be minor to beneficial to cultural resources in a previous assessment. A complete description is available in the *Integrated Training Area Management Program Management Plan Environmental Assessment* (USAG-AK 2005). Impacts to cultural resources from all Integrated Natural Resource Management Plan programs were found to be beneficial in the Environmental Assessment portion of the 2002-2006 Integrated Natural Resource Management Plans. No additional impacts to cultural resources are expected to occur under this alternative.

Alternative 2: Implement Updated Integrated Natural Resources Management Plan (Proposed Action)

Under this alternative, the 2007-2011 Integrated Natural Resource Management Plan revision would be implemented. This includes current projects affecting cultural resources described under Alternative 1 plus additional proposals included in the 2007-2011 Integrated Natural Resource Management Plan. Before natural resource projects begin, site-specific cultural resource analysis would take place in order to avoid impacts. As a result, minor to beneficial impacts are expected under this alternative.

Any Integrated Natural Resource Management Plan project involving ground disturbing activities has the potential to impact cultural resources. This may include ecosystem management projects, watershed management projects, forestry and wildfire management projects, and outdoor recreation management. Survey and monitoring would not impact cultural resources. Outreach would have beneficial impacts to cultural resources by informing users about the importance of cultural resource protection.

Wildlife, fisheries, and vegetation traditionally important for subsistence would benefit under Alternative 2. See Sections 3.2, Vegetation; 3.5, Wildlife and Fisheries; and 3.6, Public Access and Recreation for potential impacts to these resources.

Sub-alternative A

This sub-alternative would remove restrictions put in place during the recreational impact study and implement a new recreation policy for Tanana Flats Training Area. Sub-Alternative A would manage Tanana Flats Training Area as an "*open use area*", open to all types of off-road recreational vehicles and recreational activities year round. There would be no restrictions for any off-road recreational vehicles when soil is frozen. During unfrozen conditions, off-road recreational vehicles over 1500 lbs (road vehicles, dune buggies, Argo's, small unit support vehicles etc.) must stay on existing roads and trails. No restrictions for off-road recreational vehicles under 1500 lbs (all terrain vehicles, snowmachines, dirt bikes etc.). Motorized watercraft must stay within existing open water channels except within Training Areas 202 and 203 after July 15 when water levels are sufficient to avoid damage to soils and vegetation. Sub-Alternative A would have minor to moderate impacts to cultural resources.

Sub-alternative B

This sub-alternative would remove restrictions put in place during the recreational impact study and implement a new recreation policy for Tanana Flats Training Area which would be managed as a "*modified use area*". This sub-alternative would be open to all types of off-road recreational vehicles with no restrictions for any off-road recreational vehicles when soil is frozen. All off-road recreational vehicles must stay on existing roads and trails during the summer and motorized watercraft must stay within existing naturally occurring open water channels. This sub-alternative is open to all other recreational activities year round. Minor to beneficial impacts to cultural resources would result under Sub-alternative B due to moderate limitations on off-road recreational vehicles and airboats. Less recreational use would present fewer impacts to cultural resources.

Sub-alternative C

Under Sub-Alternative C, Tanana Flats Training Area would be managed as a "*limited use area*", which is open to all non-motorized recreation (hunting, fishing, trapping, hiking, skiing, and berry picking, etc.) year round but is not open to any type of off-road recreational vehicle at any time. Motorized watercraft must stay within existing naturally occurring open water channels. Sub-alternative C would result in the beneficial impacts to cultural resources as all off-road recreational vehicle traffic and motorized watercraft would be restricted from entering Tanana Flats Training Area.

Alternative 3: Suspend Integrated Natural Resources Management Plans

Under Alternative 3, all components of the Integrated Natural Resource Management Plan would discontinue operation. This action would have severe impacts to cultural resources and subsistence. Soldiers would not be educated about the importance of avoiding cultural sites and the proper notification for newly discovered sites would not ensure that mission requirements do not interfere with cultural resources. Wildlife, fisheries, and vegetation important for subsistence would not be protected. Programs and projects that allow for continued access to resources would not occur.

Cumulative Impacts

Past activities may have impacted cultural resources by disturbing or destroying undocumented or undiscovered cultural sites. Additional impacts could result from current and planned construction projects, training activities, and recreation. Activities under the proposed action would add beneficial to minor adverse cumulative impacts to cultural resources. Standard procedures for cultural resource management identified in the *Integrated Training Area Management Program Management Plan Environmental Assessment* (USAG-AK 2005) would serve to prevent adverse impacts through the Integrated Training Area Management program. Maintenance and repair projects could contribute to the negative cumulative impacts of all other ground-disturbing activities.

Past activities have impacted subsistence resources by altering habitat, restricting access, and military training. Additional impacts could result from current and planned construction projects, training activities, and recreation. Activities under the proposed action would add beneficial impacts to subsistence resources by improving access roads and trails and by improving habitat.

3.7 AIR QUALITY

The Clean Air Act (CAA) authorizes the Environmental Protection Agency (EPA) to establish national ambient air quality standards (NAAQS) to protect public health and the environment. Standards for the six criteria air pollutants have been adopted by the State of Alaska. These include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, inhaleable particulate matter, and lead. Carbon monoxide (CO) and particulate matter (PM) are specific pollutants of concern for Alaskan communities. More information on air quality can be found in the *Transformation of U.S. Army Alaska Final EIS* (USARAK 2004).

3.7.1 Affected Environment

Fort Richardson

While the city of Anchorage is subject to maintenance plan requirements for CO and the Eagle River area is in a nonattainment area for PM_{10}, Fort Richardson is not within either of these areas.

Fort Richardson is in attainment with the NAAQS for all the criteria air pollutants.

Fort Wainwright

The Fairbanks North Star Borough nonattainment area for CO was redesignated from nonattainment to attainment for CO by the EPA on 27 September 2004 (Fed. Reg. 27 July 2004 (69FR44601-44607). Areas classified as attainment but operating under a maintenance plan are referred to as maintenance areas. Areas of Fort Wainwright located within the Fairbanks North Star Borough maintenance area are subject to general conformity regulations to ensure that federal activities do not interfere with the pollutant limits set in state implementation plans. A portion of Fort Wainwright is located within this maintenance area.

Ice fog is an air pollution problem in interior Alaska caused by man-made sources of water vapor. It can occasionally occur for weeks at a time, whenever temperatures go below -35° F. Cooling waters from power plants are the largest single source. Automobiles are next in importance because of their wide-ranging mobility and exhaust pipes close to ground level. Also, many cars are left with engines idling for hours at a time during very cold weather (Benson 1970).

Donnelly Training Area

Donnelly Training Area is designated as an attainment area for the six regulated NAAQS and is permitted as a separate facility from Fort Wainwright. Since the annual potential emission is less than 100 tons for any of the criteria pollutants, no air quality operating permit is required at this time.

Fugitive dust is typically generated from daily industrial activities such as bulk material handling, storage, and construction projects. The Delta River and Jarvis Creek are large sources of fugitive dust during wind events in summer, and sometimes during winter months. Driving heavy machinery, construction equipment, and personal and tactical vehicles on unpaved surfaces can also generate fugitive dust.

No air quality monitoring data exists for Donnelly Training Area or for any of the surrounding communities. Particulate sampling equipment was recently installed at Fort Greely, but insufficient data have been collected to provide an accurate measure of air quality relative to this pollutant. Air quality at Donnelly Training Area approximates natural baseline conditions, given the low density of human development and emission sources present. While Donnelly Training Area does experience periodic episodes of ice fog, they are generally short in duration. Strong and persistent temperature inversions do occur but, due to the limited number of emission sources, the inversions are unlikely to cause pollutant levels that exceed the NAAQS.

3.7.2 Environmental Consequences

Alternative 1: Continue Current Integrated Natural Resources Management Plans without Updates (No Action)

With the exception of prescribed burning, projects listed in the current Integrated Natural Resource Management Plan generally have no impacts to air quality. Therefore few additional impacts to air quality are expected under this alternative. Impacts from prescribed burning would be considered minor and temporary.

Alternative 2: Implement Updated Integrated Natural Resources Management Plan (Proposed Action)

Similar to Alternative 1, prescribed burning is the only proposed project in the updated Integrated Natural Resource Management Plan to have adverse air quality impacts. Since prescribed burning would increase under this alternative, minor to moderate air quality impacts are expected. These impacts would be temporary, lasting for the duration of the prescribed burn. A permit from Alaska Department of

Environmental Conservation is required prior to prescribed burns exceeding 40 acres per year. Additionally, Alaska Department of Environmental Conservation requires a smoke management plan to mitigate the nuisance, health, and safety hazards to roadways, airports, and smoke sensitive features (such as hospitals, schools, and clinics). The smoke management plan also addresses compliance with Alaskan Ambient Air Quality Standards and visibility impacts.

Alternative 3: Suspend Integrated Natural Resources Management Plans

Air quality would not likely be affected under Alternative 3, because Integrated Natural Resource Management Plan projects do not address air quality.

Cumulative Impacts

All past, current and planned construction projects and training activities have local air quality impacts. These impacts consist of dust generated from ground and vegetation disturbance due to construction and training, increased use of unimproved roads for Stryker training, and use of motorized construction equipment. Procedures outlined in the *Integrated Training Area Management Program Management Plan Environmental Assessment* (USAG-AK 2005) would serve to mitigate dust generation through use of dust control best management practices during construction activities. The proposed action would add to these air quality impacts through increased smoke emissions from prescribed burning.

CHAPTER 4: PREPARERS AND CONTRIBUTORS

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CHAPTER 6: AGENCIES AND INDIVIDUALS CONTACTED

APPENDIX A: INRMP FIVE-YEAR PROJECT LIST

This is a proposed project list that will be continually updated. All projects may not be implemented within five years and additional projects may be added. Additional similar projects may be added to this list during 2007-2011.

Location	Standard Practice Category	Project Title	Approximate Acres Impacted
BRTA	Suppression	Conduct fire suppression activities as necessary.	450
DTA East	Erosion Control and Streambank Stabilization	33 Mile Loop Phase 1A and 1B	75
DTA East	Erosion Control and Streambank Stabilization	33 Mile Loop Road Phase 8A and B	75
DTA East	Erosion Control and Streambank Stabilization	33 Mile Loop Road Shortcut Upgrade	60
DTA East	Erosion Control and Streambank Stabilization	Big Lake Road Upgrade and Repair	35
DTA East	Erosion Control and Streambank Stabilization	Big Lake/Windy Ridge Trail Upgrade Phase 1	40
DTA East	Erosion Control and Streambank Stabilization	Buffalo Drop Zone Access Phase 1-2	40
DTA East	Erosion Control and Streambank Stabilization	Butch Training Area Training Area Recovery Plan	250
DTA East	Erosion Control and Streambank Stabilization	Dome Road Upgrade and Repair	30
DTA East	Erosion Control and Streambank Stabilization	Donnelly Training Area Training Area Recovery Plan	300
DTA East	Erosion Control and Streambank Stabilization	J Lake Access Control	45
DTA East	Erosion Control and Streambank Stabilization	J- Lake Gabion Repair	5
DTA East	Erosion Control and Streambank Stabilization	Jarvis East Training Area Training Area Recovery Plan	400
DTA East	Erosion Control and Streambank Stabilization	Jarvis West Training Area Training Area Recovery Plan	350
DTA East	Erosion Control and Streambank Stabilization	Ober Training Area Training Area Recovery Plan	325
DTA East	Erosion Control and Streambank Stabilization	Observation Post 2A FOB Upgrade	25
DTA East	Erosion Control and Streambank Stabilization	Observation Post Training Area Training Area Recovery Plan	275
DTA East	Erosion Control and Streambank Stabilization	Old Richardson Highway Upgrade	45
DTA East	Erosion Control and Streambank Stabilization	OP Road Drainage Upgrades	20
DTA East	Erosion Control and Streambank Stabilization	Windy Ridge Road Upgrade and Repair Phase 1-2	65
DTA East	Forest Land Improvement	BAX / CACTF	400
DTA East	Forest Land Improvement	Bolio Lake Training Area Timber Stand Improvement	350
DTA East	Forest Land Improvement	Donnelly Training Area Fuel Reduction	450
DTA East	Forest Land Improvement	Jarvis North Training Area Timber and	600

Location	Standard Practice Category	Project Title	Approximate Acres Impacted
		Maneuverability Improvement Project	
DTA East	Forest Land Improvement	Personal use firewood and house log areas	250
DTA East	Forest Land Improvement	Texas Range *AK 316 2823 JM AA85	100
DTA East	Forest Land Improvement	Wills Range Complex, Buffalo DZ Eddy DZ	400
DTA East	Habitat Improvement	Delta River Bison Range Habitat Enhancement	250
DTA East	Habitat Management	Bison habitat enhancement	50
DTA East	Habitat Management	Moose Habitat Enhancement	250
DTA East	Suppression	Conduct fire suppression activities as necessary.	100,000
DTA East	Vegetation Management	Bison Plot Vegetation Management – Burn, Fertilize and Mow	75
DTA East	Vegetation Management	Buffalo Drop Zone Vegetation Management – Burn / Mow	400
DTA East	Vegetation Management	Wills Range Complex DTA Prescribed Burn	1500
DTA East	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	20,000
DTA East	Erosion Control and Streambank Stabilization	Meadows Road Upgrade and Repair Phase 1-2	75
DTA West	Forest Land Improvement	Donnelly West Fuel Break	1,500
DTA West	Forest Land Improvement	Hays Lake Fuel Break	275
DTA West	Forest Land Improvement	Lakes Impact Area	5,000
DTA West	Forest Land Improvement	Oklahoma Impact Area *AK 316 2823 JM AA88	4,000
DTA West	Suppression	Conduct fire suppression activities as necessary.	500,000
DTA West	Vegetation Management	Nevada Lakes Impact Area, DTA Prescribed Burn	80,000
DTA West	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	100,000
FRA NP	Erosion Control and Streambank Stabilization	Clunie Lake Road Widening Phase 1, 2 and 3	65
FRA NP	Erosion Control and Streambank Stabilization	Engineer Expressway Widening Phase 1-4	80
FRA NP	Erosion Control and Streambank Stabilization	Fire Tower Ridge Road Widening Phase 1-3	65
FRA NP	Erosion Control and Streambank Stabilization	FRA Training Area Recovery Plan	375
FRA NP	Fish and Wildlife Habitat Improvement	Moose Habitat Enhancement	250
FRA NP	Forest Improvement	Waldon Lake Training Area Timber and Maneuverability Improvement Project	225
FRA NP	Forest Land Improvement	ISBC, IPBC and DMPTR	750
FRA NP	Invasive Species Control	Pike Removal and Monitoring on FRA	2
FRA NP	Invasive Species Control	Pike Telemetry in Otter Lake	2
FRA NP	Suppression	Conduct fire suppression activities as necessary.	35,000
FRA NP	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	20,000
FRA SP	Erosion Control and Streambank Stabilization	Bulldog Trail Widening Phase 2-5	60
FRA SP	Erosion Control and Streambank	M16 Record Range (widen service roads to 20	20

Location	Standard Practice Category	Project Title	Approximate Acres Impacted
	Stabilization	feet)	
FRA SP	Erosion Control and Streambank Stabilization	M16 Record Range Berm erosion control (144) berms	25
FRA SP	Erosion Control and Streambank Stabilization	Training Area Recovery Plan	425
FRA SP	Fish and Wildlife Habitat Improvement	Moose Habitat Enhancement	250
FRA SP	Forest Improvement	Ft. Richardson Small Arms Complex Fuel Break	275
FRA SP	Forest Improvement	Grezelka Range Area Timber Stand Improvement	150
FRA SP	Forest Land Improvement	Grezelka Prescribed Burn AK 316 2823 JM AA43	200
FRA SP	Forest Land Improvement	Malamute DZ Prescribed Burn AK 316 2823 JM AA43	400
FRA SP	Suppression	Conduct fire suppression activities as necessary.	25,000
FRA SP	Vegetation Management	Grezelka Fuels Management	125
FRA SP	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	15,000
FWA Main Post	Erosion Control and Streambank Stabilization	MPMG Firing Positions Upgrade	25
FWA Main Post	Erosion Control and Streambank Stabilization	NBC Parking Upgrade	10
FWA Main Post	Erosion Control and Streambank Stabilization	Training Area Recovery Plan	500
FWA Main Post	Forest Land Improvement	Personal use firewood and house log areas	150
FWA Main Post	Forest Land Improvement	Small Arms Range Prescribed Burn AK 316 2824 JW AA44	400
FWA Main Post	Habitat Management	Moose Habitat Enhancement	150
FWA Main Post	Suppression	Conduct fire suppression activities as necessary.	14,000
FWA Main Post	Vegetation Management	Small Arms Complex Firebreak	1,000
FWA Main Post	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	5000
GRTA	Habitat Management	Alaska Department of Fish and Game Bison Range	400
GRTA	Suppression	Conduct fire suppression activities as necessary.	21,000
GRTA	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	10,000
TFTA	Forest Land Improvement	Alpha Impact Area Prescribed Burn	4,000
TFTA	Habitat Improvement	Tanana Flats Moose Habitat Enhancement Prescribed Burning	4,500
TFTA	Suppression	Conduct fire suppression activities as necessary.	650,000
TFTA	Vegetation Management	Alpha Impact Area Burn	30,000
TFTA	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	200,000
YTA	Erosion Control and Streambank Stabilization	BDE CQM 25-Meter Range	15
YTA	Erosion Control and Streambank	Bravo Battery FOB	75

Location	Standard Practice Category	Project Title	Approximate Acres Impacted
	Stabilization		
YTA	Erosion Control and Streambank Stabilization	Brigadier Road Upgrade	65
YTA	Erosion Control and Streambank Stabilization	CACTF Trail Upgrade	35
YTA	Erosion Control and Streambank Stabilization	Charlie Battery Forward Operations Base	90
YTA	Erosion Control and Streambank Stabilization	DMPTR/IPBC Forward Operations Base Phase 1-3	125
YTA	Erosion Control and Streambank Stabilization	Drivers Training Course Phases 1-5	78
YTA	Erosion Control and Streambank Stabilization	Husky Drop Zone Forward Operations Base – Phase 1, 2 and 3	250
YTA	Erosion Control and Streambank Stabilization	Husky DZ Access Road Phase 2	75
YTA	Erosion Control and Streambank Stabilization	IPBC Range Berm erosion control	80
YTA	Erosion Control and Streambank Stabilization	Johnson, Skyline, Brigadier and Quarry Road Upgrade	200
YTA	Erosion Control and Streambank Stabilization	Training Area 6 Fuels Break	300
YTA	Erosion Control and Streambank Stabilization	Training Area Recovery Plan	400
YTA	Erosion Control and Streambank Stabilization	Warrior Forward Operations Base Phase 3	125
YTA	Erosion Control and Streambank Stabilization	YTA Convoy Live Fire Range Phase 1 and 2	100
YTA	Erosion Control and Streambank Stabilization	YTA Demolition Range Phase 1-3	120
YTA	Erosion Control and Streambank Stabilization	YTA Firing Point 11 Upgrade	50
YTA	Erosion Control and Streambank Stabilization	YTA Firing Point 12 Upgrade	50
YTA	Erosion Control and Streambank Stabilization	YTA Firing Point 13 Upgrade	50
YTA	Erosion Control and Streambank Stabilization	YTA Firing Point Direct Fire	40
YTA	Erosion Control and Streambank Stabilization	YTA OP Shack Upgrade	40
YTA	Forest Land Improvement	Husky DZ Prescribed Burn AK 316 2823 JM AA70	300
YTA	Forest Land Improvement	ISBC, IPBC and DMPTR Prescribed Burn	750
YTA	Forest Land Improvement	Manchu Range Prescribed Burn AK 316 2823 JM AA05	450
YTA	Forest Land Improvement	Moose Creek Timber Stand Improvement	200
YTA	Forest Land Improvement	Personal use firewood and house log areas	250
YTA	Forest Land Improvement	Stuart Creek East Fuel Break	800
YTA	Forest Land Improvement	Yukon Training Area Timber and Maneuverability Improvement Project	400
YTA	Habitat Improvement	Grouse Habitat Enhancement	75

Location	Standard Practice Category	Project Title	Approximate Acres Impacted
YTA	Habitat Management	Moose Habitat Enhancement	200
YTA	Habitat Management	Ruffed Grouse habitat enhancement; Yukon Training Area	75
YTA	Suppression	Conduct fire suppression activities as necessary.	250,000
YTA	Vegetation Management	Moose Creek Burn	200
YTA	Vegetation Management	Vegetation Management – General Phase 1	500
YTA	Wildland Fire Management	Break up large continuous fuels in areas requiring fire suppression status.	150,000

APPENDIX B: STANDARD PRACTICES

Standard Practice Category	Standard Practice	Standard Practice Description
Natural Resources Planning	Natural Resources Technical Support	Provide natural resources technical support to include natural resource planning, providing technical recommendations, etc.
Natural Resources Planning	Management Plan Preparation, Review, and Update	Prepare, review, and update natural resource management plans, to include the Integrated Natural Resource Management Plan (Integrated Natural Resources Management Plan) and the Ecosystem Management Plan.
Natural Resources Planning	Agreement preparation, review, and update	Prepare, review, and update natural resource memorandum of understanding, memorandum of agreements, and cooperative agreements.
Natural Resources Planning	Conservation Report Preparation, Review, and Update	Prepare, review, and update natural resources and conservation reports, such as Installation Status Report, Environmental Program Requirement Report, and EQR.
Natural Resources Planning	Workplan preparation, review, and update	Prepare natural resources and conservation work plans, obligation plans, and other project and budget forecasting and managing documents. Develop and recommend potential natural resource projects to be included in work plans.
Natural Resources Planning	Natural Resource Geographic Information System Planning	Utilize the Geographic Information System to conduct natural resources planning projects.
Natural Resources Planning	Natural Resource National Environmental Policy Act Requirements	Prepare, coordinate, review, and update National Environmental Policy Act documents for natural resources projects, programs, policies, and management plans.
Natural Resources Planning	National Environmental Policy Act Project Oversight	Conduct oversight of National Environmental Policy Act documents and processes for USAG-AK projects.
Natural Resources Planning	National Environmental Policy Act Project Review	Conduct National Environmental Policy Act project review for USAG-AK projects.
Natural Resources Outreach	Conservation Web Site	Prepare, update, and maintain information to be included on the USAG-AK conservation web site.
Natural Resources Outreach	Environmental Newsletter	Prepare, update and distribute environmental newsletter.
Natural Resources Outreach	Develop Training/Education Materials	Prepare, update, coordinate, publish, and distribute natural resources training and education materials.
Natural Resources Outreach	Conduct Presentations/Briefings/Training	Prepare, coordinate, and conduct natural resources presentations, briefings, and training.
Natural Resources Project Management	Plan Natural Resource Projects	Conduct project planning by inventory and identification of potential sites, project development which is accomplished using the project development worksheet, and project prioritization.
Natural Resources Project Management	Design Natural Resource Projects	Conduct project design by providing specific project designs. Project designs include site plans, cost estimates, scopes of work, and bill of materials required for each project.
Natural Resources Project Management	Coordinate Natural Resource Activities	Conduct project coordination by coordinating forestry activities by providing project planning and oversight, technical assistance and design; and coordinating National Environmental Policy Act, wetland and cultural activities related to project oversight and management.
Natural Resources Project Management	Provide Project Oversight	Provide project oversight by monitoring project progress and execution. Report results back to federal project manager and COR.
Geographic Information Systems	Spatial Data Acquisition and Input	Collect spatial field data necessary for analysis and map production. Acquire spatial data from a variety of sources.

Standard Practice Category	Standard Practice	Standard Practice Description
		Input spatial data into the Geographic Information System using a variety of methods, to include download, digitizing, and re-projecting data from outside sources to Alaska standards.
Geographic Information Systems	Spatial Data Management	Spatial data storage involves developing and maintaining data storage, procedures, and standards necessary to protect Geographic Information System data. Spatial data maintenance includes all the actions necessary to update and maintain data and metadata per Army standards.
Geographic Information Systems	Decision Support	Spatial data analysis is the heart of the Geographic Information System and sets Geographic Information System apart from being merely a cartographic map making system. Data analysis allows creation of new data layers from existing data layers, enabling a number of powerful tools to support decision making.
		Spatial data access and distribution involves the actions required to promote access to the Geographic Information System database and distribution of spatial data to the many Geographic Information System users.
		Produce hardcopy and digital spatial data products for garrison, mission, units, other agencies, and higher command.
Watershed and Wetlands Planning	Watershed and Wetlands Management Plan Preparation, Review, and Update.	Prepare, review, and update watershed and wetland management plans, to include the soil resources management plan, soil and water quality management plan, and the wetland management plan.
Watershed and Wetlands Planning	Watershed and Wetlands Geographic Information System Planning	Utilize Geographic Information System to conduct landscape scale management of watershed and wetland resources.
Watershed and Wetlands Planning	Watershed/Wetland National Environmental Policy Act Requirements	Prepare, coordinate, review, and update National Environmental Policy Act documents for wetland and watershed projects, programs, policies, and management plans.
Watershed and Wetlands Inventory and Monitoring	Conduct Wetland Monitoring	Conduct monitoring of wetlands on military land to assess the impacts of military training and recreational use.
Watershed and Wetlands Inventory and Monitoring	Wetland Planning Level Survey	Conduct wetlands planning level survey.
Watershed and Wetlands Inventory and Monitoring	Soil and Water Quality Monitoring	Conduct Soil and water quality monitoring
Watershed and Wetlands Inventory and Monitoring	Soils Planning Level Survey	Conduct Soils planning level survey
Watershed and Wetlands Inventory and Monitoring	Floristics Planning Level Survey	Conduct floristics planning level survey
Watershed and Wetlands Inventory and Monitoring	Vegetation Communities Planning Level Survey	Conduct vegetation communities planning level survey
Watershed and Wetlands Inventory and Monitoring	Topographical Planning Level Survey	Conduct topographic planning level survey
Watershed and Wetlands Inventory and Monitoring	Surface Water Planning Level Survey	Conduct surface water planning level survey.
Watershed and Wetlands Inventory and Monitoring	Rare, Threatened, Endangered Vegetation Species Survey	Conduct rare, threatened, and endangered vegetation species surveys on military lands.

Standard Practice Category	Standard Practice	Standard Practice Description
Watershed and Wetlands Project Management	Plan Watershed and Wetland Projects	Conduct project planning by inventory and identification of potential sites, project development which is accomplished using the project development worksheet, and project prioritization.
Watershed and Wetlands Project Management	Design Watershed and Wetland Projects	Conduct project design by providing specific project designs for fuel hazard reduction, habitat improvement, cover and concealment, timber stand improvement, invasive species control, wildlife suppression, timber harvest, and firewood projects. Project designs include site plans, cost estimates, scopes of work, and bill of materials required for each project.
Watershed and Wetlands Project Management	Coordinate Watershed and Wetland Activities	Conduct project coordination by coordinating forestry activities by providing project planning and oversight, technical assistance and design; and coordinating National Environmental Policy Act, wetland and cultural activities related to project oversight and management.
Watershed and Wetlands Project Management	Watershed and Wetland Project Site Preparation	Prepare a project site for project implementation by flagging boundaries, marking trees, evaluating site conditions, etc.
Watershed and Wetlands Project Management	Watershed and Wetland Project Oversight	Provide project oversight by monitoring project progress and execution. Report results back to federal project manager and COR.
Watershed and Wetlands Protection	Wetland and Watershed Protection	Prepare, coordinate, and review regulations and overlays that protect sensitive and important watersheds and wetlands
Erosion Control and Streambank Stabilization	Watershed Soil Stabilization	Conduct training area soil stabilization and maneuver damage repair in the training areas to improve training realism and support sustainability. Utilize Land Rehabilitation and Maintenance standard practices such as revegetation, soil stabilization practices (temporary and permanent), and erosion and sediment control structures.
Erosion Control and Streambank Stabilization	Watershed Soil Rehabilitation	Conduct soil rehabilitation in the training areas to improve training realism and support long term sustainability. Utilize the Land Rehabilitation and Maintenance standard practice of revegetation by employing a number of methods, including but not limited to aerial seeding, band fertilizer, broadcast fertilizer, broadcast seeding, chiseling, drill seeding, fabrics & netting, filter stripping, grassed waterways, mulching, hydro-seeding, soil amendments such as limestone & gypsum, moldboard plowing, offset disking, straw mulch, crimped straw mulch, disked sub-soiling, tandem disking, critical area treatment, grass sods, grass stolons, rhizomes, or topsoiling. Employ techniques to prevent or reduce the effects of wind erosion and control dust on and off roads. Methods include but are not limited to windrows, re-vegetation, aggregate application, windbreaks, and surface roughness, wind strip-cropping, ridging or roughening the soil surface to trap moving soil particles and applying water or other emulsions to exposed soil.
Erosion Control and Streambank Stabilization	Watershed Soil Stabilization	Conduct training area soil stabilization and maneuver damage repair in the training areas to improve training realism and support sustainability. Utilize Land Rehabilitation and Maintenance standard practices such as revegetation, soil stabilization practices (temporary and permanent), and erosion and sediment control structures.

Standard Practice Category	Standard Practice	Standard Practice Description
Erosion Control and Streambank Stabilization	Wetlands Reclamation and Protection	Conduct wetland reclamation and protection in the training areas. Utilize Land Rehabilitation and Maintenance standard practices such as wetlands reclamation, revegetation, soil stabilization practices (temporary and permanent), erosion and sediment control structures, biological and chemical controls, and prescribed burning.
Erosion Control and Streambank Stabilization	Streambank Stabilization and Repair	Conduct stream bank stabilization and repair. Construct or maintain hardened sites on stream banks or shorelines where bridging training habitually occurs. Harden shoreline for habitual amphibious training. Conduct stream bank habitat improvement. Utilize Land Rehabilitation and Maintenance standard practice such as streambank repair (interior Alaska or South Central Alaska), revegetation, and soil stabilization practices (temporary and permanent).
Watershed and Wetlands Vegetation Management	Watershed Cover and Concealment	Create, upgrade, repair, protect, or maintain cover and concealment by planting, protecting, and maintaining trees and shrubs or removing vegetation and foliage to accommodate large vehicles. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, vegetation protection, and revegetation.
Erosion Control and Streambank Stabilization	Low Water Vehicle Crossings	Create, repair, upgrade, and maintain tactical low water vehicle crossings. Construct and maintain low water crossings for tactical vehicles by improving approaches, and hardening stream, at crossing location by utilizing fabrics and netting, stone/gravel, grading and shaping, aggregate, rip rap, interlocking cement structures, cement etc. Construct or maintain low water crossings or stream crossings for vehicles to prevent erosion and sedimentation. Methods include but are not limited to unvented fords constructed of crushed stone, riprap, or precast concrete slabs. Vented fords using pipes embedded in earth fill, aggregate, rip rap, interlocking cement structures, cement structures, etc. Utilize Land Rehabilitation and Maintenance standard practice of low water crossing hardening.
Erosion Control and Streambank Stabilization	Gravel Pit Development, Management, and Reclamation	Develop, upgrade, repair and manage gravel pits. Utilize Land Rehabilitation and Maintenance standard practices such as gravel pit development, gravel crushing, gravel extraction, gravel pit reclamation, sign and Seibert stake installation, and guard rail, gate, fencing, and post installation.
Watershed and Wetlands Vegetation Management	Watershed Invasive Species Control	Conduct invasive species control to control exotic and invasive species from spreading. Control invasive species to protect natural species and improve training realism. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, and biological and chemical controls.
Watershed and Wetlands Outreach	Conduct Presentations/Briefings/Training	Prepare, coordinate, and conduct fish and wildlife presentations, briefings, and training.
Watershed and Wetlands Outreach	Develop Training/Education Materials	Prepare, update, coordinate, publish, and distribute fish and wildlife training and education materials.
Forest Planning	Forestry Management Plan Preparation, Review, and Update	Prepare, review, and update Forestry and Integrated Wildland Fire Management Plans, to include the forestry management plan, wildlife management plan, and interagency fire management plan.
Forest Planning	Burn Plan Preparation, Review, and Update	Prepare, update, and review burn plans and pre-suppression plans.
Forest Planning	Forestry Geographic Information System Planning	Utilize Geographic Information System to conduct landscape scale management of forest resources.

Standard Practice Category	Standard Practice	Standard Practice Description
Forest Planning	Forestry National Environmental Policy Act Requirements	Prepare, coordinate, review, and update National Environmental Policy Act documents for forestry and wildfire management projects, programs, policies, and management plans.
Forestry Project Management	Plan Forestry Projects	Conduct project planning by inventory and identification of potential sites, project development which is accomplished using the project development worksheet, and project prioritization.
Forestry Project Management	Design Forestry Projects	Conduct project design by providing specific project designs for fuel hazard reduction, habitat improvement, cover and concealment, timber stand improvement, invasive species control, wildlife suppression, timber harvest, and firewood projects. Project designs include site plans, cost estimates, scopes of work, and bill of materials required for each project.
Forestry Project Management	Coordinate Forestry Activities	Conduct project coordination by coordinating forestry activities by providing project planning and oversight, technical assistance and design; and coordinating National Environmental Policy Act, wetland and cultural activities related to project oversight and management.
Forestry Project Management	Forestry Project Site Preparation	Prepare a project site for project implementation by flagging boundaries, marking trees, evaluating site conditions, etc.
Forestry Project Management	Forestry Project Oversight	Provide project oversight by monitoring project progress and execution. Report results back to federal project manager and Contracting Officer's representative.
Forest Inventory and Monitoring	Forest Inventory	Conduct forest inventory and monitoring on all Army lands in Alaska. Forest inventory and monitoring include forest cover type mapping and continuous forest inventory.
Forest Inventory and Monitoring	Fuel Hazard and Fire History Mapping	Conduct fuel hazard and fire history mapping. Mapping includes fuel hazard assessments and fire history mapping.
Forest Inventory and Monitoring	Wildfire Monitoring	Conduct monitoring of wildland fires on military lands. Wildfire monitoring includes identification and reporting, monitoring progress as the wildland fire progresses, and wildfire incident coordination.
Wildfire Prevention	Wildfire Prevention Systems Integration	Prepare, update, and review regulations and systems necessary to reduce wildlife risk.
Wildfire Prevention	Wildfire Prevention Outreach	Conduct outreach programs to military, recreational, and adjacent property owners to reduce the risk of uncontrolled wildfire.
Forestry Outreach	Conduct Presentations/Briefings/Training	Prepare, update, coordinate, publish, and distribute forestry training and education materials.
Forestry Outreach	Develop Training/Education Materials	Prepare, coordinate, and conduct forestry presentations, briefings, and training.
Forest Land Improvement	Fuel Hazard Reduction / Fire - Fuel Breaks	Create, upgrade, repair or maintain fire or fuel breaks. Reduce hazard fuels in the training areas. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, vegetation protection, and revegetation.
Forest Land Improvement	Habitat Improvement	Create, upgrade, repair, or maintain habitat improvement for soldiers or wildlife habitat. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, vegetation protection, and revegetation.
Forest Land Improvement	Cover and Concealment	Create, upgrade, repair, protect, or maintain cover and concealment by planting, protecting, and maintaining trees and shrubs or removing vegetation and foliage to accommodate large vehicles. Utilize Land Rehabilitation and Maintenance

Standard Practice Category	Standard Practice	Standard Practice Description
		standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, vegetation protection, and revegetation.
Forest Land Improvement	Timber Stand Improvement	Conduct timber stand improvement activities to improve area for military training or improve commercial value of timber. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, vegetation protection, and revegetation.
Forest Land Improvement	Invasive Species Control	Conduct invasive species control to control exotic and invasive species from spreading. Control invasive species to protect natural species and improve training realism. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, and biological and chemical controls.
Forest Land Improvement	Wildfire Suppression	Conduct suppression of wildfires to protect valuable training resources and facilities. Utilize Land Rehabilitation and Maintenance standard practices such as fire suppression, fire/fuel breaks and trenches, and vegetation cutting and clearing (mechanical and hand).
Forest Land Improvement	Timber Harvest	Conduct timber harvest in preparation of range facility construction or for commercial timber sales. Offset the cost of land clearing for new facilities by conducting commercial timber sales. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand).
Forest Land Improvement	Firewood	Conduct firewood cutting / firewood sales to offset the cost of clearing timber for range and training area improvement. Utilize Land Rehabilitation and Maintenance standard practices such as vegetation cutting and clearing (mechanical and hand).
Fish and Wildlife Planning	Fish and Wildlife Management Plan Preparation, Review, and Update.	Prepare, review, and update fish and wildlife management plans, to include the fish and wildlife management activity plan and habitat management plan.
Fish and Wildlife Planning	Fish and Wildlife Geographic Information System Planning	Utilize Geographic Information System to assist landscape scale management of fish and wildlife resources.
Fish and Wildlife Planning	Fish and Wildlife National Environmental Policy Act Requirements	Prepare, coordinate, review, and update National Environmental Policy Act documents for fish and wildlife projects, programs, policies, and management plans.
Fish and Wildlife Project Management	Plan Fish and Wildlife Projects	Conduct project planning by inventory and identification of potential sites, project development which is accomplished using the project development worksheet, and project prioritization.
Fish and Wildlife Project Management	Design Fish and Wildlife Projects	Conduct project design by providing specific project designs for fuel hazard reduction, habitat improvement, cover and concealment, timber stand improvement, invasive species control, wildlife suppression, timber harvest, and firewood projects. Project designs include site plans, cost estimates, scopes of work, and bill of materials required for each project.
Fish and Wildlife Project Management	Coordinate Fish and Wildlife Activities	Conduct project coordination by coordinating forestry activities by providing project planning and oversight, technical assistance and design; and coordinating National Environmental Policy Act, wetland and cultural activities related to project oversight and management.
Fish and Wildlife Project Management	Fish and Wildlife Project Site Preparation	Prepare a project site for project implementation by flagging boundaries, marking trees, evaluating site conditions, etc.
Fish and Wildlife Project Management	Fish and Wildlife Project Oversight	Provide project oversight by monitoring project progress and execution. Report results back to federal project manager and

Standard Practice Category	Standard Practice	Standard Practice Description
		Contracting Officer's Representative..
Fish and Wildlife Inventory and Monitoring	Conduct Bison, Caribou, and Moose Monitoring	Conduct annual bison, caribou, and moose surveys to determine population levels and locations of herds.
Fish and Wildlife Inventory and Monitoring	Conduct Avian Monitoring	Conduct breeding bird surveys, migratory bird monitoring, and other avian surveys.
Fish and Wildlife Inventory and Monitoring	Conduct Waterfowl Monitoring	Conduct monitoring of waterfowl on military lands.
Fish and Wildlife Inventory and Monitoring	Conduct Furbearer Monitoring	Conduct furbearer monitoring to determine species composition, species frequency, and species population levels on military lands. Conduct data analysis and data summaries of furbearer surveys.
Fish and Wildlife Inventory and Monitoring	Conduct Small Mammal Surveys	Conduct small mammal monitoring to determine species composition, species frequency, and species population levels on military lands. Conduct data analysis and data summaries of small mammal surveys.
Fish and Wildlife Inventory and Monitoring	Conduct Fisheries Monitoring	Conduct fish habitat and fish population surveys on streams on military lands using electrofishing and other census methods. Conduct data analysis and data summaries of fish habitat and fish population surveys.
Fish and Wildlife Inventory and Monitoring	Conduct Fauna Planning Level Surveys	Conduct fence line to fence line planning level surveys for faunal species to determine what species occur on military lands and in which habitats they occur.
Fish and Wildlife Inventory and Monitoring	Conduct Rare, Threatened, and Endangered F&W Species Surveys	Conduct rare, threatened, and endangered fish and wildlife species surveys on military lands.
Fish and Wildlife Inventory and Monitoring	Conduct Bear Monitoring	Collar and track bears on military lands to determine locations, habitat, and behavior. Conduct data analysis and data summaries of bear surveys.
Fish and Wildlife Outreach	Conduct Watchable Wildlife Program	Conduct watchable wildlife program on military lands. Watchable wildlife includes designing viewing platforms, creating driving tours, developing species checklists,
Fish and Wildlife Outreach	Conduct Presentations/Briefings/Training	Prepare, coordinate, and conduct fish and wildlife presentations, briefings, and training.
Fish and Wildlife Outreach	Develop Training/Education Materials	Prepare, update, coordinate, publish, and distribute fish and wildlife training and education materials.
Habitat Management	Habitat Enhancement	Create, upgrade, repair, or maintain habitat improvement for soldiers or wildlife habitat. Utilize LRAM standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, vegetation protection, and revegetation
Habitat Management	Invasive Species Control	Conduct invasive species control to control exotic and invasive species from spreading. Control invasive species to protect natural species and improve training realism. Utilize LRAM standard practices such as vegetation cutting and clearing (mechanical and hand), prescribed burning, and biological and chemical controls.
Habitat Management	Habitat Protection	Prepare, coordinate, and review regulations and overlays that protect sensitive and important wildlife habitat
Population Management	Wildlife Harvest	Provide support to conduct wildlife harvest by setting population goals, supporting check stations, and enforcing state and federal laws, regulations, and policies during hunting seasons.

Standard Practice Category	Standard Practice	Standard Practice Description
Population Management	Fisheries Harvest	Participate in fisheries harvest activities on military land.
Population Management	Fish Stocking	Participate in fish stocking activities on military land.
Population Management	Transplanting	Conduct transplanting of wildlife onto or off of military lands.
Population Management	Nuisance Wildlife Control	Conduct nuisance wildlife control, to include moose, bear, beaver, and other furbearers.
Population Management	Invasive Species Management	Conduct removal of invasive wildlife species from military lands, such as pike.
Population Management	Wildlife Protection and Conflict Avoidance	Put in place measures to protect wildlife species and to promote conflict avoidance through policies and regulations.
Outdoor Recreation Planning	Outdoor Recreation Management Plan Preparation, Review, and Update.	Prepare, review, and update outdoor recreation management plans
Outdoor Recreation Planning	Outdoor Recreation GIS Planning	Utilize Geographic Information System (GIS) to conduct landscape scale management of outdoor recreation resources.
Outdoor Recreation Planning	Outdoor Recreation National Environmental Policy Act Documentation	Prepare, coordinate, review, and update National Environmental Policy Act documents for outdoor recreation projects, programs, policies, and management plans.
Outdoor Recreation Inventory and Monitoring	Recreational Facility Survey	Conduct a survey of recreational facilities on military lands.
Outdoor Recreation Inventory and Monitoring	Recreational Impact Monitoring	Conduct a survey of recreational impacts across the landscape of military lands.
Outdoor Recreation Inventory and Monitoring	Trespass Structure Monitoring	Conduct a survey of trespass structures on military lands.
Outdoor Recreational Project Management	Plan Outdoor Recreation Projects	Conduct project planning by inventory and identification of potential sites, project development, which is accomplished using the project development worksheet, and project prioritization.
Outdoor Recreational Project Management	Design Outdoor Recreation Projects	Conduct project design by providing specific project designs for fuel hazard reduction, habitat improvement, cover and concealment, timber stand improvement, invasive species control, wildlife suppression, timber harvest, and firewood projects. Project designs include site plans, cost estimates, scopes of work, and bill of materials required for each project.
Outdoor Recreational Project Management	Coordinate Outdoor Recreation Activities	Conduct project coordination by coordinating forestry activities by providing project planning and oversight, technical assistance and design; and coordinating National Environmental Policy Act, wetland and cultural activities related to project oversight and management.
Outdoor Recreational Project Management	Outdoor Recreation Project Site Preparation	Prepare a project site for project implementation by flagging boundaries, marking trees, evaluating site conditions, etc.
Outdoor Recreational Project Management	Outdoor Recreation Project Oversight	Provide project oversight by monitoring project progress and execution. Report results back to federal project manager and COR.
Public Access	Support Recreational Access	Provide support to upgrade and maintain USARTRAK software and database. Create, staff, and implement recreational access permits.

Standard Practice Category	Standard Practice	Standard Practice Description
Recreational Activities	Hunting, Fishing, and Trapping	Provide hunting, fishing, and trapping support to plan and organize hunting, fishing and trapping activities on military lands.
Recreational Activities	Off-Road Recreational Vehicle	Provide Off-Road Recreational Vehicle support to plan and organize Off-Road Recreational Vehicle activities on military lands.
Recreational Activities	Other Recreational Activities	Provide support to other recreational activities, such as hiking, boating, berry picking, etc on military lands.
Trespass Structure Abatement	Conduct Trespass Structure Abatement	Plan, organize, coordinate, an d conduct trespass structure posting and removal.
Subsistence	Support Subsistence	Provide subsistence opportunities and access to subsistence users on military lands.
Outdoor Recreation Outreach	Conduct Presentations/Briefings/Training	Prepare, coordinate, and conduct fish and wildlife presentations, briefings, and training.
Outdoor Recreation Outreach	Develop Training/Education Materials	Prepare, update, coordinate, publish, and distribute fish and wildlife training and education materials.
TES Survey and Monitoring	Conduct Rare, Threatened, and Endangered F&W Species Surveys	Conduct rare, threatened, and endangered fish and wildlife species surveys on military lands.
TES Management	Special Interest Areas	Designate and manage appropriate areas as special interest areas.

APPENDIX C. SUMMARY OF ENVIRONMENTAL IMPACTS FOR STANDARD PROCEDURES

Standard Procedure Category	Location in INRMP	Soil Resources	Vegetation Resources	Water Resources	Fish and Wildlife Resources	Public Access and Recreation	Cultural Resources	Air Quality
Natural Resources Planning	Volume 1, Chapter 4; Volume 2, Annex A	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Natural Resources Outreach	Volume 1, Chapter 4; Volume 2, Annex A	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Natural Resources Project Management	Volume 1, Chapter 4; Volume 2, Annex A	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Geographic Information Systems	Volume 1, Chapter 4; Volume 2, Annex A	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Forestry Planning	Volume 1, Chapter 3.3; Volume 2, Annex C; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Forestry Project Management	Volume 1, Chapter 3.3; Volume 2, Annex C; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Forest Inventory and Monitoring	Volume 1, Chapter 3.3; Volume 2, Annex C; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Wildfire Prevention	Volume 1, Chapter 3.3; Volume 2, Annex C; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Forestry Outreach	Volume 1, Chapter 3.3; Volume 2, Annex C; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Forest Land Improvement	Volume 1, Chapter 3.3; Volume 2, Annex C; Volume 4	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial
Fish and Wildlife Planning	Volume 1, Chapter 3.4; Volume 2, Annex D; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Fish and Wildlife Project Management	Volume 1, Chapter 3.4; Volume 2, Annex D; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Fish and Wildlife Inventory and Monitoring	Volume 1, Chapter 3.4; Volume 2, Annex D; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Fish and Wildlife Outreach	Volume 1, Chapter 3.4; Volume 2, Annex D; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Fish and Wildlife Habitat Improvement	Volume 1, Chapter 3.4; Volume 2, Annex D; Volume 4	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial
Habitat Management and Protection	Volume 1, Chapter 3.4; Volume 2, Annex D; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Population Management	Volume 1, Chapter 3.4; Volume 2, Annex D; Volume 4	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial

Standard Procedure Category	Location in INRMP	Soil Resources	Vegetation Resources	Water Resources	Fish and Wildlife Resources	Public Access and Recreation	Cultural Resources	Air Quality
Watershed and Wetland Planning	Volume 1, Chapter 3.2; Volume 2, Annex B; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Watershed and Wetland Inventory and Monitoring	Volume 1, Chapter 3.2; Volume 2, Annex B; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Watershed and Wetland Project Management	Volume 1, Chapter 3.2; Volume 2, Annex B; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Watershed and Wetland Protection	Volume 1, Chapter 3.2; Volume 2, Annex B; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Erosion Control and Streambank Stabilization	Volume 1, Chapter 3.2; Volume 2, Annex B; Volume 4	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial
Vegetation Management	Volume 1, Chapter 3.2; Volume 2, Annex B; Volume 4	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial
Watershed and Wetland Outreach	Volume 1, Chapter 3.2; Volume 2, Annex B; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Outdoor Recreation Planning	Volume 1, Chapter 3.5; Volume 2, Annex E; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Outdoor Recreation Inventory and Monitoring	Volume 1, Chapter 3.5; Volume 2, Annex E; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Outdoor Recreation Project Management	Volume 1, Chapter 3.5; Volume 2, Annex E; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Public Access	Volume 1, Chapter 3.5; Volume 2, Annex E; Volume 4	Minor	Minor	Minor	Minor	N/A	Minor	Minor
Recreational Activities	Volume 1, Chapter 3.5; Volume 2, Annex E; Volume 4	Minor	Minor	Minor	Minor	N/A	Minor	Minor
Trespass Structure Abatement	Volume 1, Chapter 3.5; Volume 2, Annex E; Volume 4	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial	Minor to Beneficial
Subsistence	Volume 1, Chapter 3.5; Volume 2, Annex E; Volume 4	None	None	None	None	None	None	None
Outdoor Recreation Outreach	Volume 1, Chapter 3.5; Volume 2, Annex E; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Threatened and Endangered Species Monitoring	Volume 1, Chapter 3.6; Volume 2, Annex F; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial

Standard Procedure Category	Location in INRMP	Soil Resources	Vegetation Resources	Water Resources	Fish and Wildlife Resources	Public Access and Recreation	Cultural Resources	Air Quality
Threatened and Endangered Species Protection	Volume 1, Chapter 3.6; Volume 2, Annex F; Volume 4	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial

APPENDIX D: Integrated Natural Resources Management Plan PROJECT ASSESSMENT CHECKLIST

PROJECT _____

DESCRIPTION AND LOCATION _____
_____
_____
_____

FORM COMPLETED BY _____ **DATE**_____

In reference to the above project, check yes or no for each item below. If "yes" is indicated for any of the questions, additional NEPA analysis may be needed for the project. If "yes" is not indicated for any of the questions, the sample Record of Environmental Consideration (REC) should be used. USAGAK NEPA staff should be provided a copy of this checklist and consulted prior to project activity. Project managers should maintain this checklist as part of the project administrative record.

Project

Yes	No	
☐	☐	Is this project in addition to those listed in Appendix A of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?
☐	☐	Is a procedure, method, practice, or technique being used for this project that is not listed in either Table 2.1 or Appendix B of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?
☐	☐	Is the project or its potential impacts considered environmentally controversial?
☐	☐	Could the project result in high or uncertain environmental risks?

Soil Resources

Yes	No	
☐	☐	Is permafrost present within the project or construction footprint?
☐	☐	Has the Department of Public Works (DPW) determined that a dig permit is necessary?
☐	☐	Could impacts to soils resulting from this project be greater than those described in Section 3.1, Soil Resources, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?

Vegetation

Yes	No	
☐	☐	Could the project significantly contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area (E.O. 13112)?
☐	☐	Will the project occur in an area where there are federally listed, endangered, or threatened vegetation?
☐	☐	Could impacts to vegetation resulting from this project be greater than those described in Section 3.2, Vegetation, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?

Wetlands

Yes	No	
☐	☐	Is the project located within a wetland?
☐	☐	Will dredging, disposal of dredged material, excavation, or filling of a wetland be involved, or could the project result in modifications or adverse effects to wetlands or waters of the U.S.?
☐	☐	Could impacts to wetlands resulting from this project be greater than those described in Section 3.3, Wetlands, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?

Water Resources

Yes	No	
☐	☐	Is the project located within a floodplain (E.O. 11988)?
☐	☐	Is any part of the project footprint depicted as a red area on the environmental limitations overlay?
☐	☐	Will the project expose one or more acres of soil?
☐	☐	Will the project involve discharge (or runoff) of sediment into a waterway or storm sewer?
☐	☐	Will the project result in diversion or obstruction of stream flow?
☐	☐	Will the project impact a wild or scenic river?
☐	☐	Could the project result in potential impacts to surface water quality?
☐	☐	Could impacts to waters resulting from this project be greater than those described in Section 3.4, Water Resources, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?

Wildlife and Fisheries

Yes	No	
☐	☐	Will the project occur in an area where there are migratory birds or federally listed, endangered, or threatened wildlife or habitat?
☐	☐	Could the project affect the marine environment?
☐	☐	Could impacts to wildlife and fisheries resulting from this project be greater than those described in Section 3.5, Wildlife and Fisheries, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?

Fire Management

Yes	No	
☐	☐	Could this project interfere with Alaska Fire Service or military firefighting efforts?
☐	☐	Could impacts to fire management resulting from this project be greater than those described in Section 3.6, Fire Management, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?

Public Access and Recreation

Yes	No	
☐	☐	Will the project significantly hinder compliance with the Sikes Act?

☐	☐	Could impacts to public access and recreation resulting from this project be greater than those described in Section 3.7, Public Access and Recreation, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?

Cultural Resources

Yes	No	
☐	☐	Could the project involve disturbance of previously undisturbed ground?
☐	☐	Has the project undergone Cultural Resource Management staff review?
☐	☐	Could impacts to cultural resources resulting from this project be greater than those described in Section 3.8, Cultural Resources, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?
☐	☐	Could impacts to subsistence resulting from this project be greater than those described in Section 3.8, Cultural Resources, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?

Human Health and Safety

Yes	No	
☐	☐	Will the project involve the demolition of a structure?
☐	☐	Could impacts to human health and safety resulting from this project be greater than those described in Section 3.9, Human Health and Safety, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?

Socioeconomics

Yes	No	
☐	☐	Could the project have disproportionately high and adverse effect on low income or minority populations (E.O. 12898)?
☐	☐	Could impacts to socioeconomics resulting from this project be greater than those described in Section 3.10, Socioeconomics, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?

Noise

Yes	No	
☐	☐	Could the project generate significant short-term or long-term noise impacts?
☐	☐	Could impacts to noise resulting from this project be greater than those described in Section 3.11, Noise, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?

Air Quality

Yes	No	
☐	☐	Could emissions resulting from the project cause the installation to exceed regulated air pollutant criteria?
☐	☐	Could impacts to air quality resulting from this project be greater than those described in Section 3.12, Air Quality, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?

Cumulative Impacts

Yes	No	
☐	☐	Could the project have a direct relationship to other actions with individually insignificant but cumulatively significant environmental effects?
☐	☐	Could cumulative impacts resulting from this project be greater than those described in Section 3.13, Cumulative Impacts, of the *USAG-AK Integrated Natural Resources Management Plan Environmental Assessment*?

APPENDIX E: SAMPLE RECORD OF ENVIRONMENTAL CONSIDERATION (REC)

RECORD OF ENVIRONMENTAL CONSIDERATION

TITLE: Prescribed Fire at the Stuart Creek Impact Area, Yukon Training Area, Fort Wainwright, Alaska

DESCRIPTION OF PROPOSED ACTION: The Bureau of Land Management's Alaska Fire Service (AFS) proposes to conduct a prescribed burn on lands within Donnelly Training Area on Fort Wainwright Army Installation (FWA) at Oklahoma Range. The total area would be approximately 40,000 acres (see attached map).

The Oklahoma Range is located fifteen miles southwest of Delta Junction, Alaska with its center located at the approximate Universal Transverse Mercator (UTM) coordinates of VG 538000 x 7079000. The burn area is located south and west of 100 Mile Creek and along the eastern edge of the Little Delta River. Rivers, creeks and high alpine areas surround the burn unit. Vegetation within the burn units consists of areas dominated by grass, forbs, and willow with scattered birch and spruce trees. Grasses cover approximately 95% of the burn units and dominate in the wetter areas. Smoke volume and extended combustion are expected to be low due to the light fuel loading. Risk of fire escaping the area will be low due to high moisture content of adjacent fuels along the perimeter prior to ignition, surrounding rivers and creeks, and the presence of adequate holding forces (fire fighting personnel).

The environmental impacts associated with this type of project were analyzed in the *Environmental Assessment and Final Finding of No Significant Impact, Integrated Training Area Management Program Management Plan (ITAM EA 2005)*. The analyses of this Record of Environmental Consideration (REC) are considered in light of the environmental analysis provided in the 2007-2011 INRMP EA to determine whether this action represents a significant change from that previously assessed.

The Bureau of Land Management's AFS prepares a Prescribed Fire Burn Plan prior to conducting a prescribed burn. Prescribed burns can not be conducted without the development, review and approval of a burn plan by USAG-AK, USARAK and BLM-AFS. A Prescribed Fire Burn Plan summarizes burn methods and objectives, risk analysis, smoke management, public safety and notification methods, local, state and federal permitting requirements, and contingency plans, among other items.

PURPOSE AND NEED OF THE PROPOSED ACTION: The proposed prescribed burn is intended to minimize the risk of wildfire starts during training by reducing grass and fine fuel loading on the range. The proposed burning activity also provides for firefighter and public safety and offers training on prescribed burning techniques for AFS personnel. Failure to implement this project would result in increased wildfire danger on the ranges during training events.

ANTICIPATED DATE AND/OR DURATION OF THE PROPOSED ACTION: Burning activities are anticipated to begin in mid-April of 2007, depending on green-up conditions. This project may be postponed until the fall or winter in anticipation of possible unfavorable weather conditions and/or AFS scheduling conflicts. This prescribed burn is scheduled for maintenance burning at one to two year intervals during the spring and fall months through 2010. The duration of the prescribed burn is anticipated to be no longer than one month.

MITIGATION AND/OR SPECIAL CONDITIONS: The AFS has prepared a Prescribed Fire Burn Plan for this action and would be consulted prior to burning activities. Local air quality guidelines

regarding prescribed burning will be followed. If poor air mixing heights or air quality conditions exist, all burning activities must be postponed until conditions improve.

Prescribed burning should be conducted as early in the spring as possible to minimize impacts to bird nesting periods.

U.S. Army Alaska Donnelly Training Area Range Control must be contacted at (907) 873-4714 prior to any burning activities. All AFS personnel will be briefed on the potential and hazards of unexploded ordnance within the immediate area.

Existing roads and trails would be used for site access. This project will not create any sub-surface ground disturbance. In the event that sub-surface disturbance is required, the Environmental Resources Department archaeologist will be notified prior to any digging or earthwork. In the event that cultural resources are disturbed or discovered without digging or earthwork during this project, the Environmental Resources Department archaeologist shall be notified.

CONCLUSION: The environmental impacts associated with the prescribed burning of approximately 40,000 acres are not sufficiently different from those analyzed in the *Environmental Assessment and Finding of No Significant Impact, Integrated Training Area Management Program Management Plan Dec 2006 (2007-2011 INRMP EA)*. The proposed actions at Oklahoma Range are not sufficient to warrant preparation of a separate environmental assessment. The proposed action would not degrade the existing environment, is not environmentally controversial, nor would it adversely affect environmentally sensitive resources. Anticipated impacts associated with this project are comparable with those addressed in the 2007-2011 INRMP.

Prepared by: _____

CARRIE MCENTEER
NEPA Coordinator, USAG-AK
Fort Wainwright, Alaska

Reviewed by: _____

KEVIN GARDNER
Chief, Environmental Department
Directorate of Public Works

Approved by: _____

ALLAN D. LUCHT
Director
Directorate of Public Works

ITAM PROJECT ASSESSMENT CHECKLIST

PROJECT: Prescribed Fire at Oklahoma Range on Fort Wainwright Donnelly Training Area, Alaska

DESCRIPTION AND LOCATION: The Oklahoma Range is located fifteen miles southwest of Delta Junction, Alaska with its center located at the approximate Universal Transverse Mercator (UTM) coordinates of VG 538000 x 7079000.

FORM COMPLETED BY: Carrie McEnteer **DATE:** 9 March 07

In reference to the above project, check yes or no for each item below. If "yes" is indicated for any of the questions, additional NEPA analysis may be needed for the project. If "yes" is not indicated for any of the questions, the sample Record of Environmental Consideration (REC) should be used. USAGAK NEPA staff should be provided a copy of this checklist and consulted prior to project activity. Project managers should maintain this checklist as part of the project administrative record.

Project

Yes No

X ☐ Is this project in addition to those listed in Appendix A (LRAM Five-Year Project List) of the *USAG-AK INRMP EA*?

☐ X Is this project in addition to those listed in Appendix B (Standard INRMP Projects) of the *USAG-AK INRMP*?

☐ X Is a procedure, method, practice, or technique being used for this project that is not listed in either Table 2.1 or Appendix B of the *USARAK USAG-AK INRMP EA?*

☐ X Is the project or its potential impacts considered environmentally controversial?

☐ X Could the project result in high or uncertain environmental risks?

Soil Resources

Yes No

☐ X Is permafrost present within the project or construction footprint?

☐ X Has the Department of Public Works (DPW) determined that a dig permit is necessary?

☐ X Could impacts to soils resulting from this project be greater than those described in Section 3.1, Soil Resources, of the *USAG-AK INRMP EA*?

Vegetation

Yes No

☐ X Could the project significantly contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area (E.O. 13112)?

☐ X Will the project occur in an area where there are federally listed, endangered, or threatened vegetation?

☐ X Could impacts to vegetation resulting from this project be greater than those described in Section 3.2, Vegetation, of the *USAG-AK INRMP EA*?

Wetlands

Yes No

☐ ☐ Is the project located within a wetland?

☐ X Will the project involve dredging, disposal of dredged material, excavation, or filling of a wetland as described under Section 404 of the Clean Water Act?

☐ X Could the project result in modifications or adverse effects to wetlands?

☐ X Could impacts to wetlands resulting from this project be greater than those described in Section 3.3, Water resources, of the *USAG-AK INRMP EA*?

Water Resources

Yes No

☐ X Is the project located within a floodplain (E.O. 11988)?

☐ X Is any part of the project footprint depicted as a red area on the environmental limitations overlay?

☐ X Will the project expose one or more acres of soil?

☐ X Will the project involve discharge (or runoff) of sediment into a waterway or storm sewer?

☐ X Will the project result in diversion or obstruction of stream flow?

☐ X Will the project impact a wild or scenic river?

☐ X Will the project involve dredging or filling of a water body as described under Section 404 of the Clean Water Act?

☐ X Will the project involve construction, excavation, or deposition of materials in, over, or under a water body, or would any work affect the course, location, condition, or capacity of a water body as described under Section 10 of the Rivers and Harbors Act?

☐ X Could the project result in potential impacts to surface water quality?

☐ X Could impacts to waters resulting from this project be greater than those described in Section 3.4, Water Resources, of the *USAG-AK INRMP EA*?

Wildlife and Fisheries

Yes No

X ☐ Will the project occur in an area where there are migratory birds or federally listed, endangered, or threatened wildlife or habitat?

☐ X Could the project affect the marine environment?

☐ X Could impacts to wildlife and fisheries resulting from this project be greater than those described in Section 3.5, Wildlife and Fisheries, of the *USAG-AK INRMP EA*?

Fire Management

Yes No

☐ X Could this project interfere with Alaska Fire Service or military firefighting efforts?

☐ X Could impacts to fire management resulting from this project be greater than those described in Section 3.3, Vegetation, of the *USAG-AK INRMP EA*?

Public Access and Recreation

Yes No

☐ X Will the project significantly hinder compliance with the Sikes Act?

☐ X Could impacts to public access and recreation resulting from this project be greater than those described in Section 3.6, Public Access and Recreation, of the *USAG-AK INRMP EA*?

Cultural Resources

Yes No

☐ X Could the project involve disturbance of previously undisturbed ground?

X ☐ Has the project undergone Cultural Resource Management staff review?

☐ X Could impacts to cultural resources resulting from this project be greater than those described in Section 3.7, Cultural Resources, of the *USAG-AK INRMP EA*?

☐ X Could impacts to subsistence resulting from this project be greater than those described in Section 3.7, Cultural Resources, of the *USAG-AK INRMP EA*?

Human Health and Safety

Yes No

☐ X Will the project involve the demolition of a structure?

X ☐ Could impacts to human health and safety resulting from this project be greater than those described in Section 3.9, Human Health and Safety, of the *USARAK ITAM Program Management Plan EA*?

Socioeconomics

Yes No

☐ X Could the project have disproportionately high and adverse effect on low income or minority populations (E.O. 12898)?

☐ X Could impacts to socioeconomics resulting from this project be greater than those described in Section 3.10, Socioeconomics, of the *USARAK ITAM Program Management Plan EA*?

Noise

Yes No

☐ X Could the project generate significant short-term or long-term noise impacts?

☐ X Could impacts to noise resulting from this project be greater than those described in Section 3.11, Noise, of the *USAG-AK INRMP EA*?