INTEGRATED NATURAL RESOURCES

FOR

CAMP MURRAY

Washington Army National Guard

Environmental Program

Prepared June 2010

Updated June 2017

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INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN UPDATE

CAMP MURRAY, PIERCE COUNTY, WA

JUNE 2017

This Integrated Natural Resources Management Plan (INRMP) Update meets the requirements for INRMPs as specified in the Sikes Act, as amended (16 USC §670a *et seq.*). It has set appropriate and adequate guidelines for conserving and protecting the natural resources of Camp Murray.

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EXECUTIVE SUMMARY

An Integrated Natural Resources Management Plan (INRMP) has been developed for Camp Murray as a tool for managing natural resources at this installation. The Camp Murray INRMP was initially developed in 2010 and updated in 2017. The primary purpose of this INRMP is to guide the natural resource management program towards the protection and enhancement of military training at Camp Murray in accordance with the Sikes Act, 16 United States Code [USC] §670a *et seq*., as amended.

Camp Murray encompasses approximately 240 acres located just south of Tacoma in western Washington, and is managed by the Washington Military Department. The primary purpose of Camp Murray is to support the mission of the Washington Army National Guard (WAARNG), the Washington Air National Guard (WAANG), and the Washington Military Department Emergency Management Division (EMD). The EMD serves as a Washington State major incident command center for coordinating local emergency services and integrating WAARNG and WAANG into a regional or statewide emergency response effort. The INRMP is designed to support and accommodate accomplishment of the military and emergency response missions while providing for natural resources stewardship and management. Approximately 110 acres on the installation are undeveloped, and consist of mixed coniferous-deciduous forest as well as Oregon white oak woodland, a priority habitat in the State of Washington.

Specific goals identified by the INRMP in Chapter 7 are:

Goal 1: Improve coordination with Joint Base Lewis McChord (JBLM) regarding shared natural resources.

Goal 2: Enhance rearing and spawning habitat for kokanee salmon in support of WDFW efforts to restore the native kokanee population in Murray Creek and American Lake. Also enhance stream habitat for resident cutthroat and rainbow trout in Murray Creek.

Goal 3: Maintain vegetated communities in a condition that minimizes the threat to human health and safety, and maintains and enhances habitat for flora and fauna.

Goal 4: Improve awareness of natural resources at Camp Murray to ensure compliance with all federal and state laws and regulations.

Goal 5: Protect and enhance existing habitat for bald eagles and other raptors including, but no limited to, hawks, owls and ospreys. Improve awareness of bald eagle habitat at Camp Murray to ensure compliance with all federal and state laws and regulations.

Goal 6: Ensure that all biological resources at Camp Murray are appropriately inventoried and managed.

Goal 7: Foster community involvement within Camp Murray and the surrounding areas (i.e., the Boy Scouts, elementary schools, installation personnel).

Goal 8: Protect the quality of water on Camp Murray for use by people and wildlife.

Goal 9: Promote the conservation and management of pollinators, their habitats and associated ecosystems.

Goal 10: Consider climate change impacts in the identification and implementation of sound natural resource strategies.

These goals are supported in the INRMP by objectives and projects, which provide management strategies and specific actions to achieve these goals. Objectives and projects are listed in the Project Table (Appendix H) of the INRMP Update.

In 2010, an Environmental Assessment (EA) was required for the development of the INRMP (see Appendix B). Since the initial INRMP development, there have been no significant changes in the intensity or timing of training activities at Camp Murray. Also, no federal or state listed species have been identified at Camp Murray. Therefore, the 2010 INRMP is considered effective in guiding the natural resource management decisions at Camp Murray. Minor updates to the INRMP were completed in a 2017 INRMP update to ensure the effectiveness of the plan moving forward during the next five years. These updates include:

- Discussion of sustainability in the context of climate change in the management strategies section of the INRMP including a statement of support for Department of Defense vulnerability assessments
- Update of noxious weed information based on current state and county lists.
- Update of federal and state listed species information.
- Inclusion of information from the 2012 fish and wildlife planning level study.
- Update of facility maps to accurately represent the current built and natural environment.

Since these changes are not expected to result in consequences materially different from those in the existing INRMP and analyzed in the 2010 NEPA document and will not result in a significant environmental impact, no further NEPA documentation other than a REC/Checklist is required (Appendix B).

This INRMP also includes an updated Forest Management Plan (FMP) for Camp Murray (Appendix F). The purpose of this FMP is to provide management recommendations for forests on Camp Murray to ensure 1) installation compliance with all applicable laws and regulations, 2) perpetuation of natural resources needed to sustain the military mission, and 3) safety of life and property for people using the installation.

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
AEDB-EQ	Army Environmental Database Environmental Quality module
AERO	Army Environmental Reporting Online
AMEC	AMEC Earth & Environmental, Inc.
AR	Army Regulation
ARNG	Army National Guard
ARPA	Archaeological Resources Protection Act
BEMP	Bald Eagle Management Plan
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CFMO	Construction and Facilities Management Office
CFMO-Env	Construction and Facilities Management Office-Environmental Programs Section
CSMS	Combined Support Maintenance Shop
CWA	Clean Water Act
DA	Department of Army
DCSOPS	Deputy Chief of Staff for Operations and Plans
DENIX	Defense Environmental Network Information Exchange
DoD	Department of Defense
DoDI	Department of Defense Instruction
DUSD	Deputy Under Secretary of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMD	Emergency Management Division
EMO	Environmental Management Officer
EMS	Environmental Management System
EO	Executive Order
EPR web	Environmental Project Review website
EQR	Environmental Quality Report
ESA	Endangered Species Act
°F	Degrees Fahrenheit
FM	Field Manual
FMP	Forest Management Plan
FY	Fiscal Year
GIS	Geographic Information System
I-5	Interstate Highway 5
IICEP	Interagency/Intergovernmental Coordination for Environmental Planning
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IPMP	Integrated Pest Management Plan

IPM	Integrated Pest Management
ISO	International Standards Organization
ITAM	Integrated Training Area Management
MAMC	Madigan Army Medical Center
MBTA	Migratory Bird Treaty Act
MFR	Memorandum for Record
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
msl	mean sea level
NAGPRA	Native American Graves Protection and Repatriation Act
NAISA	National Aquatic Invasive Species Act
NEPA	National Environmental Policy Act of 1969
NGB	National Guard Bureau
NGB-ARE	NGB Army Environmental Programs Division
NGB-ARI	NGB Army Installations Division
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
ODCSOPS	Office of the Deputy Chief of Staff for Operations
PEM	Palustrine Emergent
PFO	Palustrine Forested
PHS	Priority Habitats and Species
PL	Public Law
PLANTS	Plant List of Accepted Nomenclature, Taxonomy, and Symbols
PLS	Planning Level Surveys
PPP	Pollution Prevention Plan
PSS	Palustrine Scrub-Shrub
RCW	Revised Code of Washington
RTLP	Range and Training Land Program
SAIA	Sikes Act Improvement Act
SEPA	State Environmental Policy Act
SHPO	State Historic Preservation Office
SOP	Standard Operating Procedure
SRM	Sustainment, Restoration, and Maintenance
SRP	Sustainable Range Program
STEP	Status Tool for the Environmental Program
SWANCC	Solid Waste Agency of Northern Cook County
SWMM	Storm Water Management Manual for Western Washington
TNC	The Nature Conservatory
TSC	Training Site Commander
UIC	underground injection controls
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency

USFWS	U.S. Fish and Wildlife Service
WAARNG	Washington Army National Guard
WAANG	Washington Air National Guard
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WDOE	Washington Department of Ecology
WMD	Washington Military Department
WQC	Water Quality Certification
WRIA	Washington Resource Inventory Area

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1. GENERAL INFORMATION

1.1 Purpose

This Integrated Natural Resources Management Plan (INRMP) has been developed for use by the National Guard Bureau (NGB) and the Washington Army National Guard (WAARNG) as the primary tool for managing natural resources at the WAARNG's 240-acre Camp Murray installation. The original Camp Murray INRMP was developed in 2010 and updated in 2017. This document presents an update to the 2010 INRMP to ensure effectiveness of the plan moving forward in the next five years.

Camp Murray was established in Pierce County in west-central Washington in the 1890s. Camp Murray includes facilities serving the Washington Army National Guard (WAARNG), the Washington Air National Guard (WAANG), and the Emergency Management Division (EMD) of the Washington Military Department. The WAANG, occupies approximately 43 acres of forested and developed land on Camp Murray, which is leased to the US Air Force and licensed to the WAANG, funded and operated as a separate entity from the WAARNG.

This INRMP is required by Army policy and has been prepared consistent with the Sikes Act as mandated by Army policy. The Sikes Act Improvement Act (SAIA) of 1997 (16 U.S. Code (USC) §670a *et seq*., as amended) requires federal military installations with adequate wildlife habitat to develop long-range integrated natural resources management plans and implement cooperative agreements with other agencies. In 2010, Congress expanded the scope of the Sikes Act to include state-owned Army National Guard installations that receive federal funding for training, including Camp Murray.

Sites requiring INRMPs were initially identified in 1998 after the passing of the SAIA, which required DOD to prepare and implement the plans. Additional sites were identified by a 2002 data call, at which time Camp Murray was added. Camp Murray is the only WAARNG site that was identified to the Department of Defense (DOD) and Congress as requiring an INRMP per DA memorandum dated April 20, 2006. This INRMP is intended to be consistent with the SAIA.

Camp Murray was initially required to develop an INRMP because it was located within an active bald eagle nesting territory. The United States Fish and Wildlife Service (USFWS) listed the bald eagle as a federally-threatened species protected by the Endangered Species Act (ESA) of 1973. Although the bald eagle was de-listed from the ESA in 2007, an INRMP is still required for Camp Murray pursuant to the U.S. Army because the installation contains sensitive natural resources, including Washington State Priority Habitats and Species, wetlands, streams, and shoreline that require integrated management. To continue to perform its military mission, Camp Murray must remain in compliance with all applicable federal, state, and local environmental laws, and ensure that natural resources remain in a safe and functional condition.

The purpose of this INRMP is to ensure that natural resource conservation measures and military activities on mission lands are integrated and consistent with Federal stewardship requirements. Consistent with the SAIA, this INRMP "shall, to the extent appropriate and applicable, provide for:

a) Fish and wildlife management, land management, forest management, and fish- and wildlife-oriented recreation;

b) Fish and wildlife habitat enhancement or modifications;

c) Wetland protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants;

d) Integration of, and consistency among, the various activities conducted under the plan;

e) Establishment of specific natural resources management goals and objectives and time frames for proposed action;

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;

h) Enforcement of applicable natural resource laws (including regulations);

i) No net loss in the capability of military installation lands to support the military mission of the installation;

j) Such other activities as the Secretary of the military department determines appropriate."

The WAARNG has embraced the concept of integrating natural resource management with its mission activities. The WAARNG recognizes that successful execution of their mission is dependent upon the sustainable maintenance of their environment. Therefore, the WAARNG is committed to the planned management of natural resources, supporting the installation's operational mission, meeting or exceeding stewardship requirements, and enhancing the quality of life for its personnel and guests.

1.2 Authority

This INRMP has been prepared pursuant to the following laws, regulations, and directives:

- Army Regulation (AR) 200-1, *Environmental Protection and Enhancement, effective 27 December 2007*;
- This INRMP is consistent with the SAIA (The Sikes Act "Conservation Programs on Military Reservations" (16 USC §670a *et seq*.), as amended).
- Department of Defense Instruction (DoDI) 4715.03, *Natural Resources Conservation Program*;
- *Environmental Effects of Army Actions,* 32 Code of Federal Regulations (CFR) 651;
- DoD Manual 4715.03, *INRMP Implementation Manual*;
- Office of the Deputy Under Secretary of Defense (DUSD), *Updated Guidance for Implementation of the SAIA,* on 5 November 2004.
- 32 CFR 190, *Appendix-Integrated Natural Resources Management*;
- *Army National Guard Directorate (ARNG) Guidance for the Creation, Implementation, Review, and Revision and Update of INRMPs, April 9, 2012*.

1.3 Responsibilities

The Adjutant General of the WAARNG is directly responsible for the operation and maintenance of WAARNG facilities, including implementation of this INRMP. Under the direction of The Adjutant General, the force structure (that is, types and number of units, types of equipment, training events, etc.), projects, construction and budgets at WAARNG facilities are determined throughout the five-year operational period of the INRMP. Under the leadership of The Adjutant General, all WAARNG personnel and guests will be involved in environmental awareness, and will be explicitly mandated to comply with the policies, procedures, requirements and applicable laws and regulations that accomplish the goals and objectives of the INRMP.

The WAARNG Deputy Chief of Staff for Operations and Plans (DCSOPS) has the primary responsibility for military training of WAARNG troops and for ensuring the safety of all personnel during the conduct of training exercises at WAARNG facilities. The DCSOPS determines the training capacity based upon the force structure determined by the Adjunct General. The DCSOPS is responsible for ensuring that the INRMP supports WAARNG training requirements. The DCSOPS office reviews the plans and is a signatory to the plan.

The WAARNG's Construction and Facilities Management Office-Environmental Program (CFMO-Env) is responsible for directing the management of natural resources and for the development and implementation of the INRMP. The CFMO-Env is responsible for identifying compliance requirements, and providing guidance to the Training Site Commander (TSC) and other personnel. The CFMO-Env provides technical assistance to the TSC and the training site personnel to develop projects, secure required permits, conduct field studies, provide environmental awareness materials, identify natural and cultural resources, direct the National Environmental Policy Act (NEPA) process, and manage the development and revision of the INRMP. The Camp Murray staff is responsible for providing input to the plan and implementing specific elements of the plan. The CFMO-Env is also responsible for the annual review of the INRMP. Periodic evaluations and revisions at no less than every five years will be conducted by the CFMO-Env, with input from the USFWS, Washington Department of Fish and Wildlife (WDFW), Washington Department of Natural Resources (WDNR), other government agencies, and internal and external stakeholders, as appropriate.

The NGB is responsible for review and approval of this INRMP. The NGB is also responsible for programming, funding, and reviewing the implementation of projects set forth in the INRMP.

1.4 Management Philosophy

This INRMP has been developed in an interdisciplinary approach by gathering information from the WAARNG CFMO-Env, concerned Camp Murray staff, USFWS, WDFW, and WDNR personnel, other federal, state, tribal and local agencies, and special interest groups with an interest in the management of natural resources at Camp Murray. The draft INRMP and draft EA were made available for public comment. A distribution list for the draft 2010 INRMP, as well as initial agency and tribal coordination and response letters are included with the Environmental Assessment in Appendix B.

An INRMP describes the baseline conditions of natural resources at a military installation and provides management programs and guidance allowing for the performance of successful military training, while providing for the conservation of renewable natural resources, preservation of rare and unique resources, and long-term resource sustainability. Specific plan expectations include the following:

- Provide a comprehensive plan for the WAARNG to carry out its mission while promoting ecosystem health and biodiversity at Camp Murray and in the surrounding region.
- Document goals, objectives, guidelines, and future direction for natural resources management.
- Establish a framework for implementing natural resources programs and ecosystem management.
- Provide centralized information on the natural resources program status.
- Identify environmental constraints to land use so that military training can be matched with the ecosystem carrying capacity.
- Identify mission-related impacts and options for conflict resolution.
- Serve as a baseline of existing environmental conditions for defensible future Environmental Assessments (EA) and Environmental Impact Statements (EIS).
- Ensure that the installation complies with environmental regulations.
- Identify, prioritize, and schedule long-term budget requirements.

The typical management programs addressed in an INRMP include training area management, land management, forest management, aquatic and terrestrial habitat management, special natural area management, fish and wildlife management, rare and endangered species management, pest management, fire management, recreational resource and activity management, and agricultural program management.

The overall policies and philosophy of land management at Camp Murray are derived from AR 200-1 and 32 CFR 651. These policies, regulations, and programs are based on the concept that natural resources management is an integral component of the primary mission of military use. The WAARNG must train; therefore, the WAARNG will manage Camp Murray to conserve valuable training resources, including the natural environment. Management of natural resources on an ecosystem basis ensures the sustainable use of training lands while considering the effects on the surrounding environment and public concern.

1.5 Military Mission

The primary mission of the WA National Guard at Camp Murray is to safeguard lives, property, and the economy of Washington State. Camp Murray, as the headquarters of the WA National Guard and Emergency Management Division, provides administrative mission support to homeland security, assists in major emergency responses, and serves as the central location for information gathering, disaster analysis, and response coordination. Camp Murray also provides drill grounds, classroom training, and physical fitness training facilities to WAARNG and WAANG personnel. No live combat training is conducted at Camp Murray.

The primary purpose of natural resources management at Camp Murray is to support the military mission by maintaining sustainable natural resources as a critical asset upon which to accomplish the mission of the WAARNG at Camp Murray. Overall goals of natural resource management at Camp Murray include:

- Ensure no net loss in the capability of installation lands to support existing and future military operations at Camp Murray.

- Ensuring military operations are not interrupted due to non-compliance with applicable laws,

This INRMP integrates the various aspects of natural resources management into the military mission, and becomes the primary tool for ecosystem management at Camp Murray while ensuring the successful, efficient accomplishment of the military mission. A multiple-use approach will be implemented through use of the INRMP to accommodate the presence of mission-oriented activities and provide for good stewardship, thereby maintaining and improving the quality, aesthetic values and ecological relationships of the environment.

Implementation of this INRMP at Camp Murray will promote adaptive stewardship practices that protect and enhance natural resources for multiple use and biological integrity, while supporting the military mission.

1.6 Environmental Management System

Executive Order (EO) 13423 Strengthening Federal Environmental, Energy, and Transportation Management was signed in January 2007, which sets federal goals in the areas of energy efficiency, acquisition, renewable energy, toxics reductions, recycling, renewable energy, sustainable buildings, electronics stewardship, fleets, and water conservation. The order requires the use of Environmental Management Systems (EMS) as the primary management approach for addressing environmental aspects of internal agency operations and activities, Developing and implementing an EMS is required at all Army installations, as well as at all WAARNG installations.

The EMS is part of an installation's overall management system and includes organizational structure, planning, responsibilities, practices, procedures and processes, and resource allocation for developing, implementing, achieving, reviewing, and maintaining environmental commitments. The International Standards Organization (ISO)-14001 EMS model leads to continual improvement based upon a cycle of "plan, do, check, act":

- Planning, including identifying environmental aspects and establishing goals [**plan**];
- Do - Implementing, including training and operational controls [**do**];
- Checking, including monitoring and corrective action [**check]**;
- Reviewing, including progress reviews and acting to make needed changes to the EMS [**act**].

The EMS is continually updated through this cycle, fine-tuning its management of operations that may harm the environment. This continual improvement cycle is a fundamental attribute of the EMS that allows the system to adapt to the dynamic nature of the organization's operations.

This INRMP will be used to directly support the development of the WAARNG's EMS.

1.7 Ecosystem Management

An ecosystem is the "sum of the plant community, animal community, and environment in a particular region or habitat" (Barbour 1987). Ecosystem management may be defined as management "to restore

and maintain the health, sustainability, and biological diversity of ecosystems while supporting sustainable economies and communities" (U.S. Environmental Protection Agency [USEPA] 1994).

The goal of ecosystem management is "to ensure that military lands support present and future training and testing requirements while preserving, improving, and enhancing ecosystem integrity" (DoDI 4715.03). Natural resources at Camp Murray will be managed with an ecosystem management approach.

Principles and guidelines of ecosystem management, per DoDM 4715.03, are as follows:

1) Guarantee continued access to land, air and water for realistic military training.
2) Maintain and improve the sustainability of native biodiversity of ecosystems.
3) Administer with consideration of ecological units and timeframes.
4) Support sustainable human activities.
5) Develop vision of ecosystem health.
6) Develop priorities and reconcile conflicts.
7) Develop coordinated approaches to work toward ecosystem health.
8) Rely on the best science and data available.
9) Use benchmarks to monitor and evaluate outcomes.
10) Use adaptive management.
11) Implement through installation plans and programs.

Biological diversity or biodiversity may be defined as "the variety of living organisms considered at all levels of organization, from genetics through species, to higher taxonomic levels, and including the variety of habitats and ecosystems, as well as the processes occurring therein" (Meffe 1994).

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 DoD has developed a Biodiversity Management Strategy (Keystone 1996). This document identifies five reasons to conserve biodiversity on military lands, to wit:

1) Sustain natural landscapes required for the training and testing necessary to maintain military readiness.
2) Provide the greatest return on the DoD investment to conserve 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 notes that the challenge is, "to manage for biodiversity in a way that supports the military mission." This strategy identifies the INRMP as the primary vehicle to implement biodiversity conservation 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 the INRMP and other planning protocols;
- Involve internal and external stakeholders up front;
- Emphasize the regional (ecosystem) context; and
- Concentrate on results.

Specific management practices identified in this INRMP have been developed to enhance and maintain biological diversity within the ecosystems at Camp Murray.

1.8 Conditions for Implementation and Revision

1.8.1 Implementation

The WAARNG CFMO-Env is responsible for directing the management of natural resources and for the development and implementation of the INRMP. Successful implementation of the INRMP will require:

- Administrative and technical support;
- Agency cooperation and technical assistance;
- Funding;
- Priorities and scheduling;
- Production of project scopes and budgets; and
- The ability to amend and revise this document as necessary.

Where projects identified in the plan are not implemented because of lack of funding, or other compelling circumstances, the installation will review the goals and objectives of this INRMP to determine whether adjustments are necessary.

1.8.2 Agency Coordination and NEPA Compliance

This INRMP was developed in cooperation with the USFWS and WDFW consistent with the Sikes Act. Using an interdisciplinary approach, relevant information was gathered from concerned Camp Murray staff, as well as other federal, state, and local agencies and other stakeholders in the management of natural resources at Camp Murray.

An INRMP is a federal action document that triggers compliance with National Environmental Policy Act (NEPA) requirements. The 2010 INRMP for Camp Murray included an Environmental Assessment (EA). According to Army policy, NEPA compliance for the Natural Resources Management Program must be accomplished to specifically address the environmental impacts of the proposed natural resources management program during the initial development of the Integrated Natural Resources Management Plan and when a major five–year revision to the Plan is conducted. An Environmental Assessment (EA) was prepared in 2010 pursuant to the NEPA of 1969, as amended (42 USC §4321); Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508); AR (32 CFR Part 651, Environmental Effects of Army Actions); NGB NEPA Handbook, June 2006; and the NGB Army Environmental Programs Division (NGB-ARE) Memorandum 9 August 2004, Additional Guidance for National Environmental

Policy Act Documentation. A REC/Checklist was prepared for the INRMP Update to satisfy NEPA requirements.

The scope of this EA includes descriptions and evaluation of two alternatives, summarized as follows:

Alternative 1: Preferred Action Alternative – Implement natural resources management measures as presented in the INRMP.

Alternative 2: No Action Alternative – Continue with operations as currently conducted and do not implement the revised INRMP.

The EA summarizes the affected environment and assesses the environmental consequences of INRMP implementation. The assessment concludes that the known and potential impacts of the Proposed Action on the physical, biological, and cultural environment will generally be of a positive nature. Implementing this INRMP will not result in adverse environmental effects. Public participation requirements of the SAIA and the DoD Supplemental SAIA Guidance were accomplished in this EA. The draft 2010 INRMP and draft EA were made available for public comment.

1.8.3 INRMP Reviews

The SAIA requires an informal annual review of the INRMP (see Section 8.3). According to the Army National Guard Directorate's INRMP guidance (April 2012), an INRMP review shall verify the following:

- All "must fund" projects and activities have been budgeted for and implementation is on schedule. "Must fund" conservation requirements are those projects and activities that are required to meet recurring management requirements or current compliance needs.
- 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 any changes made during the previous year have been discussed.
- 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 are still valid.
- "No net loss" of training capability has occurred due to implementation of the INRMP in accordance with Sikes Act.

Documentation of annual reviews is included in Appendix G.

In accordance with Army National Guard Directorate's INRMP guidance (April 2012), each INRMP must be reviewed for "operation and effect" every five years by the three parties to the INRMP which include the Washington Military Department Environmental Program Manager, the USFWS and the WDFW. The review for operation and effect is an assessment by these three parties to determine whether the INRMP is being implemented to meet the requirements of the Sikes Act and is contributing to the conservation and rehabilitation of natural resources on the military installation. This review process can result in either an INRMP revision or update. Page revisions can be made when major revisions are unnecessary. Information such as that relating to the soils, natural vegetation, and environmental data, not requiring revision, will be retained in the plan.

The 2010 INRMP was reviewed for "operation and effect" starting in 2016 and completed in 2017. Copies of coordination letters mailed to USFWS and WDFW are included in Appendix G. This review noted that no changes in the intensity or timing of training activities have occurred at Camp Murray since the INRMP was developed in 2010. The review also notes that no federal or state listed species have been identified at Camp Murray. Therefore, the review concludes that the 2010 INRMP is considered effective in guiding the natural resource management decisions at Camp Murray. Minor updates to the INRMP were completed and are included in this 2017 INRMP to ensure the effectiveness of the document moving forward during the next five years. The updates included:

- Discussion of sustainability in the context of climate change,
- Update of noxious weed information based on current state and county lists,
- Updated federal and state listed species information,
- Include information from the most recent fish and wildlife planning level study (2012), and
- Update facility maps to accurately represent the current built environment.

An INRMP update includes any change to an INRMP that, if implemented, is not expected to result in consequences materially different from those in the existing INRMP and analyzed in an existing NEPA document. Such changes will not result in a significant environmental impact. Public review or comment on the decision to continue implementing an updated INRMP is not required (DoD 2015).

2. INSTALLATION OVERVIEW

2.1 Location and Area

Camp Murray lies adjacent to Joint Base Lewis McChord Lewis Main (formerly Fort Lewis) in Pierce County, Washington, approximately 10 miles south of Tacoma (Appendix A, Figure A-1). Camp Murray is the location of the WAARNG headquarters. The installation consists of approximately 240 acres shared by the WAARNG, the WAANG, and the EMD. All of Camp Murray land is state-owned.

Approximately 46 percent (110 acres) of the installation consists of undeveloped natural areas. Natural areas on the site include forested areas, a shoreline adjacent to American Lake, a perennial stream (Murray Creek), and wetlands. Several state-listed Priority Habitats are present on the installation, and bald eagles are known to use the area for breeding and foraging.

Access to Camp Murray is restricted. Persons accessing the installation must check-in with guards posted at one of two entrances located on the north and south ends of the property.

A boat launch on American Lake is located in the northwestern portion of the site, and is the only area within Camp Murray that is open for civilian use. The boat launch sits on land leased by the WDFW, and is accessed through public streets located in the City of Lakewood.

2.2 Installation History

Camp Murray was first legally recognized as part of a land claim in 1846 by the Puget Sound Agricultural Company, a subsidiary of the Hudson's Bay Company. Under the ownership of Puget Sound Agricultural Company, the land was used as a cattle park until the 1850s. Camp Murray was first used for military activity by the Washington State Militia beginning around 1890. However, ownership of the land did not rest with Washington State until the state acquired the land in 1903 and constructed a formal training site with a quartermaster warehouse. Camp Murray was then used for maneuver training until 1938. Today, Camp Murray serves as the headquarters of the WMD, which includes WAARNG, WAANG and EMD.

2.3 Current Land Use

Camp Murray encompasses a total of approximately 240 acres. Developed areas, which encompass approximately 54 percent of the installation, included various administrative buildings for the three major divisions (WAARNG, WAANG and EMD), the Pierce County Readiness Center which was completed in 2017 on the site of the former Combine Support Maintenance Shop (CSMS), and recreational amenities. The built environment of Camp Murray provides storage buildings, administrative offices, classrooms, troop barracks, a heliport, and a drill field. Recreational amenities include a physical training course, campground, and a boat launch. The boat launch is the only facility within Camp Murray that is open for civilian use. The remaining portions of the installation consist of undeveloped forest, wetlands, shoreline, and riparian areas. Current land use in Camp Murray is shown in Figure 2.

All of Camp Murray land is owned by the State of Washington under the WMD, a state agency. The State of Washington has leased approximately 43 acres of land on Camp Murray to the WAANG since 1974. Other entities leasing land from the WMD within Camp Murray include:

- WDFW, who leases a portion of the American Lake shoreline for a boat launch;

- Lakewood Fire Department, who leases a portion of the shoreline for a dock and boathouse;
- National Guard Association, who leases a portion of the shoreline and adjacent forest for a campground;
- Telecommunications service provider who leases a portion of land for a cellular communications station;
- American Lake Credit Union and Vic's Espresso Stand, who leases Building 16

2.4 Military Mission

2.4.1 Camp Murray Military Mission

Camp Murray is the headquarters of both the WAARNG and the WAANG. The primary mission of the WA National Guard at Camp Murray is to safeguard lives, property, and the economy of Washington State. Camp Murray, as the headquarters of the WA National Guard and Emergency Management Division, provides administrative mission support to homeland security, assists in major emergency responses, and serves as the central location for information gathering, disaster analysis, and response coordination. Camp Murray also provides drill grounds, classroom training, and physical fitness training facilities to WAARNG and WAANG personnel. No live combat training is conducted at Camp Murray.

The primary purpose of the WAARNG Construction and Facilities Management Office (CFMO) is to support the military mission through the construction, development and maintenance of facilities used by the Washington Military Department.

The Camp Murray Master Plan, which is being developed, will provide a detailed description of the mission and activities on Camp Murray, and project a road map for future development of the built environment.

2.4.2 Washington Army National Guard Military Mission

The WAARNG has both federal and state missions. The WAARNG federal mission is to maintain properly trained and equipped units available for prompt mobilization for war, national emergency, or as otherwise needed. The state mission is to provide trained and disciplined forces for domestic emergencies or as otherwise required by state laws. The DA, under which the WAARNG operates for its federal mission, also has an environmental mission to sustain the environment to enable the Army mission in perpetuity.

2.5 Surrounding Communities and Land Use

Camp Murray is located approximately 10 miles south of Tacoma, in Pierce County Washington. Located on the shores of Commencement Bay, Tacoma is the second largest city in the Puget Sound area and the third largest in the state with a population of 198,397 according to the 2010 census. Tacoma also serves as the center of business activity for the South Sound region which has a population of around 1 million people. Olympia, Washington State's capital, is located approximately 25 miles south of Camp Murray.

Camp Murray is one of the three military bases - Camp Murray, JBLM McChord Field (formerly McChord Air Force Base), and JBLM Lewis Main - that lie contiguous to each other along the Interstate 5 (I-5)

corridor in western Washington. Most of the southern and western boundaries of Camp Murray are adjacent to JBLM Lewis Main, an approximately 86,000-acre military reservation that consists of training areas, housing, open space, and support facilities (ENSR 2007). A neighborhood of single-family homes lies adjacent to the northeastern boundary of Camp Murray. The southern boundary of Camp Murray is separated from JBLM Lewis Main by I-5, the main transportation corridor for western Washington (Appendix A, Figure A-2).

2.6 Regional Land Use

Between 1988 and 2004, the conversion of forest land outside of federal ownership in western Washington (8,483,000 acres) to non-forest land uses was estimated at a rate of 1.04 percent per year (WDNR 2005). During the same period, nine percent of western Washington's non-federal land in a forest land use was converted to agriculture/mixed-rural land uses, while five percent was converted to residential or urban land uses. Eighty three percent of the land in forest land use in 1988 remained the same in 2004. The remaining three percent was classified as changing to water or other unidentified uses (clouds, haze, etc.).

2.7 Local and Regional Natural Areas

The southern and western boundaries of Camp Murray are located adjacent to JBLM Lewis Main. More than 80 percent of JBLM Lewis Main is open space, which consists of approximately 52,600 acres of forest, 14,000 acres of prairies and grasslands, 4,000 acres of Oregon white oak woodlands, and 4,500 acres of wetlands (ENSR 2007). Ecosystems on JBLM Lewis Main are managed to support the military mission, to provide habitat for threatened and endangered species, and to enhance and conserve regional biodiversity.

Camp Murray lies on the southeast shore of American Lake, which is the largest natural body of freshwater in Pierce County (Mueller and Downen 1999). American Lake consists of approximately 1,100 acres separated into two basins by a distinct, narrow channel. Land use around American Lake is mostly urban, with JBLM Lewis Main and Camp Murray comprising a total of over 42 percent of the shoreline. Puget Sound is located approximately four miles north of Camp Murray. Other natural areas in the vicinity of Camp Murray include a network of small regional and city parks.

3. THE PHYSICAL ENVIRONMENT

3.1 Climate

Camp Murray is located within the Puget Sound Lowland Region of western Washington State. The climate for this region is characterized as Marine Type due to its close proximity to the Puget Sound and the Cascade and Olympic Mountain Ranges. Topographic variations cause air and moisture to reach this region from the Strait of Juan de Fuca to the north and from the Chehalis River Valley to the south. Prevailing winds come from the south throughout the year, with an average wind speed of 7.2 miles per hour as measured at the McChord Air Force Base, approximately 4 miles to the northeast of Camp Murray.

The National Climate Data Center's Coop weather station, Tacoma 1 (number 458278) is located at latitude 47.15° N and longitude 122.25° W, approximately 10 miles north of Camp Murray. Conditions at the weather station should be nearly analogous to Camp Murray due to their close proximity

Average monthly rainfall and temperatures recorded from 01 March 1982 through 30 June 2007 at the Tacoma 1 weather station are shown in Table 1 below. Average temperatures range from 60 degrees Fahrenheit (° F) to 65° F in the summer and from 38° F to 45° F in the winter. Temperatures for this region of Washington rarely drop below 10° F to 15° F in the winter months and only exceed 90° F for a few days. Average precipitation for the Tacoma region generally falls between 35 and 55 inches for the year. Most of this precipitation falls as rain during the winter months. Snowfall is rare and generally melts quickly.

Table 1. Average monthly rainfall, snowfall, and temperatures for Tacoma, 1982-2015.

Month	Average Precipitation (inches)	Average Snowfall (inches)	Average Temperature (°F)		
			Min	Max	Mean
January	6.08	0.30	37.0	48.4	42.6
February	3.63	0	37.0	50.8	44.0
March	4.33	0	39.8	55.2	47.7
April	3.06	0	43.1	60.3	51.9
May	2.09	0	48.0	66.1	57.4
June	1.64	0	52.5	71.3	62.3
July	0.74	0	55.9	76.4	66.4
August	0.83	0	55.8	76.9	66.6
September	1.27	0	51.6	71.2	61.5
October	3.56	0	46.1	61.3	53.8
November	6.82	0.10	40.4	52.4	46.3
December	5.72	0.10	35.9	46.8	41.4
Total	39.76	0.50			

Source: Western Regional Climate Center 2016.

3.2 Topography

Camp Murray is located in the Puget - Willamette Lowland ecosystem in the northern portion of the Pacific Lowland Mixed Forest Province. The Puget-Willamette Lowland subregion occupies a north-south depression between the Coast Ranges and the Cascade Mountains. The Puget Sound Valley is a

depressed glaciated area consisting of moderately dissected tableland covered by glacial till, glacial outwash, and lacustrine deposits (Bailey 1994; Franklin and Dyrness 1988). Relief in the valley is moderate with elevation ranging from sea level to 480 feet above mean sea level (msl) although the elevation rises to 1,380 feet in some areas. Poorly drained sites with swamp or bog communities are abundant throughout the region.

Elevation within Camp Murray is generally flat. Most of the installation lies at 280 feet above msl and slopes gently to the west to 240 feet above msl along the shoreline of American Lake (see Appendix A, Figure A-1).

3.3 Geology and Soils

Camp Murray lies within the Puget Trough physiographic province which extends the entire length of Washington from the Canadian border to Oregon (Franklin and Dyrness 1988). The Puget Sound basin is a depressed, formerly glaciated area which is now partially submerged. Most of soils in the Puget Sound basin are formed in glacial materials under the influence of coniferous forest vegetation.

A Soil Survey of Camp Murray was produced by the Natural Resources Conservation Service (NRCS) in 1999. Soils throughout most of the installation are comprised of Everett gravelly sandy loam or Spanaway very gravelly loam (Appendix A, Figure A-3). Other areas within Camp Murray are mapped as either vitrandic Dystroxerepts, Spanaway gravelly sandy loam, or urban land. Soil descriptions, including soil management considerations, were obtained from the Soil Survey (NRCS 1999) and are summarized in Table 2.

3.4 Hydrology

Camp Murray is located within the Chambers/Clover Watershed within Washington Resource Inventory Area (WRIA) 12. The Chambers/Clover Watershed drains approximately 180 square miles in Pierce County, Washington (WDOE 2007). The watershed is bounded by the Puget Sound to the northwest, the Puyallup River Basin to the northeast, and the Nisqually River Basin to the south. Unconsolidated glacial and interglacial deposits underlie the watershed. Water within the Chambers/Clover Watershed drains into Puget Sound.

A wetland PLS was conducted in 2007 to determine the extent of wetlands and other waters on Camp Murray (Turnstone 2007). Camp Murray is comprised of approximately 5.2 acres of wetlands (total of 11 wetlands) and approximately 0.54 miles of water bodies, which include the American Lake shoreline and Murray Creek (a perennial stream that transverses the north-central portion of the property). A wetland delineation and rating study was completed in 2016 to re-delineate a 0.4-acre, Category III depressional wetland in the center of Camp Murray updated in conformance with Washington State's revised wetland rating system (Lee, 2016).

The location of each waterbody on Camp Murray is shown in Figure A-4 (Appendix A).

Table 2. Description of soils units mapped within Camp Murray

Map Unit (Map Symbol)	Hydric?	Description	Management Considerations
Everett gravelly sandy loam (1, 2, 3)	No	Very deep, somewhat excessively-drained, permeable soil found on terraces, moraines, and terrace escarpments formed in glacial outwash and volcanic ash.	Mapping Symbol 1 & 2: Slight erosion hazard. Mapping Symbol 3: Moderate erosion hazard. Rapid permeability causes seepage that may endanger groundwater. Drought susceptibility. Coarse texture causes cutbanks to cave. Slopes can be limiting.
Vitrandic Dystroxerepts (4)	No	Very deep, moderately well-drained, moderately permeable soils occurring in drainage channels and elongated depressional areas. May be inclusions of poorly drained soils.	Slight erosion hazard. Water in poorly drained inclusions may be limiting.
Spanaway very gravelly loam (5)	No	Very deep, somewhat excessively drained, permeable soil found on terraces and plains formed in glacial outwash and volcanic ash.	Slight erosion hazard. Moderate permeability causes seepage that may endanger groundwater. Drought susceptibility. Coarse texture causes cutbanks to cave. Wetness and flooding can be limiting.
Urban land (6)		Consists of areas covered by streets, buildings, parking lots, and other structures that obscure soils that prohibit identification.	Impervious surfaces may concentrate water and flood adjacent areas.
Water (7)		Consists of areas near and adjacent to the shoreline that are covered with water throughout the year.	

Source: NRCS 1999

3.4.1 Surface Water

3.4.1.1 *Murray Creek*

The Murray-Sequalitchew Watershed is located in Pierce County Washington, south of Tacoma and north of Olympia. The watershed covers approximately 7,839 acres of land area (Shapiro and Associates, Inc. 1996) and drains portions of the JBLM Lewis Main and Camp Murray military installations.

Murray Creek flows from east to west through a shallow valley from Kinsey Marsh to American Lake. The stream is fed by surface water from Kinsey Marsh and several springs and seeps upstream of the Special Forces compound located on JBLM Lewis Main. The creek is approximately 3 miles in length and is primarily low gradient in most stretches. From the headwaters in Kinsey Marsh to the mouth at American Lake, the creek has a drop of approximately 45 feet, with 30 feet of this drop associated with the 0.55 mile reach west of I-5. The creek has a low gradient between 0.5 and 3 percent (Shapiro and Associates, Inc. 1996).

Historically, the stream was perennial with continuous water flow throughout the year. Starting in the early 1990s, the lower portion of Murray Creek began to go intermittently dry due to a combination of low annual precipitation and groundwater pumping from the shallow aquifer by the Madigan Army Medical Center (MAMC; ENSR 1998).

Several strategies for the Murray Creek sub basin were developed to protect creek flow in Murray Creek (Shapiro and Associates, Inc. 1997). Recommended conservation strategies included: 1) limiting the extent of impervious surfaces, 2) increasing stormwater infiltration, 3) limiting activities that result in soil erosion and compaction, 4) maintaining forested open space and steam buffers, 5) water conservation, and 6) establishing recharge and groundwater protection areas. Groundwater withdrawals from the shallow aquifer ceased in fall 2008, after which time the creek flow in Murray Creek has steadily increased (Tom Skjervold, pers. comm.).

As of 2017, increased creek flow in Murray Creek due to reduced groundwater withdrawals and increased spring precipitation has caused worsening flooding issues near Building 1 and a nearby footbridge across Murray Creek. A 1969 addition to Building 1, perhaps built during a period of low flow, spans the creek along the upstream portion of the reach within Camp Murray. Several structural elements of the building are perilously located within the channel itself. The location and positioning of the building restricts and channelizes the creek, leading to increased water velocities and erosion potential. Components of the foundation, which jut into the creek, create cut banks and eddies that currently erode beam foundations as the channel attempts to migrate to the north. The resulting erosion contributes sediment with the potential to increase turbidity and negatively affect water quality. In addition to the periodic flooding that threatens the building itself, this erosion of the building's structure presents additional hazards to personnel and infrastructure. A risk assessment and analysis of possible solutions is planned for FY2018 to include channel migration, floodplain enhancement, or infrastructure modification.

Ongoing efforts continue to support the restoration of wildlife habitat functions of Murray Creek. Murray Creek historically supported a resident population of cutthroat trout and provided spawning habitat for kokanee salmon. Several structures for fish rearing and holding are located along the creek. Since 2001, with support from WDFW, Camp Murray personnel have maintained these structures to introduce and rear kokanee fingerlings as broodstock. The creek and adjacent riparian vegetation communities also provide habitat for a variety of wildlife species. Riparian restoration activities for

Murray Creek, ongoing since 2008, have focused on riparian zone vegetation expansion and enhancement, invasive weed control, and public outreach.

American Lake

American Lake, located along the western boundary of Camp Murray, is the largest natural body of freshwater in Pierce County (Mueller and Downen 1999). The approximately 1,100-acre lake consists of two basins separated by a distinct, narrow channel. American Lake is primarily fed by groundwater; however, some inflow occurs via Murray Creek outfall to the southeast portion of the lake, precipitation, and stormwater runoff. The lake has no natural outlet. During times of high water (elevation greater than 230 feet), water flows through a box culvert overflow channel at the south end of the lake.

Land use around American Lake is mostly urban. Together, the JBLM Lewis Main Military Reservation and Camp Murray comprise over 42 percent of the shoreline, with the remainder devoted to residential and recreational uses, including the Tacoma Country and Golf Club along the northwestern shore (Mueller and Downen 1999). American Lake receives high recreational use because of its proximity to the City of Tacoma, JBLM Lewis Main, JBLM McChord Field, and Camp Murray. In addition to several county parks and private marinas, WDFW stocks the lake annually with game fish (see Section 6.3.1) and maintains a public boat launch near the mouth of Murray Creek.

The aquifer supplying American Lake has previously been known to contain excessive concentrations of nutrients such as phosphorus and nitrate due to surrounding land use in the American Lake watershed (Mueller and Downen 1999). As reported by KCM (1993), American Lake was characterized by intermittent algal blooms, oxygen-depleted bottom waters, hypolimnetic buildup of phosphorus, an impoverished benthic invertebrate community, and phosphorus-rich surface sediments. The occurrence of toxic blue-green algal blooms has been a concern in the past. The toxic algae concern was highest in 2013, and it seems to have been limited to the winter months in more recent years. However, there are reports of swimmer's itch—CFMO-Env has coordinated with the Tacoma-Pierce Health Department to provide signage and information for the National Guard Association and campers at the American Lake Campgrounds.

The 2016 Pierce County Surface Water Health report card indicated that the water quality of American Lake was an "A-", limited by high phosphorus levels. It has steadily improved in quality since 2011, when it was a "C+" due to the presence of 2,3,7,8-TCDD, Dieldrin, and PCBs in addition to phosphorus.

The shoreline of American Lake is considered to be a Shoreline of Statewide Significance because it is greater than 1,000 acres in size. Therefore, the shoreline is regulated by the Washington State Department of Ecology (WDOE) under the Shoreline Management Act.

3.4.2 Wetlands

The U.S. Army Corps of Engineers (USACE) and the USEPA define wetlands as:

> "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

Both federal and state laws and regulations protect waters of the state, which includes wetlands. The Clean Water Act (CWA) is the primary law protecting U.S. waters. Section 404 of the CWA (33 USC 1344) prevents the discharge of dredged or fill material into waters of the U.S. without a permit from the USACE. Generally, whenever a Section 404 permit is required, a Section 401 Water Quality Certification (WQC) issued by the State of Washington is also required.

Executive Order 11990, *Protection of Wetlands*, requires federal agencies to take action to minimize the destruction, loss or degradation of wetlands, and to conserve and enhance the beneficial values of wetlands.

Because of the U.S. Supreme Court Decision in the case of Solid Waste Agency of Northern Cook County (SWANCC) v. USACE 531 U.S. 159 (09 January 2001), the USACE no longer has authority to regulate isolated wetlands under the Section 404 permit. However, all wetlands in Washington State are regulated under the State Water Pollution Control Act (Revised Code of Washington [RCW] 90.48), and/or the Shoreline Management Act (RCW 90.58).

3.4.2.1 *Wetlands at Camp Murray*

A Wetland PLS for Washington Military Lands, including Camp Murray was completed in 2007 (Turnstone 2007). A total of 11 wetlands encompassing 5.2 acres were identified on the installation (Figure A-4, Appendix A). Wetlands are classified as Palustrine forested (PFO), Palustrine emergent (PEM), and Palustrine scrub-shrub (PSS) as described by Cowardin (1979). Wetlands consisted of lake fringe wetlands, riparian fringe wetlands, and a depressional wetland. All wetlands were rated as Category III wetlands using the 2004 Washington State Wetlands Rating System (Hruby 2004). Most of wetlands are located along Murray Creek or the American Lake shoreline.

In 2016, a wetland PLS was completed to re-delineate the small swale or depressional wetland located near the center of Camp Murray. The 2016 wetland study also re-evaluated the ratings for all Camp Murray wetlands based on the revised 2014 Washington State Wetland Rating System. The total wetland acreage did not significantly change. All wetlands on Camp Murray are rated as Category III wetlands using the 2014 Western Washington Wetland Rating System (Lee, 2016).

Scientific nomenclature of all plant species follows that of the PLANTS database (NRCS 2007) and Hitchcock and Cronquist (1976). The common and scientific names of all plants detected during field surveys are included in Appendix C.

Depressional Wetland

The depressional wetland totaled 0.4 acres. The wetland is a forested wetland except for a utility corridor in which trees have been removed. Trees are a combination of black cottonwood and Oregon ash, with an understory of slough sedge with snowberry, gooseberry, and black twinberry. Creeping buttercup was present along the southwest edge. Soils within the depressional wetland are mapped as the Spana-Spanaway-Nisqually complex, 0 to 2 percent slopes, which is a hydric soil (Lee, 2016).

Lake fringe Wetlands

The 9 lake fringe wetlands totaled 4.02 acres. Vegetation in the lake fringe wetlands is composed primarily of a willow plant association which occurs in places along the shoreline of American Lake with permanently-saturated soils (Turnstone 2007). At Camp Murray, Pacific willow and Sitka willow are co-dominant. Soils within the lake fringe wetlands consisted of Everett gravelly sandy loam. In terms of

hydrology, all the lake fringe wetlands are saturated with the American lake's water for a significant period of the growing season.

Riparian fringe wetland

The riparian fringe wetland totaled 1.08 acres. The riparian fringe running along Murray Creek consists of a narrow vegetation zone that extends no more than 1 to 2 feet from the edge of the creek. Vegetation is often dominated by exotic turf grasses, particularly reed canary grass. Since the riparian fringe is so narrow, invasive weeds tend to colonize the wetland. Soil type and textures within the riparian fringe wetlands were also consistent with the mapped type, but had considerably less gravel than the lake fringe wetland soils. Murray Creek is the hydrologic source for one contiguous riparian fringe wetland located around the boundary of the creek.

Swale wetland

The swale wetland was 0.08 acres in size. This wetland is a forested palustrine wetland with no visible outlet. Vegetation consists of an overstory of black cottonwood and Oregon ash. The shrub layer was relatively depauperate, with snowberry growing sporadically. In the herbaceous layer, species observed were slough sedge, ladyfern and some sparse reed canarygrass. Soils within the depressional swale wetland varied from the fringe wetlands. They consisted of silt loams and sandy clays, with gravel at about 5 percent cover on average. Hydrology in the swale wetland is not connected to either American Lake or Murray Creek. Because this is a depressional wetland with no outlet, hydrologic sources are limited to direct precipitation and overland flow.

Some invasive species are present in wetlands at Camp Murray, including purple loosestrife, reed canarygrass, yellow-flag iris, Scotch broom, and Japanese knotweed.

3.5 Ground Water

Groundwater beneath Murray Creek is contained primarily within the Surface Aquifer (Shapiro and Associates, Inc. 1997). The Surface Aquifer is located within two general sediment types, a silty-sand and/or gravel and a sand and/or gravel. The silty unit is less permeable than the sand and gravel unit. Flow direction within the aquifer is towards American Lake. The groundwater table dips down steeply towards American Lake west of I-5. Groundwater levels in the aquifer typically fluctuate 2 to 6 feet seasonally, and high surface infiltration rates occur over most of the watershed.

Groundwater was monitored at Camp Murray in October 2005 and January 2006. However, laboratory analytical results of groundwater monitoring were not statistically analyzed for trends and significance.

4. ECOSYSTEMS AND THE BIOTIC ENVIRONMENT

4.1 Ecosystem Classification

Camp Murray is located in the northern portion of the U.S. Ecoregion – Humid Temperate Domain – Marine Regime Mountains – Pacific Lowland Mixed Forest Province - Puget - Willamette Lowland ecosystem land classification. The Puget-Willamette Lowland subregion occupies a north-south depression between the Coast Ranges and the Cascade Mountains. The Puget Sound Valley is a moderately dissected tableland covered by glacial till, glacial outwash, and lacustrine deposits. This province includes isolated hills and low mountains (USFS 2007).

Before cultivation, dense coniferous forest dominated the vegetation in this region. In interior valleys, the coniferous forest is less dense than along the coast, and contains deciduous trees, such as big-leaf maple, Oregon ash, and black cottonwood. Prairies that support open stands of Oregon white oaks or mixed groves of oaks and Douglas fir and other trees are prevalent. Poorly drained sites with bog communities are also abundant throughout the region.

4.2 Vegetation

4.2.1 Historic Vegetative Cover

Prior to European settlement, dense coniferous forest dominated by western cedar, western hemlock, and Douglas fir comprised most of the landscape in this region (Bailey 1994). Mixed stands of Douglas fir with some Oregon white oak, Pacific dogwood and Pacific madrone were common on drier sites. Periodic flooding and infrequent fires were once the predominant disturbance regimes in the region (WWF 2001). Long intervals (centuries) between large-scale fire events were more typical of moister forest types with drier forests and prairies experiencing frequent fires due to both natural and anthropogenic factors. No sizable blocks of intact habitat remain in the region. A few relict stands of prairie-oak communities occur on JBLM Lewis Main and are managed by the base to maintain characteristic plant composition.

4.2.2 Current Vegetation Communities

Camp Murray is located within the Western Hemlock Zone, which is the most extensive vegetation zone in western Washington (Franklin and Dyrness 1988). Major tree species in this zone are Douglas fir, western hemlock and western red cedar, with black cottonwood, Oregon ash and red alder common along water courses. Pacific madrone and Oregon white oak may be found on drier, lower elevation sites anywhere in the zone, and are a significant part of Camp Murray's habitat.

During field surveys conducted in spring and summer 2005 (Turnstone 2006a), four plant associations were identified within the forested areas of Camp Murray:

- Douglas fir/salal (approximately 60 acres);
- Oregon white oak woodland (approximately 48 acres);
- Oregon ash/snowberry (approximately 8 acres); and
- Willow (approximately 3 acres).

These vegetation communities are described below and depicted in Figure A-5 (Appendix A). The remaining natural portions of Camp Murray are primarily mowed and consist of maintained grass. Of

particular significance are the Oregon white oak woodlands and riparian plant communities, which qualify as Priority Habitat as designated by the WDFW.

4.2.2.1 *Douglas Fir/Salal Plant Association*

This plant association occurs in the conifer dominated areas of Camp Murray, just east of the shoreline of American Lake and adjacent to the Oregon oak woodlands to the north and east. The overstory consists of Douglas fir, big leaf maple and Oregon ash. Dominant understory species include snowberry, beaked hazelnut and salal. The herbaceous layer includes species such as Hooker's fairy bells, star-flowered Solomon's seal, starflower, and mountain sweet cicely.

A varying type of this plant association exists in areas with greater disturbance. These areas have a thinner canopy cover, a greater degree of disturbance from edge effects, greater coverage of shrubs, and sparse conifer regeneration.

Figure 1. Douglas fir/salal plant association.

4.2.2.2 *Oregon White Oak Woodland*

This plant association occurs in the north and east of Camp Murray and near buildings and offices where the understory is mowed. Overstory dominants consist of Oregon white oak, Douglas fir, and Pacific madrone. Dominant understory species include orchard grass, velvet grass, snowberry, honeysuckle and Oregon grape. A large portion of the understory has been colonized by Scotch broom, a Class B noxious weed according to the Washington State Noxious Weed Control Board.

Oak woodlands in the Puget Sound area of Washington are a result of thousands of years of the shaping of vegetation by indigenous people, fire, a mild climate and diverse physiography (Thysell and Andrew 2001). Since the European settlement in the 1890s, Douglas fir has been systematically encroaching on both prairies and oak communities (Kruckeberg and Arthur 1991). Although Oregon white oak trees in Western Washington extend north to the islands of Puget Sound and southeastern Vancouver Island (Stein 1990), relatively intact oak communities exist primarily on the JBLM Lewis Main Military Reservation (Thysell and Andrew 2001).

Figure 2. Oregon white oak woodland near Building 20B at Camp Murray. The blue tubes are tree protectors for oak trees planted in 2007.

Oregon white oak woodland is considered a Priority Habitat by the WDFW. WDFW has made this designation because the various plant communities and stage age mixtures within oak forests provide valuable habitat that contributes to wildlife diversity statewide (Larsen and Morgan 1998). Oaks can also provide habitat for a variety of species listed as state Sensitive, Threatened, Endangered or candidates for these listings.

WDFW classifies Oregon white oak woodlands as Priority Habitat if they meet the following description and classification (Larsen and Morgan 1998):

> "Priority Oregon white oak woodlands are stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25 percent; or where total canopy coverage of the stand is <25 percent, but oak accounts for at least 50 percent of the canopy coverage present. The latter is often referred to as an oak savanna. In non-urbanized areas west of the Cascades, priority oak habitat is stands 0.4 ha (1 ac) in size. East of the Cascades, priority oak habitat is stands 2 ha (5 ac) in size. In urban or urbanizing areas, single oaks, or stands of oaks <0.4 ha (1 ac), may also be considered priority habitat when found to be particularly valuable to fish and wildlife (i.e., they contain many cavities, have a large diameter at breast height [dbh], are used by priority species, or have a large canopy)."

The Oregon white oak woodlands at Camp Murray are in stands of mixed oak/conifer associations with average canopy cover of the oak component of the stands at least 25 percent overall and considerably more in places.

The condition of the oak woodlands throughout the installation is generally poor, due to mowing (in the areas adjacent to buildings) and the presence of invasive species. Scotch broom in particular, as well as non-native grasses, have degraded the habitat and reduced its value for wildlife, as well as the likelihood of occurrence of listed or candidate plant species. The habitat is also imperiled by the encroachment of Douglas fir trees from the adjacent communities.

In spring of 2007, Pierce County required a portion of the Oregon white oak woodlands in the northern portion of Camp Murray to be restored as part of a Conditions of Critical Area Approval regarding impacts to Priority Oak Woodlands from the development of three new buildings (20B, 91, and 92) and associated infrastructure. A total of 120 Oregon white oak trees were planted within a designated conservation easement tract adjacent to the project area in the northeastern-most oak woodland. This area has been monitored and maintained by Camp Murray staff. Another oak mitigation site associated with the completed Phase I road widening project was established at an area along 41st Division Way and at an area along Quartermaster Road near Murray Creek.

4.2.2.3 *Oregon Ash/Snowberry Plant Association*

This plant association occurs in places along the shoreline of American Lake, occupying areas with only seasonally saturated soils. The overstory contains black cottonwood, Oregon ash, Douglas fir, and Pacific madrone. Understory dominants include Oregon ash seedlings and saplings, snowberry, bulrush, willow, and spirea.

Figure 3. American Lake shoreline lined with black cottonwood, Oregon ash, bigleaf maple, madrone, Douglas fir and other species

4.2.2.4 *Willow Plant Association*

This plant association often forms a dense thicket in places along the shoreline of American Lake in those areas with permanently saturated soils. Oregon ash and black cottonwood are present in the overstory, but appear farther inland and are not a significant component of the plant community. Understory dominants include willow, spirea, bulrush, slough sedge, yellow water lily and reed canarygrass.

This community type is found throughout the Puget Trough lowlands, generally in permanently flooded areas, but it also occurs in areas that are seasonally flooded. Soils are muck with woody debris and some fibrous peat. Woody debris provides an elevated secondary substrate (Kunze, 1994). The vegetation usually consists of several shrubby species forming a dense stand where one or more species of Salix is dominant. At Camp Murray, Pacific willow and Sitka willow are co-dominant. Spirea is usually present and often co-dominant. There are several understory microenvironments related to water depth and substrate within the stands.

4.3 Vascular Plants

A vascular plant survey was conducted in May 2005 (Turnstone 2006a). The flora survey identified 132 vascular plant taxa. Listed or candidate species with a high likelihood of occurrence in Pierce County as listed at the time of the plant survey were specifically surveyed based on information provided by the Washington Natural Heritage Program. No sensitive or listed plant species were observed on Camp Murray during these surveys.

Species lists, including scientific and common names are included in Appendix C.

4.4 Noxious Weeds

Washington currently maintains lists of noxious weeds that pose a threat to the resources of the state. Noxious weeds are assigned to a series of four classes depending on their abundance, threat and distribution: Class A, Class B, Class C or the Monitor List. Certain classes may be subject to eradication laws, sale prohibition, and other control measures.

The presence of noxious weeds was determined using the results of the 2005 floristic survey, communication with Camp Murray staff, and observations of CFMO-ENV staff. No Class A weeds have been identified at Camp Murray. Six Class B weeds and thirteen Class C weeds were observed at Camp Murray. All information on status and regulation below was obtained from the Washington State Noxious Weed Control Board (2016) and the Pierce County Noxious Weed Control Board (2016).

Class A Weeds. Class A weeds have a limited distribution in the state. Eradication is required by law. No Class A weeds are present at Camp Murray.

Class B Weeds. These species are established within some regions of Washington State but are of limited distribution or not present in other regions of the state. Because of differences in distribution, treatment of Class B weeds varies between regions of the state. Table 3 identifies Class B weeds present at Camp Murray and identifies which species are subject to state control.

Class C Weeds. These species are already widely established within Washington State or are of special interest to the agricultural industry. They are placed on the state's noxious weed list to allow counties to enforce control if so desired. Table 3 also identifies Class C weeds present at Camp Murray.

Table 3. Noxious weeds present at Camp Murray

Common Name	*Species*	Class	Control required in Pierce County
Butterfly bush	*Buddleja davidii*	B	No
Bull thistle	*Cirsium vulgare*	C	No
Canada thistle	*Cirsium arvense*	C	No
Common catsear	*Hypochaeris radicata*	C	No
Common groundsel	*Senecio vulgaris*	C	No
Common tansy	*Tanacetum vulgare*	C	No
English ivy	*Hedera helix*	C	No
Field bindweed	*Convolvulus arvensis*	C	No
Himalayan blackberry	*Rubus armeniacus*	C	No
Japanese knotweed	*Polygonum cuspidatum*	B	No
Oxeye daisy	*Leucanthemum vulgare*	C	No
Purple loosestrife	*Lythrum salicaria*	B	No
Reed canarygrass	*Phalaris arundinacea*	C	No
Scotch broom	*Cytisus scoparius*	B	No
Spotted knapweed	*Centaurea maculosa*	B	Yes
St. Johnswort	*Hypericum perforatum*	C	No
Tansy ragwort	*Senecio jacobaea*	B	Yes
Wild carrot	*Daucus carota*	C	No
Yellowflag iris	*Iris pseudocarus*	C	No
Bittersweet nightshade	*Solanum dulcamara*	Not listed	No
Eurasian Milfoil	*Myriophyllum spicatum*	B	No

The greatest concern for noxious weeds identified in the 2010 INRMP was the establishment of Japanese knotweed and purple loosestrife along Murray Creek (TNC 2008). These species were present primarily along the upper reaches of Murray Creek. A rigorous noxious weed control program has eliminated purple loosestrife along the creek, and the extent of Japanese knotweed has been significantly diminished. Yellow flag iris continues to be a concern both in Murray Creek and along the American Lake shoreline. Herbicide treatment along the creek in 2015 eliminated most of the yellow flag iris in Murray Creek. Continued monitoring for all noxious weed species is required to ensure that these species and others do not establish themselves at Camp Murray.

Camp Murray participates as a stakeholder in the development of an Integrated Aquatic Vegetation Management Plan for American Lake, and effort lead by the City of Lakewood and focusing on the control of Eurasian Milfoil. Milfoil is suspected to limit native fish habitat in American Lake.

4.5 Fish and Wildlife

Wildlife habitat at Camp Murray includes open water associated with American Lake, shoreline, wetlands, mature forest, oak woodlands, early successional forest, and riparian areas. Wildlife surveys were conducted on 29-30 March, 26-27 May, and 28 July, 2005 (Turnstone 2006a). A fish and wildlife planning level survey was completed during March through October 2012 (AMEC 2013). During the surveys, special attention was paid to state or federally-listed species. Special surveys were conducted specifically for the presence of bald eagles or their habitat as this species was federally listed as threatened at the time of the investigation.

Species lists, including scientific and common names, are provided in Appendix C.

4.5.1 Mammals

Mammal surveys were conducted in spring and summer of 2005. Species were recorded when they were seen or heard during pedestrian surveys, or if signs such as middens, scat, or tracks were observed. No bat sampling was conducted, and no trapping was performed. As noted in Appendix H under Objective 6.1, a nocturnal wildlife survey is currently planned. During the surveys completed in 2012 mammals were recorded during field work when detected through sight, sound, or sign. In 2005 and in 2012, a protocol-specific survey was conducted for western gray squirrels, a species listed as threatened by the WDFW. This species was not identified at Camp Murray; the results from the western gray squirrel surveys are discussed in Section 4.6.1.1.

Five species of mammals representing five genera were identified at Camp Murray in 2005. Species observed include Douglas squirrel, eastern gray squirrel, coyote, raccoon, and black-tailed deer. Except for the Douglas squirrel, all species detected on Camp Murray were generalist species, able to tolerate considerable levels of human disturbance.

It is likely that additional mammal species would have been detected had more exhaustive mammal survey methods such as trapping or scent-stations been used. However, JBLM recently installed a bat box on Camp Murray as part of a bat monitoring program, and Camp Murray will be increasing efforts to document nocturnal mammals.

4.5.2 Migratory Birds

Bird surveys were conducted in spring and summer of 2005 (Turnstone 2006a) and in 2012 (AMEC 2013). Species were recorded when they were seen or heard during pedestrian surveys, or if signs such as nests, scat, nesting cavities, foraging holes, feathers or whitewash were observed. No protocol-specific nest surveys were conducted, nor were nocturnal surveys for owls performed. During the wildlife inventory, a species-specific survey was conducted for bald eagles, a species that was federally listed as threatened at the time of the inventory. The results of the bald eagle survey are discussed in Section 4.6.1.2.

Bird species detected during the surveys included both year-round resident and migratory species. Primary considerations with regard to migratory bird management are compliance with the Migratory Bird Treaty Act (MBTA); implementation of migratory bird management actions in accordance with EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*; and support, contribution and compatibility with the goals and efforts of numerous regional migratory and game bird conservation programs. The MBTA controls many actions that may negatively affect migratory birds, particularly the collection and transportation of birds. Special purpose permits may be requested and issued that allow for the relocation or transport of migratory birds for management purposes. New construction will be

encouraged to use bird-safe building practices such as minimizing nighttime lighting, using awnings or windows angling towards the ground, or utilizing minimally-reflective windows or exterior treatments to discourage bird collisions.

A total of 60 species of birds were observed during the faunal surveys, including both habitat generalists that are well adapted to human disturbance and birds that are dependent on the unique habitats present at Camp Murray (Turnstone 2006a, AMEC 2013). Birds unique to the mature forested habitats of Camp Murray include pileated woodpecker, brown creeper, and varied thrush. Birds unique to wetlands of Camp Murray include red-winged blackbird, yellow warbler, and great blue heron. The aquatic habitats on Camp Murray provide foraging sites for a variety of wintering waterfowl, including Barrow's goldeneye, bufflehead, and common merganser. An active rufous hummingbird nest was observed during faunal surveys.

Five species of birds observed at Camp Murray are listed as Priority Species by the WDFW. Priority species are discussed in Section 4.6.2 Raptor species found on Camp Murray include red-tailed hawks, great horned owls, ospreys, and bald eagles. Camp Murray coordinates with JBLM on Western bluebird monitoring, as JBLM previously installed five bluebird houses on Camp Murray's oak habitat areas.

4.5.3 Reptiles and Amphibians

Both amphibians and reptiles may be found in forests and grasslands; however many species are especially prevalent in seasonally ponded areas that dry out and do not contain fish. Amphibians are water dependent during the early parts of their life cycle and spring mating.

No reptiles or amphibians were observed during faunal surveys in 2006 (Turnstone 2006a). Class specific amphibian surveys were completed in 2012 (AMEC 2013); however, no suitable amphibian habitat was observed at Camp Murray.

4.5.4 Macroinvertebrates of Murray Creek

Biological monitoring of surface waters provides a comprehensive approach to measuring stream health, because degradation of sensitive ecosystem processes is more frequently observed within the biological community. Because stream dwelling invertebrates are affected by physical, chemical and other biological variables in their localized environment, they can be used as biological indicators and provide a historical, site-specific view of a stream's health. A macroinvertebrate study of Murray Creek was conducted in fall of 2005 (Turnstone 2006b) and was repeated in 2012 (AMEC 2013).

Results for both surveys indicated that the overall biological integrity of Murray Creek is low; however, certain metrics have improved since 2005, particularly at the upstream survey location. The biological integrity of Murray Creek near the mouth has not improved from 2005. While the total number of taxa in 2012 was twice as many as in 2005, the long-lived intolerant taxa were still missing. This finding may indicate that lower Murray Creek has very low late summer flows that lead to high temperature problems. Ongoing monitoring can provide a valuable indicator of the efficacy of water quality protection and stream restoration efforts, particularly under the observed effects of increased stream flow and projected changing climate impacts along Murray Creek. Camp Murray is working with JBLM to reestablish macroinvertebrate sampling and monitor for a wider range of water quality indications on its portion of Murray Creek.

4.5.5 Fish

Information regarding the presence of fish in American Lake and Murray Creek was obtained during the spring and summer of 2005 from JBLM Lewis Main websites and personal communication with anglers (Turnstone 2006a).

Nine species of fish were determined to be present in American Lake. Game fish include largemouth bass, smallmouth bass, and kokanee (Turnstone 2006a). Of the nine species of fish present in American Lake, four species have been identified by the WDFW as Priority Species, including kokanee, resident cutthroat trout, rainbow trout, and largemouth bass.

Washington State Department of Fish and Wildlife conducted a report, Evaluations of Potential Limiting Factors for Kokanee in American Lake, Washington (Large Lakes Research Team, 2014), to investigate the limited success in reestablishing the kokanee population in American Lake and Murray Creek. The results indicate that Kokanee survival is potentially limited by being forced into a specific depth strata due to combined factors including high water temperatures and low dissolved oxygen levels. They may also be competing for habitat with Yellow Perch, a nonnative sports fish.

It is also suspected that Eurasian milfoil may be contributing to the extremely limited habitat range in American Lake for kokanee salmon. Camp Murray is supporting the City of Lakewood's efforts to create and execute an Integrated Aquatic Vegetation Management Plan.

4.6 Threatened and Endangered Species

No federally-listed endangered, threatened, or candidate plant or animal species have been observed during field surveys at Camp Murray. The field surveys conducted at Camp Murray have considered all listed or candidate species with a high likelihood of occurrence in Pierce County.

Several wildlife species with State status are known to occur at Camp Murray as shown in Tables 4 and 5. As recently as 2003, a pair of bald eagles nested in the forested areas adjacent to American Lake. The bald eagle was listed as federally threatened until June 28, 2007, and is presently classified as a Sensitive Species in Washington State (WDFW 2007). Pileated woodpeckers are candidates for endangered species listing in Washington State, and are known to use the forested areas on Camp Murray. Camp Murray also contains habitat for four other federally- or state- listed species. Protocol-specific surveys were conducted for most listed species in spring and summer of 2005.

The WDFW Habitat Program has developed a Priority Habitats and Species (PHS) list that identifies habitats and species considered priorities for conservation and management. There are 18 habitat types, 140 vertebrate species, 28 invertebrate species, and 14 species groups currently on Washington's PHS list (WDFW 2007).

Priority Species are defined as fish and wildlife species requiring protective measures and/or management guidelines to ensure their perpetuation (WDFW 2007). Priority Habitat is defined as a habitat type with unique or significant value to many species. Classifications and definitions are as follows:

Priority Species: Species that require protective measures for their perpetuation due to their population status, sensitivity to habitat alteration and/or recreational, commercial, or tribal importance. Priority species include State Endangered, Threatened, Sensitive and Candidate species;

animal aggregations considered vulnerable; and those species of recreational, commercial, or tribal importance that are vulnerable.

Priority Habitats: These are habitat types or habitat features with unique or significant value to a diverse assemblage of species. A priority habitat may consist of a unique vegetation type or dominant plant species, a described successional stage or a specific structural element (WDFW 2007).

An area identified and mapped as priority habitat has one or more of the following attributes:

- Comparatively high fish and wildlife density.
- Comparatively high fish and wildlife species diversity.
- Important fish and wildlife breeding habitat.
- Important fish and wildlife seasonal ranges.
- Important fish and wildlife movement corridors.
- Limited availability.
- High vulnerability to habitat alteration.
- Unique or dependent species.

Three species of birds and four species of fish present at Camp Murray are listed as Priority Species (Table 5). In addition, potential habitat exists on Camp Murray for two other Priority Species.

Potential and existing Federal-, State-, and priority-listed species on Camp Murray are shown in Table 5. Figure A-6 (Appendix A) shows the location of historic bald eagle nest trees and oak woodland priority habitat at Camp Murray. Management of protected species is discussed in Section 6.4. Common and scientific names of all species detected during surveys are included in Appendix C. Appendix C also contains a list of the rare plant species considered, habitat needs, and survey efforts.

Table 4. Federal, state, and priority listed wildlife species that could occur at Camp Murray

Common name	Scientific name	Federal Status	State Status	Habitat at Camp Murray?	Detected at Camp Murray?
Western gray squirrel	*Sciurus griseus*	SOC	Threatened	Yes	No
Bald eagle	*Haliaeetus leucocephalus*	SOC	Sensitive	Yes	Yes
Pileated woodpecker	*Dryocopus pileatus*	---	Candidate	Yes	Yes
Barrow's goldeneye	*Bucephala islandica*	---	Priority	Yes	Yes
Bufflehead	*Bucephala albeola*	---	Priority	Yes	Yes
Great blue heron	*Ardea herodias*	---	Priority	Yes	Yes
Kokanee	*Oncorhynchus nerka*	---	Priority	Yes	Yes
Rainbow trout	*Oncorhynchus mykiss*	---	Priority	Yes	Yes
Purple martin	*Progne subis*	---	Priority	Yes	No
White-breasted nuthatch	*Sitta carolinensis*	---	Priority	Yes	No

Table 5. Federal, state, or rare status plant species that could occur at Camp Murray

Common name	Scientific name	Federal Status	State Status	Detected at Camp Murray?
blue toadflax	*Linaria canadensis var. texana*		Sensitive	No
bog clubmoss	*Lycopodiella inundata*		Sensitive	No
branching montia	*Montia diffusa*		Sensitive	No
bristly sedge	*Carex comosa*		Sensitive	No
California swordfern	*Polystichum californicum*		Threatened	No
common blue-cup	*Githopsis specularioides*		Sensitive	No
curved woodrush	*Luzula arcuata*		Sensitive	No
giant chain fern	*Woodwardia fimbriata*		Sensitive	No
golden paintbrush	*Castilleja levisecta*	Threatened	Threatened	No
Howellia	*Howellia aquatilis*	Threatened	Sensitive	No
large-awned sedge	*Carex macrochaeta*		Threatened	No
mountain buttercup	*Ranunculus populago*		Sensitive	No
northern microseris	*Microseris borealis*		Sensitive	No
pygmy saxifrage	*Saxifraga rivularis*		Sensitive	No
rush aster	*Symphyotrichum boreale*		Threatened	No
slender crazyweed	*Oxytropis campestris var. gracilis*		Sensitive	No
small-flowered trillium	*Trillium parviflorum*		Sensitive	No
tall agoseris	*Agoseris elata*		Sensitive	No
tall bugbane	*Cimicifuga elata*	SOC	Sensitive	No
Torrey's peavine	*Lathyrus torreyi*		Threatened	No
triangular-lobed moonwort	*Botrychium ascendens*	SOC	Sensitive	No
white meconella	*Meconella oregana*	SOC	Endangered	No
white-top aster	*Aster curtus*	SOC	Sensitive	No

Turnstone 2006a, WDNR 2009

4.6.1 State Listed Species

4.6.1.1 *Western Gray Squirrel*

The western gray squirrel is listed as threatened in Washington State, and is a federal species of concern. Western gray squirrels have been found at nearby JBLM Lewis Main in oak ecotones 332 hectares in size and bordering Douglas fir communities and prairies (Bayrakgi, et al. 2001). Suitable habitat likely exists on Camp Murray (TNC 2008). Both visual and audio surveys were conducted for Western gray squirrels during the surveys.

Western gray squirrels in Washington rely on transitional forests of mast-producing Oregon white oak, ponderosa pine, and Douglas fir. Mast-producing trees of pine and oak with interconnected crowns are particularly important in the life history of the western gray squirrel.

Most of the Oregon oak woodlands that occur at Camp Murray have been extensively fragmented and the understory has been mowed, resulting in less than ideal habitat for the Western gray squirrel. The prevalence of invasive species such as Scotch broom has further degraded western gray squirrel's habitat on Camp Murray.

Most of the higher quality oak woodland forest that the western gray squirrel requires is located on JBLM Lewis Main property, which contains one of the few remaining Western gray squirrel populations in western Washington. I-5 separates Camp Murray from JBLM Lewis Main, and likely acts as a barrier to colonization and dispersal (Ryan and Carey 1995). While suitable western gray squirrel habitat may be too small on Camp Murray to support a population, existing habitat could help support regional populations by providing areas for forage and cover (USDA 2008).

More extensive live/bait trapping and line transect surveys would need to be conducted to determine conclusive presence/absence of the Western gray squirrel on Camp Murray.

4.6.1.2 *Bald Eagle*

The bald eagle was removed from the federal list of threatened and endangered species on June 28, 2007, but is still listed as a federal species of concern and as a threatened species in Washington State (WDFW 2007). The WDFW is expected to recommend to the Washington Fish and Wildlife Commission that the bald eagle be downlisted to sensitive status (E^2M 2007b).

The bald eagle is one of the largest birds of prey in North America. Bald eagles are opportunistic feeders, with fish comprising much of their diet. They also eat waterfowl, shorebirds, small mammals, turtles, and carrion (Birdweb 2006). In the Pacific Northwest, preferred nesting habitat is mature forests along major waterways where nests are often built in the tallest tree. Bald eagles tend to return to the same territory year after year.

As of 2003, four active nesting territories have been identified at nearby JBLM Lewis Main, one of which is located in the western portion of American Lake directly across from Camp Murray (DA 2003). This nest was first identified in 2000. Although bald eagles have historically nested on Camp Murray as late as 2003, no active nesting sites were located during the 2005 surveys (Turnstone 2006a).

Protocol-specific surveys were conducted for bald eagles at Camp Murray in spring and summer 2005. Two previous nesting sites were identified on Camp Murray. These had been previously marked by biologists with wildlife placards. Identified nesting trees were late seral stage Douglas fir trees with

masses of sticks placed near the top. It was unclear whether any of the nesting material had been placed recently.

One pair of adults and at least eight juvenile bald eagles were observed perching and soaring along the shorelines of American Lake. Juveniles were most likely offspring from JBLM Lewis Main nesting sites.

Although the bald eagle has been federally de-listed, numerous state and federal laws continue to regulate activities that could have adverse effects on this species. These laws are discussed in Section 6.4 and in Appendix D.

4.6.1.3 *Pileated Woodpecker*

The pileated woodpecker is currently a candidate for endangered species listing by the WDFW (WDFW 2007). Nearly as large as a crow, the pileated woodpecker is the largest woodpecker in North America (Birdweb 2006). Both sexes have a black body and a red crest on the head. Males have a red forehead and red in the black mustache stripe. The female has a gray to yellow-brown forehead and no red in the mustache stripe.

Any forest type (broadleaved, coniferous, or mixed) can sustain pileated woodpeckers as long as there are trees large enough for roosting and nesting. Pileated woodpeckers are often associated with mature and old-growth forests but can breed in younger forests if they contain some large trees. In western Washington, they typically roost in western hemlock and western red cedar (Birdweb 2006). The pileated woodpecker digs characteristically rectangular holes in trees to find ants.

Auditory detections, as well as signs of presence (rectangular-shaped drill holes on trees) of pileated woodpeckers were made during the surveys in 2005.

4.6.2 Priority Species

4.6.2.1 *Barrow's Goldeneye*

Barrow's goldeneye duck is a medium-sized diving duck with a chunky body and a large head. The male is white with a black back and head, and crescent-shaped white spot on face. The female is smaller with a gray-colored body and a brown head.

Barrow's goldeneye duck is primarily a bird of the western mountain region of North America that prefers small, clear lakes and ponds that are not crowded with submergent and emergent vegetation, and that do not support populations of fish. Goldeneyes are cavity-nesting ducks and typically use forested habitat with mature trees (deciduous or coniferous) that offer suitable nesting cavities. During migration, goldeneyes stop to feed on large lakes and rivers (Birdweb 2006). All breeding grounds in Washington State are considered priority habitat for this species.

Barrow's goldeneye ducks were observed at American Lake in early spring 2005 and were not observed during subsequent surveys. It is likely that Barrow's goldeneye ducks use American Lake as a stopover *en route* to their breeding grounds.

4.6.2.2 *Bufflehead*

The bufflehead is a small diving duck with a rounded head. The male has a white underside and a dark back that appears black, but upon closer inspection, is actually a deep iridescent greenish-purple. A large white patch is located on the back of the head. The female is duller and darker, with gray sides and small white patch on the head.

Buffleheads breed in boreal forests with nearby stands of poplar and aspen adjacent to small lakes and ponds. Buffleheads nest near water in abandoned flicker holes, and in man-made boxes. In the winter, they are most often found in coastal areas in shallow bays and inlets. Birds found in Washington in winter come from many western breeding areas. The birds arrive in Washington in fall and return to their breeding grounds in early spring (Birdweb 2006). All breeding grounds in Washington State are considered priority habitat for this species.

Buffleheads were observed at American Lake during surveys in early spring 2005, and were not observed during subsequent surveys. It is likely that buffleheads use American Lake as a stopover *en route* to their breeding grounds.

4.6.2.3 *Great Blue Heron*

The great blue heron is the largest and most widespread heron in North America, found in a variety of habitats. The great blue heron has a large, gray body with a long S-shaped neck, a thick bill, and a white crown stripe. The neck is reddish or gray with shaggy feathers. Sexes are similar.

Great blue herons forage alone or in small groups, but they nest in colonies. Nesting colonies are typically found in mature forests, on islands, or near mudflats, and do best when they are free of human disturbance and have foraging areas close by. All breeding grounds in Washington State are considered priority habitat for this species.

Great blue herons were detected on American Lake in Camp Murray by auditory and visual detections. No rookery or breeding area was confirmed to be present on Camp Murray property.

4.6.2.4 *Kokanee Salmon*

Kokanee are sockeye salmon that spend their entire lives in freshwater. They are usually found in lakes that have either limited or no access to the ocean. Kokanee tend to be smaller in size than sockeye due to more limited food sources. Before spawning, kokanee will turn bright red with green heads; males will also develop a humped back and hooked jaw. Kokanee return to their natal areas in an inlet stream or lakeshore gravel bed to spawn in early fall.

Murray Creek provides habitat for a resident population of kokanee on Camp Murray. Habitat includes gravel beds in the lower 800 feet of the creek before the confluence with American Lake, and in gravel beds along the lakeshore (Shapiro and Associates, Inc. 1996). Much of the suitable kokanee spawning habitat in Murray Creek has been compromised since 1992, when the lower reach of Murray Creek began to go intermittently dry during the summer months, probably due to a variety of natural and anthropogenic causes.

Kokanee are currently managed as a game species by the WDFW. Since the early 1980s, WDFW has stocked several thousand kokanee annually into American Lake to bolster recreational angling opportunities (Mueller and Downen 1999). Efforts are currently underway to restore ecological functions to Murray Creek that enhance a naturally spawning kokanee population. Restoration has included the rearing and introduction of kokanee fingerlings as broodstock, the enhancement of vegetation within the stream's riparian zone, control of invasive weed species, and public education.

4.6.2.5 *Rainbow Trout*

Rainbow trout is a salmonid fish native to streams of the Pacific Northwest. Rainbow trout can be found in small creeks, rivers, lakes, and reservoirs. Rainbow trout spawn in rock and gravel, usually in streams. Diet includes invertebrates, other fish, and fish eggs, depending upon body size and habitat.

Rainbow trout are currently managed as a game species by the WDFW. Since the early 1980s, WDFW has stocked several thousand rainbow trout annually into American Lake to bolster recreational angling opportunities (Mueller and Downen 1999).

4.6.2.6 *Largemouth Bass*

The largemouth bass is the largest of the black basses found in lakes and large, slow streams. Largemouth bass are not native to Washington State. Prey items include mainly fish and invertebrates, but can also include small birds and mammals. Spawning occurs in shallow areas of lakes and ponds.

Largemouth bass are currently managed as a game species by the WDFW. American Lake supports a naturally reproducing population of largemouth bass.

4.6.2.7 *Cutthroat Trout*

Cutthroat trout are native to western North America. Most populations stay in freshwater throughout their lives, although some may be anadromous. Cutthroat trout vary widely in size, coloration, and habitats, and readily hybridize with rainbow trout, a closely related fish species. As adults, different populations and subspecies of cutthroat can range from 6 to 40 inches in length. There are 14 subspecies of cutthroat trout.

Cutthroat trout are currently managed as a game species by the WDFW. American Lake supports a naturally reproducing population of largemouth bass.

4.6.2.8 *Purple Martin*

The Purple Martin is the largest swallow in North America (Birdweb 2006). In Washington State, purple martins nest and forage on open land near water. Purple Martins can be found in developed areas, along waterfronts, and in fields, wetlands, and clearings. They are cavity nesters that historically nested in tree cavities, old woodpecker holes, rotted pilings, and other natural cavities, but most purple martins now nest in man-made nest boxes. Purple Martins have been regionally targeted for conservation, and many landowners have effectively provided nesting habitat by creating clustered birdhouses near large canopy openings, such as water. According to The Nature Conservancy, Camp Murray may contain suitable habitat in the forest opening created by American Lake for purple martins (TNC 2008)..Purple martins were not detected during field surveys.

4.6.2.9 *White-breasted nuthatch*

The white-breasted nuthatch has a bright white breast and face, and is the largest of the three species of nuthatch in Washington (Birdweb 2006). This species was historically present in the oak woodlands of western Washington, and efforts are currently underway to restore populations through habitat enhancement and re-introduction. According to The Nature Conservancy, suitable habitat may exist in the Oregon white oak woodlands on Camp Murray for the white-breasted nuthatch (TNC 2008). The Nature Conservancy has identified the restoration of oak woodlands on Camp Murray as an excellent opportunity to enhance habitat for white-breasted nuthatches. White-breasted nuthatches were not detected during field surveys.

5. MISSION IMPACTS ON NATURAL RESOURCES

5.1 Land Use

Camp Murray encompasses a total of approximately 240 acres. Approximately 54 percent of the installation is developed, and consists of storage buildings, administrative offices and classrooms, troop

barracks, a heliport, and a drill field. Recreational amenities include a physical training course, trails, campground, and boat launch. The remaining portions of the installation consist of undeveloped forest, wetlands, shoreline, and riparian areas. Facilities and land use are described below. Installation land use is shown in Figure A-2 (Appendix A).

5.1.1 Developed Areas

The built environment at Camp Murray comprises approximately 130 acres on the installation. Most of the developed areas are managed by WAARNG, with a small portion managed by the WAANG. Facilities within the developed area include:

- administrative buildings
- storage buildings
- museum
- readiness centers
- helipad
- drill field
- mailroom
- warehouse buildings
- boat launch
- hazardous materials building
- telecommunications towers
- troop barracks
- classrooms
- guard shacks
- supply buildings
- beach office and kitchen
- latrines
- maintenance shops
- campground & picnic areas
- physical training trail

5.1.2 Washington Air National Guard Lease

The WAANG occupies approximately 43 acres of forested and developed land in the southwestern portion of Camp Murray. Some portions of the land leased by the WAANG are bordered by a fence separating the facility from the rest of WAARNG and EMD facilities in Camp Murray. Facilities within the developed area of the WAANG compound include:

- troop barracks,
- classrooms,
- supply buildings,
- warehouse and storage facilities, and
- administrative buildings.

Undeveloped areas occupied by the WAANG consist of mixed coniferous forest, shrub areas, and a portion of the American Lake shoreline. As required by DoD regulations, the WAANG has developed natural resource reports including a Bald Eagle Management Plan to help manage natural resources on the installation.

5.1.3 Undeveloped Areas

Approximately 46 percent of Camp Murray consists of natural areas, including deciduous and coniferous forest, a large tract of shoreline adjacent to American Lake, a perennial stream, and wetlands.

5.2 Current Potential Impacts

Current operations at Camp Murray include training, facility operations, recreation, and maintenance. By their nature, these activities have the potential to impact water quality and fish and wildlife resources, including protected species.

Recreation, impermeable surfaces, and vehicle use and maintenance activities contribute to existing water quality degradation in the watershed. Surface water impacts are also possible when using herbicide during pest management activities. This impact is expected to be minimal, as these activities are conducted according to label instruction and the Integrated Pest Management Plan (IPMP) for WAARNG facilities (WAARNG 2012).

The military mission requires maintenance and management of the developed areas of Camp Murray. However, regular mowing in patches of oak woodlands in developed areas keeps the diversity of the native understory low and prevents the natural regeneration of the oak canopy.

Wetlands, streams, and shorelines can be impacted through current operations, if personnel are not aware of these sensitive areas and the requirements for protecting them. Similarly, habitat for priority species and habitats, such as the bald eagle and white oak woodlands, can be impacted through training activities and improper forest management, if personnel are not aware of management requirements.

There is a potential for noise from training activities to affect wildlife; however, these impacts are considered minimal at Camp Murray. Examples of noise-producing activities on Camp Murray include military vehicle use; grounds maintenance; occasional tree pruning and removal; construction activities; helicopters; general troop training; and use of authorized, personally owned vehicles, boats, and personal watercraft.

5.3 Potential Future Impacts

The Camp Murray Site Development Plan was completed in February 2010 to guide development at the installation for a period of 25 years (Jacobs 2010). No major property expansions are planned to occur within the next 25 years. However, several projects are planned, pending available funding and the attainment of appropriate permits including the construction of new buildings, parking facilities, road consolidation, and improvements to the Historic District. Included in these plans are night-sky compliant LEDs for exterior building lights and new street lights; these lights were considered for their ability to reduce encroachment, enhance natural habitat, and contribute towards bird-safe building conditions.

The Camp Murray Site Development Plan considers management goals and objectives outlined in this INRMP (Jacobs 2010). Except for the new entry control point/main gate project completed in 2013, nearly all construction proposed in the Site Development Plan will occur within the built environment and is not expected to impact any natural resources on Camp Murray. Planned road improvements may result in the loss of a few forest trees. The new main gate construction resulted in the removal of a few oak trees that were mitigated per Pierce County permitting regulations. However, all impacts to sensitive areas including wetlands, streams, and the American Lake Shoreline are avoided by restricting development to areas outside of recommended buffer setbacks.

Implementation of this INRMP is expected to have positive effects for stream, wetland, and terrestrial habitats. Restoration efforts along Murray Creek, such as invasive species removal and the planting of native species are being implemented and monitored, enhancing the overall stream, riparian and

wetland habitats on the site. Buffers are established around sensitive areas to ensure their protection. The implementation of actions proposed in this INRMP, with management guidance on implementation of projects, should reduce the potential for negative effects to wetlands, wildlife habitat, and water quality.

Where maintenance is not essential to meet the requirements of the military mission, mowing will be reduced in oak woodlands to promote the development of native understory and tree regeneration. However, active control of invasive species and competing tree species such as Douglas fir will continue.

5.4 Natural Resources Needed to Support the Military Mission

Natural landscapes are not required for the success of training activities at Camp Murray. Camp Murray requires the existing highly modified landscape of maintained and mowed grass areas to provide drill training for the WAARNG, meet force protection requirements, and provide aesthetic enjoyment for military personnel. Non-native turf species are established in these areas, and the WAARNG has no plans to remove established turf and replace it with native species. Other missions supported by the developed areas include classroom training, administrative operations, and facilities maintenance.

Natural resources needed to support the mission at Camp Murray are as follows:

- Maintained (mowed, drained, and devoid of trees and shrubs) grasslands for drill practice and force protection;
- Functioning and unobstructed surface water drainage systems;
- Ground water free of contamination so that the installation is not shut down because of pollutant discharge;
- Functioning and healthy ecosystems capable of withstanding natural and artificial stresses, and thereby able to support the military mission in perpetuity.

The WAARNG recognizes that it has a responsibility to manage the natural resources entrusted to it in a way that complies with legal and regulatory requirements, promotes ecological sustainability, and facilitates mission accomplishment in perpetuity. With proper natural resource management, the WAARNG shall maintain its ability to train and complete their mission, while sustaining a legacy of natural resources for current and future generations. Natural resources management at Camp Murray will be aimed at maintaining the ecosystems necessary to support the military mission, and encouraging habitat conservation in other natural areas throughout the installation such as forested areas, wetlands, streams, and shorelines.

5.5 Natural Resources Constraints to Missions and Mission Planning

The SAIA requires that INRMPs provide for, "…no net loss in the capability of military installation lands to support the military mission of the installation" (16 USC §670 *et seq*.). The INRMP enables the installation to meet the requirements of the military mission within the limitations and legal restrictions of the baseline natural resources at Camp Murray.

Environmental constraints at Camp Murray, such as the bald eagle, oak woodlands and wetlands, dictate where and when certain types of activities can occur to ensure regulatory compliance and the long-term sustainability of natural resources on the installation. Camp Murray will manage environmental constraints to training activities by assigning site users a training site specific to the type of training or activity to be performed; brief them on any known restrictions in the area; and monitor

them for compliance. Camp Murray will manage environmental constraints to other activities (i.e., facility maintenance, recreation) by briefing site users on any known restrictions in the area, and monitoring them for compliance.

Natural resources at Camp Murray that could limit activity include Murray Creek; wetlands; threatened, endangered, or priority species, including the bald eagle; oak woodlands; and the American Lake shoreline. These areas with activity constraints are shown on figures included in Appendix A, and discussed below:

- Activities in and around Murray Creek, wetlands, and American Lake shorelines are limited because impacts such as filling, modifying, draining, or construction, could result in CWA violations. Any new projects or types of training in or around wetlands, streams, and shorelines, must be coordinated by the CFMO-Env staff to ensure that actions comply with all applicable laws.
- New projects within 200 feet of the American Lake shoreline must be coordinated with Pierce County (via CFMO-Env) to determine whether any permits are needed.
- Activities (including grounds maintenance) in the vicinity of Oregon oak woodlands should be limited to minimize soil compaction and damage to tree roots, and to encourage the growth of the native understory.
- Any new projects or type of training must be considered for potential threatened and endangered species prior to implementing them.
- Activity in the vicinity of the historic eagle nest trees should be minimized especially at the beginning of the nesting season in January to avoid discouraging the eagles to nest. Activities that may cause disturbance to eagles are described in detail in the WAANG Bald Eagle Management Plan (BEMP) (E^2M 2007b), which is included as Appendix E.
- If a nest is known to be built, disturbance within a specified distance to the nest (buffer) will be avoided during the critical nesting time from March to May, and minimized from May through July. Recommended buffer widths are included in the BEMP in Appendix E.

Additional information on how to properly manage these natural resources limitations during mission planning are presented in Sections 6.3 to 6.7. Laws and regulations that pertain to these natural resources are also incorporated in Chapter 6 and discussed in Appendix D.

6. NATURAL RESOURCES PROGRAM MANAGEMENT

6.1 Natural Resources Program Management

Intra- and inter-agency cooperation, coordination, and communication at the federal, state, and local levels (for example, USFWS and WDNR) are requisite to the success of the INRMP. The WAARNG has coordinated with these groups throughout the development of this INRMP, as specialized expertise is required to adequately manage natural resources at Camp Murray. Technical assistance should continue to be sought from federal and state agencies, universities, and special interest groups.

6.1.1 Administrative and Technical Support

The Natural Resources Program at Camp Murray is administered by the WAARNG CFMO-Env. Responsibilities of the CFMO-Env include:

- Implementing this INRMP (with the assistance of Camp Murray staff).
- Providing oversight and coordination with other agencies.
- Developing and implementing programs to ensure the inventory, delineation, classification, and management of all applicable natural resources to include: wetlands, scenic areas, endangered and threatened species, sensitive and critical habitats, and other natural resource areas of special interest.
- Providing for the training of natural resources personnel.
- Maintaining natural resources management records.
- Reviewing all environmental documents (for example, environmental impact assessments and remedial action plans) and construction designs and proposals to ensure adequate protection of natural resources, while ensuring that technical guidance as presented in this INRMP is adequately considered.
- Evaluating impacts of training missions and providing guidance to trainers.
- Coordinating the Cultural Resources program and Section 106 compliance.
- Coordinating with local, state, and federal governmental and civilian conservation organizations regarding Camp Murray natural resources management program.
- Coordinating hunting and fishing programs.
- Implementing and executing AR 200-1.
- Assisting the Adjutant General with developing funding priorities for all natural resources program and compliance activities.

The CFMO-Env also receives support from Camp Murray staff, each of whom has significant duties in addition to natural resources support. Additional labor resources may include:

- Federal agencies (for example, USFWS, NRCS, USACE, and the U.S. Army Environmental Center),
- State agencies,
- Local and regional universities,
- Local and regional elementary, middle, and high schools,

- Scouting groups, and
- Special interest groups (for example, Audubon Society, and sports clubs).

6.1.2 Cooperative Agreements

6.1.2.1 *Federal Agreements*

The DoD and subcommand entities have Memorandums of Understanding (MOU), Memorandums of Agreement (MOA), and other cooperative agreements with other federal agencies, interest groups, and various state agencies to provide assistance with natural resources management at installations across the U.S. Generally, these agreements allow installations and agencies or interest groups to obtain mutual conservation objectives. An incomplete list of these agreements is in Appendix I.

6.1.2.2 *State Agreements*

The WAARNG has no statewide cooperative agreements, and no written cooperative agreements specific to Camp Murray have been established for the management of natural resources on the installation. However, bald eagles have actively nested on Camp Murray until 1994 and have continued to use previous nesting trees as perches since then. In addition, bald eagle nests are active on adjacent properties.

The WAANG was required to develop a Bald Eagle Management Plan for the management of bald eagles on Camp Murray, which is included as Appendix E (E^2M 2007b). Because bald eagle management issues are the same throughout Camp Murray, the WAARNG has obtained permission to use the WAANG BEMP for bald eagle management on their portion of Camp Murray to maximize efficiency.

6.2 Geographic Information Systems

Natural resources data are maintained by WAARNG CFMO-Env at Camp Murray. The GIS database incorporates required SDSFIE feature classes as required by National Guard Bureau and meets or exceeds the CIP data calls required by NGB.

The WAARNG currently has electronic GIS data files for the following natural resources:

- Topography;
- 2015 Aerial photo;
- Soils;
- Wetlands, streams, and open water;
- Tree inventory for areas near buildings and parking areas;
- Terrestrial vegetation communities; and
- Wildlife species and habitats of concern.

In addition, the WAARNG has electronic GIS data files for the following:

- Installation boundary;
- Roads;
- Utilities;

- Towers;
- Helipad;
- Demographics; and
- Buildings.

6.3 Fish and Wildlife Management

The boat launch on American Lake is open to the general public. Fishing on the lake is subject to state regulations and is monitored by WDFW. Due to the limited amount of undeveloped area at Camp Murray, no future hunting program is planned. Similarly, no *Watchable Wildlife* areas are designated or wildlife education and interpretation programs are planned.

Laws and regulations pertaining to the management of fish and wildlife include:

- Clean Water Act (33 USC §1341);
- Executive Order 11990, Protection of Wetlands;
- Endangered Species Act, 7 USC §136; 16 USC §460 *et seq*. (1973) as amended;
- Fish and Wildlife Conservation Act (USC §2901 *et seq*.);
- Fish and Wildlife Coordination Act, as amended (16 USC §661 *et seq*.);
- Migratory Bird Treaty Act, as amended (16 USC §703-712);
- NEPA (42 USC §4321 *et seq*.);
- SAIA (16 USC §670a-o);
- Animal Damage Control Act (7 USC §426 *et seq*.);
- Environmental Safeguard for Activities for Animal Damage Control on Federal Lands (EO 11870)
- WAC 220, Fish and Wildlife, Fisheries;
- WAC 232, Fish and Wildlife, Wildlife; and
- The Bald and Golden Eagle Protection Act (16 USC §668a-d)

The full list of laws and regulations are described in Appendix D**.**

6.3.1 Fish

The WDFW manages a recreational fishery in American Lake, which is accessible to the public from the boat launch located on Camp Murray. The boat launch is accessed through public streets of Lakewood, adjacent to the northern boundary of Camp Murray. A fishing license is required, and the WDFW occasionally patrols the lake to ensure fishermen are in compliance with state regulations. WDFW stocks the lake annually with game fish. In addition, several other non-game species have become established in American Lake. Common species caught include kokanee, largemouth bass, and rainbow trout.

Efforts are currently underway to restore ecological functions and sustain creek flow in Murray Creek (see Section 3.4). Monitoring and maintenance of the restoration efforts is conducted under the direction of CFMO-Env staff.

Several structures intended to augment fish rearing habitat are currently in place along the lower portion of Murray Creek, and are maintained by base personnel in cooperation with the WDFW. Guidelines for managing fish on Camp Murray are as follows:

- Maintain fish holding and rearing structures in Murray Creek.
- Continue to implement recommendations outlined in the Murray Creek Planning Guide (Shapiro and Associates, Inc. 1997) for restoring creek flow in Murray Creek.
- Monitor and restore degraded riparian habitats.
- Control invasive species along Murray Creek and the American Lake shoreline.
- Encourage the recruitment of large woody debris that falls into Murray Creek and along the shoreline of American Lake by leaving fallen trees in place to provide additional fish habitat. However, grass clippings, wood shavings, and other debris should not be piled in or adjacent to aquatic habitats, such as the wetlands, buffers, and riparian areas, as doing so can degrade these habitats.

6.3.2 Wildlife

Little active management is needed for wildlife on Camp Murray. However, several priority species could likely benefit from habitat enhancement and/or coordination with surrounding land managers. The following wildlife management activities will be conducted at Camp Murray provided that activities do not deter the military mission.

- Snags and den trees will be left undisturbed except when they pose a threat to safety. Snags are standing dead trees that provide essential habitat for wildlife species, including food and cavities for nesting. Many birds that live in snags eat insects, which help prevent insect and disease problems in other living trees. Den trees are live trees with cavities used by birds, mammals, and reptiles for nesting or protection.
- Understory and native shrub vegetation will be left intact to provide nesting habitat and cover for birds and small mammals.
- Large woody debris that falls into the forest will be left in place to provide additional wildlife habitat. However, grass clippings, wood shavings, and other debris will not be piled in or adjacent to the forest, as doing so can potentially increase the risk of forest fire.
- Disturbance in the vicinity of bald eagle perch trees will be limited during the breeding season. Refer to Section 6.4.1 for additional management information pertaining to bald eagle management on the installation.
- Maintenance and monitoring of a former landfill site behind Building 116, which is undergoing establishment as a pollinator habitat. The site may require reseeding and additional plantings to fully establish native pollinator-supporting plants.

6.3.3 Nuisance Wildlife and Wildlife Diseases

No wildlife species are presently considered serious pests at Camp Murray. Wildlife on the installation that sometimes cause nuisance includes coyotes, beavers, feral dogs and cats, European Starlings, and Canada Geese (E^2M 2007a). Most nuisance wildlife is currently managed according to the IPMP (WAARNG 2012). Refer to Section 6.7 for additional information on the IPMP.

Camp Murray actively manages beavers on the installation. Camp Murray staff monitors for beavers, particularly in the vicinity of Murray Creek, and implements beaver control actions, such as partially opening large beaver dams and removing debris from the I-5 culvert.

Canine and feline pests can reduce the populations of nesting and foraging birds and small mammals, and can carry human diseases such as cat scratch fever, distemper, plague, and rabies. European starlings are considered to be a nuisance species because of their tendency to occur in large flocks and to rob native cavity-nesting birds of nest sites. Canada Geese are not native to Puget Sound region and have few predators. Canada geese are considered to be a nuisance when they overgraze lawns and crops, leading to erosion. Build-up of fecal matter can also lead to reduced water quality by fostering bacteria, and adding excess nitrogen and phosphorus to water bodies.

Diseases affecting fish and wildlife may occur on the installation. As outlined in AR 200-1, installation Natural Resources personnel will consult with appropriate Army Veterinary Corps personnel regarding large-scale fish and wildlife deaths and unnatural behavior occurring on the installation.

6.4 Management of Threatened and Endangered Species Habitats

The WAARNG will manage threatened and endangered species by avoiding sensitive areas, preventing damage to sensitive areas, and rehabilitating previously damaged areas where possible. This section presents management guidance information about sensitive species that are located or may be located at Camp Murray, and requirements and strategies for management.

In cases where endangered species management done in accordance with the appropriate guidance would conflict with mission activities, consultation would be initiated with the WDFW. The WAARNG is required to manage bald eagles according to all federal laws. Failure to protect bald eagles could lead to violations of the Bald and Golden Eagle Protection Act (BGEPA) and the MBTA, which could result in monetary fines, and negatively impact the land available to support the military mission.

Laws and regulations pertaining to the management of threatened and endangered species include:

- SAIA (16 U.S.C.670a *et seq*.);
- AR 200-1, Environmental Protection and Enhancement;
- MBTA of 1918;
- BGEPA of 1940 (16 U.S.C. 668-668d, 54 Stat. 250);
- DoDI 4715.3, Environmental Conservation Program;
- Habitat Buffer Zones for Bald Eagles (RCW 77.12.655);
- Bald Eagle Protection Rules (WAC 232-12-292);
- Wildlife Classified as Protected Shall Not be Hunted or Fished (WAC 232-12-011); and
- Protection of Bald Eagles and Their Habitats — Cooperation Required (RCW 77.12.650).

These laws and regulations are described in Appendix D.

No federally-listed species are known to occur on Camp Murray. Habitat management recommendations and guidelines for state-listed species that have been previously observed at Camp Murray or that have documented habitat are included in the following sections.

6.4.1 Bald Eagle Habitat

A bald eagle management plan was developed by the WAANG in 2007 (Appendix E). This plan was not developed in coordination with WAARNG Camp Murray personnel. However, the WAARNG has found the plan to be suitable and manages bald eagle habitat on Camp Murray according to guidelines outlined in the WAANG BEMP as summarized below.

- Protect and maintain landscape buffers and perch trees, including mature trees along the American Lake shoreline;
- Minimize disturbance, including boating, military training, and construction activities around nest trees during the wintering and breeding seasons;
- Educate Camp Murray personnel about the location of identified nesting sites on American Lake to avoid disturbing eagles during recreational use, and on the proper disposal of trash (i.e., fishing line) to avoid injury to eagles;
- Conduct annual monitoring of eagles and eagle habitat;
- Coordinate with JBLM Lewis Main to manage American Lake resources, including fish stocks and invasive species along the shoreline; and
- Establish activity-specific protective buffers around identified nesting trees as specified in the BEMP.

6.4.2 Western Gray Squirrel Habitat

Suitable western gray squirrel habitat has been documented on Camp Murray (TNC 2008). Before any trees are cut within and outside the Oregon oak woodlands, WAARNG environmental managers at CFMO-Env must be contacted to determine if coordination with the USFWS is required. Protocol-specific surveys will be conducted prior to any development in the oak savannah area. Pending funding, the following actions will be taken to enhance the quality of western gray squirrel habitat on Camp Murray.

- Coordinate with surrounding land managers to ensure the complimentary management of potential western gray squirrel habitat on the installation.
- Restore and manage Oregon oak woodlands to enhance the production of mast by facilitating the development of healthy, large-crowned oaks.

6.5 Water Resource Protection

Several surface water surveys have been conducted within the last decade on Camp Murray, the most recent of which was conducted in 2007 (Turnstone 2007). The 2007 survey described and mapped the distribution and extent of wetlands on Camp Murray.

Laws and regulations that are associated with the control and abatement of pollution in U.S. waters, and erosion control and soil conservation include:

- Federal Water Pollution Control Act, as amended by the CWA of 1977 (33 USC §1251);

- U.S. Fish and Wildlife Coordination Act (16 USC §661);
- NEPA (42 USC §4321);
- EO 11990, Protection of Wetlands;
- EO 11752, Prevention, Control, and Abatement of Environmental Pollution;
- EO 12088, Federal Compliance with Pollution;
- Soil Conservation Act (16 USC §590a *et seq*.);
- Federal Water Pollution Control Act as amended by the CWA of 1977 (33 USC §1251);
- EO 11989, Off-road vehicle use;
- SAIA (16 USC §670 *et seq*.);
- AR 200-1 August 2007, 32 CFR 651;
- State Water Pollution Control Act (RCW 90.48); and
- Shoreline Management Act (Chapter 90.58 RCW).

These laws and regulations are described in Appendix D.

6.5.1 Stormwater and Wastewater Management

Activities that disturb soil, including natural resources management activities, have the potential to negatively affect water quality. However, general Best Management Practices (BMPs) are used during natural resource management and other activities that could potentially affect water resources to prevent the introduction of contaminants to Murray Creek and American Lake (refer to Section 6.5.2 for BMPs).

Stormwater runoff is produced when rainfall at any time during a storm exceeds the infiltration capacity of the soil. When this happens, water will accumulate in small depressions and run downslope as overland flow. Stormwater runoff can be a significant source of pollutants and sediment into surface waters, especially in areas where groundcover has been disturbed. Water quality also may be negatively impacted by disturbances causing increased sedimentation to wetlands and stream channels. In addition, sources of stormwater and pollution at Camp Murray could originate from areas designated for fueling and maintenance activities. Stormwater runoff from impervious surfaces has a high potential to carry pollutants into wetlands, surface waters, and groundwater. Impervious surfaces at Camp Murray include paved areas (for example, sidewalks and parking lots) and buildings.

Stormwater at Camp Murray is currently managed according to guidelines and protocols outlined in the Stormwater Management Manual for Western Washington (SWMM) Publication Number 99-11 to 99-15 (WDOE 2001). Stormwater control structures on the installation include catch basins, dry wells/underground injections controls (UIC), oil/water separator, ditches, bioinfiltration swale, culverts, and a Stormceptor™ vault. These facilities are maintained according to guidance specified in the Camp Murray Stormwater Control System Maintenance Plan (Tetra Tech 2004a).

A Stormwater Control System Corrective Design Plan (Tetra Tech 2004b) was developed for Camp Murray in spring 2004 to recommend BMPs, including repairs, retrofits, and alternative designs for the existing stormwater control structures. The Corrective Design Plan identifies potential design problem areas and provides corrective design recommendations.

6.5.2 Erosion and Soil Conservation

Erosion control and soil conservation are important water resource conservation issues. Accelerated erosion, continued compaction, or the removal of topsoil can drastically alter soils. Sediment accumulation resulting from erosion affects surface water quality and aquatic organisms. There are two main types of soil erosion: wind erosion and water erosion. As both erosion types are generally not an issue at Camp Murray, there is no active erosion management that occurs at the site. However, general BMPs are used during activities that could potentially affect water resources. Proper use of BMPs will prevent the introduction of sediments into Murray Creek and American Lake, and reduce soil losses. Examples of BMPs include installing vegetative strips around a surface-water body to reduce runoff and sedimentation, implementing an integrated pest management program, and the use of silt fences.

Camp Murray will implement the following strategies:

- Follow guidelines and protocols outlined in the WDOE SWMM Publication Number 99-11 through 99-15 (WDOE 2001) as the acceptable standard or controlling erosion.
- Obtain authorization to discharge stormwater under an National Pollutant Discharge Elimination System (NPDES) construction stormwater permit from the WDOE for all construction sites of one acre or larger (including smaller sites that are part of a larger common plan of development).
- Replant barren ground as soon as possible.
- Minimize the use of pesticides and herbicides.
- Minimize the amount of impervious surfaces in newly developed areas.
- Restrict vehicle use to established roadways.
- Avoid parking vehicles in unpaved, grassland areas, and within the driplines of trees.
- Adhere to BMPs for construction activities described in WDOE's SWMM.
- Minimize streambank erosion by reducing the impact of constructed barriers and channelizing structures

6.5.2.1 *General Soil Practices and Concerns*

Map unit locations at Camp Murray are presented in Figure A-3 (Appendix A). Except for portions of Mapping Unit #3 soils within Camp Murray are not highly erodible. The main limitations for soils on the installation are caused by high water tables during the wet season, steep slopes, and/or dryness. See Table 2 for a detailed description of management concerns for soils on Camp Murray. Increasing vegetative cover reduces erosion. When replanting, mulching seedlings aids in soil moisture retention and increases plant growth.

6.5.3 Re-vegetation

Native vegetation will be used when replanting areas disturbed through construction and repair. Planting native plants is generally more cost-effective because they are adapted to the natural soil conditions, climate, and other biological and physical conditions found in Washington. Thus, they do not require continual replanting or fertilizer application as required by nonnative species. Areas dominated by shrub or forest vegetation will be replanted with a mix of native species similar to adjacent undisturbed areas.

6.5.3.1 *Silt Fences*

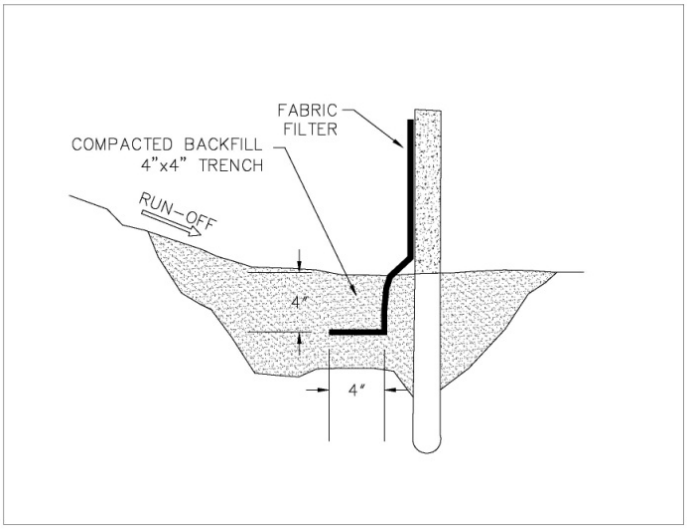
Exposed soils that are to remain unworked for more than 30 days will be seeded and mulched. In addition, silt fences will be used to prevent silt from leaving the site. Install silt fences along the borders, according to the instructions below.

- Place the silt fence at the lowest elevation of the graded area.
- Fasten silt fence securely to each steel support post or to woven wire, which is in turn attached to the steel fence posts.
- Embed silt fence in trench and backfill.
- At each end of the silt fence, turn fence upslope, and extend until ground surface rises.
- Inspect the silt fence frequently, and repair or replace promptly as needed.
- Remove accumulated silt when it reaches a depth of six inches. Dispose of sediment trapped by this practice in an area not prone to erosion.
- Remove silt fence when it has served its usefulness to avoid blocking storm flow or drainage.

6.5.3.2 *Guidance for Roadways and Ditches*

Provide V-shaped side ditches as shown in Field Manual (FM) 5-35 *Engineer Field Data* (DA 1987). Size and shape the ditches according to this manual, generally with a 2:1 slope. Slopes should not be too steep to avoid bank sloughing. Provide properly sized and installed culverts according to FM 5-35 to protect roadways and prevent erosion. In erosive areas, use riprap to stabilize the ditches. On steep erosive slopes, construct V-ditches with geotextile fabric and riprap to add stability. If applicable, integrate live stakes or plant selections as suggested by the Natural Resources specialist as a long-term erosion prevention measure.

Shape and crown roads to drain water. Install culverts to improve drainage and minimize shrinking, swelling, and frost damage. Add crushed rock or gravel to prevent road damage caused by low strength. Use vegetative cover, silt fencing, geotextile fabric, straw bales, or a combination of several techniques in sloping areas where road ditches have a tendency to wash. For Best Management Practices, refer to the Stormwater Management Manual for Western Washington and the Stormwater Pollution Prevention Plan for Camp Murray (Appendix J).



6.5.4 Wetlands, Stream, and Shoreline Protection

A wetland PLS was completed in 2007, which described and mapped the distribution and extent of wetlands on Camp Murray (Turnstone 2007). In 2016, a wetland survey was initiated to update the delineation of the depressional wetland and update all wetland ratings. Figure A-4 (Appendix A) shows the wetland locations in Camp Murray. Wetlands are protected in

accordance with state and federal laws and regulations. Camp Murray currently manages wetlands according to JBLM Lewis Main guidelines, which includes 50-meter-wide buffer for Murray Creek and jurisdictional wetlands. Camp Murray also honors the 200-foot Pierce County Shoreline buffer for American Lake. The installation has no pending Section 404 and 401 permits as of the effective date of this INRMP, and there is no current involvement with local or regional wetlands banking.

Laws, regulations, and executive orders pertaining to wetlands and shoreline protection and policies include:

- Rivers and Harbors Act of 1899;
- Fish and Wildlife Coordination Act of 1967;
- Land and Water Conservation Fund Act of 1968;
- Federal Water Pollution Control Act as amended by the CWA of 1977 (33 USC §1251);
- EO 11990, Protection of Wetlands;
- NEPA (42 USC §4321);
- SAIA (16 USC §670 *et seq*.);
- State Water Pollution Control Act (RCW 90.48); and
- Shoreline Management Act (Chapter 90.58 RCW).

These laws and regulations are described in Appendix D.

The following guidelines will be implemented to maintain compliance with all applicable regulations:

- Camp Murray staff must contact the CFMO-Env prior to dredging, filling or earth moving activities near wetlands. The CFMO-Env will assess whether a wetland could be impacted, whether a jurisdictional wetland delineation is required, and what permits need to be obtained to comply with all federal and state regulations. Non-permitted impacts to wetlands and/or floodplains may result in CWA violations, potentially resulting in fines and other penalties, which may ultimately compromise the integrity of Camp Murray.
- Work occurring in or near stream or lake shorelines will require a Hydraulic Project Approval from the Washington Department of Fish and Wildlife, and CFMO-Env must be instructed by the project manager to apply for the permit or work with the contractors to do so.
- Invasive species in the wetlands will be managed to prevent additional loss in wetland plant diversity.
- Wetlands will continue to be enhanced and/or restored. All enhancement and restoration projects will be planned in coordination with CFMO-Env staff, and will be thoroughly documented.
- Camp Murray staff must contact the CFMO-Env prior to any planned disturbance within 200 feet of the shoreline of American Lake. The CFMO-Env will assess whether permits are needed to be obtained to comply with federal and state coastal zone regulations and policies.

- Wetland buffers will be established as follows: 75 feet for low impact use, 110 feet for moderate impact use, and 150 feet for high impact use will be maintained as recommended by the WDOE's Guidance on Wetland Mitigation in Washington State, Part 1 (Turnstone 2007). Low Impact Land Use includes forestry and low intensity open space. Moderate Impact Land Use includes residential with one unit per acre or less, moderate-intensity open space such as parks and moderate intensity agriculture. High Impact Land Use includes commercial, urban, industrial, high intensity agriculture or residential with more than one unit per acre.

6.5.5 Grounds Maintenance

Grounds maintenance focuses on developed areas. Of Camp Murray's total area of 240 acres, 54 percent is developed land. Developed land includes buildings, roads, maintained turf with landscaped trees, and paved areas. Natural resources occurring in these areas are limited. The turf areas and landscaped trees need routine grounds maintenance, including mowing, fertilization, and herbicide application and watering, as needed.

Laws and regulations associated with grounds maintenance activities include:

- EO 13148, Greening the Government through Leadership in Environmental Management;
- Presidential Memorandum (April 1994), Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds;
- Presidential Memorandum (June 2014) Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators, and
- Federal Insecticide, Fungicide, and Rodenticide Act (7 USC §136).

These laws and regulations are described in Appendix D.

A Presidential Memorandum, dated 26 April 1994, directs federal executive departments and agencies to use regionally native plants in landscaping for federal grounds and federally-funded projects. Native species generally provide better habitat for wildlife and have relatively low irrigation requirements. In addition, the use of native species generally reduces the need for pesticides and fertilizers. Urban forests are often an integral component of landscaped areas. Urban forests are valued for non-consumptive uses such as providing shade, aesthetic value, and habitat for wildlife.

During landscaping and grounds maintenance activities, specific natural resources management includes:

- Using native species in new landscaping;
- Using xeriscaping (zero or low irrigation, zero mowing-required grass) landscaping where possible;
- Avoiding or limiting the use of pesticides or herbicides around designated habitat areas, including oak, riparian, and pollinator habitats;
- Ensuring that BMPs for spill prevention and pollution prevention are followed to protect surface water and aquatic habitats; and

- Ensuring that use of herbicides and pesticides are minimized in accordance with Invasive Species and Noxious Weed Control and IPM strategies.

Grounds maintenance and landscaping is performed in accordance with federal and state laws and regulations. Camp Murray also carries out these activities in accordance with the statewide *Integrated Pest Management Plan for the Washington Army National Guard,* (WAARNG 2012), and the *Pollution Prevention Plan for the Washington Army National Guard,* (Kleinfelder, Inc. 2001). The IPMP describes the installation's pest management requirements, outlines the resources necessary for surveillance and control, and describes the administrative, safety, and environmental requirements of the program.

Federal agencies and facilities are required to implement pollution prevention measures because of EO 12856. The WAARNG prepared a Pollution Prevention Plan (PPP) for its statewide maintenance facilities, as required under Chapter 173-307 of the Washington Administrative Code (WAC), Pollution Prevention Plans (Kleinfelder, Inc. 2001), which encourages voluntary efforts to redesign industrial, commercial, production and other processes to reduce or eliminate hazardous waste byproducts and to maximize the in-process reuse or reclamation of valuable spent material. It is also Army policy, as stated in AR 200-1, to reduce as much as is practicable the quantity and toxicity of wastes generated by Army operations.

The WAARNG currently has 13 military hazardous waste generating stations statewide. In addition, there are five state maintenance regions that use the WAARNG stations for disposal of hazardous waste. The military waste is generated from the maintenance of vehicles, equipment, and weapons. The state maintenance waste is generated from operations at buildings, grounds, and facilities. Because the operations at each station are generally similar in nature, the PPP applies to all statewide WAARNG waste generation.

Issues addressed in the PPP includes:

- A general description of common activities at WAARNG maintenance facilities, and an overview of the facility processes;
- An inventory of processes using or generating hazardous substances and the quantity of the waste generated by each facility;
- Options for reduction in the use of hazardous products, and the generation of hazardous wastes; and
- Opportunities for additional recycling or waste treatment.

6.5.6 Vegetation Management

Surveys of flora, vegetation communities, and fauna, including threatened and endangered species, were conducted in 2005 to provide the necessary background information for natural resources management at Camp Murray (Turnstone 2006a). The flora survey was an installation-wide vascular plant survey that produced a list of plant species with verified nomenclature, classification and annotation compatible with the USDA NRCS's (2007) *Plant List of Accepted Nomenclature, Taxonomy, and Symbols.* The vegetation communities survey described and mapped the distribution and extent of plant communities throughout Camp Murray (see Figure A-5, Appendix A). The fauna survey described and mapped the distribution and extent of sensitive species at Camp Murray. Threatened and endangered species surveys were conducted concurrently with the flora and faunal surveys, which mapped the kinds and known distribution of federal and state endangered, threatened, proposed, and candidate species occurring on the installation.

Laws and regulations pertaining to terrestrial habitat management include:

- Federal Insecticide, Fungicide, and Rodenticide Act (7 USC §136);
- Forest and Rangeland Renewable Resources Planning Act (16 USC §1601 *et seq*.);
- NEPA (42 USC §4321);
- AR 200-1, Environmental Protection and Enhancement, August 2007;
- SAIA (16 U.S.C 670 *et seq*.);
- MBTA, as amended (16 USC §703-712);
- Pierce County Critical Areas Ordinance: Section 18E.40.020, Fish and Wildlife Species and Habitat Conservation Areas; and
- Washington State Forest Practices Rules (WAC 222).

These laws and regulations are described in Appendix D.

Section 6.7 presents the laws and regulations pertaining to the management of nuisance plant species.

Forest vegetation on Camp Murray will be managed according to guidelines outlined in the Camp Murray Forest Management Plan (FMP, Appendix F). Vegetation in developed areas will be managed as outlined in Section 6.5.5.

6.5.7 Forest Management

Three main forest types are present on Camp Murray - mixed coniferous/deciduous forest, Oregon oak woodlands, and the urban forest. There are no commercial forests on the installation. Except for the oak woodlands, most forested areas on Camp Murray require little active management, with the exception of maintaining the trees' health and safety to humans and vehicles in the urban forest and parts of the oak woodland.

Maintenance, such as the removal of downed limbs and trunks, is performed adjacent to gravel roads within the undeveloped portions of the mixed forest. Some oak woodland and unvegetated areas located in the northern part of the installation has recently been restored with Oregon white oak trees and is being actively maintained by Camp Murray staff. The expansion and paving of a portion of Armory Road will result in the loss of a small amount of forested habitat; however, the major extent of forests on Camp Murray is expected to be maintained as protected open space.

Activity within parts of the Camp Murray forest is restricted, including the bald eagle nest sites, oak woodlands, and within the buffer zone of sensitive areas (i.e., American Lake shoreline, Murray Creek, wetlands). Section 6.5.4 contains information on shoreline and wetland buffers. Oak woodlands are managed in accordance with the WDFW's *Management Recommendations for Washington's Priority Habitats: Oregon White Oak Woodlands* (Larsen and Morgan 1998), JBLM Lewis Main guidelines, and in accordance with local regulations.

A FMP for Camp Murray has been developed concurrent with the preparation of this INRMP, and is included as Appendix F. The FMP provides a description of forest resources on Camp Murray; a summary of applicable laws and regulations; general forest management guidelines; forest pests; and maintenance recommendations.

6.6 Fire Management

A large portion of Camp Murray is developed with buildings, structures and turf areas. Undeveloped land consists mainly of forests, which are located primarily to the south and west of developed areas. For this reason, the threat of wildfire to the mission and natural resources is low. Should a fire occur in the forest (for example, from a lightning strike), the local fire department will be called to assist. No prescribed fire is used on the installation.

6.7 Integrated Pest Management Program

The WAARNG has a statewide *Integrated Pest Management Plan for the Washington Army National Guard* (WAARNG 2012)). This plan describes the installation's pest management requirements, outlines the resources necessary for surveillance and control, and describes the administrative, safety, and environmental requirements of the program. No specific IPMP for the Camp Murray installation has been developed, although much of the statewide plan addresses issues specific to Camp Murray. Camp Murray personnel are required to use the statewide plan.

The plan outlines a list of pests that are of concern on the WAARNG installations and how they will be managed. WAARNG pests include, but are not limited to, rodents, invasive plants, and insects. Several sensitive species and habitats are present on Camp Murray; therefore, the threat of invasive species to natural areas is a major concern at the installation.

Laws and regulations pertaining to invasive and exotic species and pest control include the following:

- Federal Noxious Weed Act of 1974 (7 USC §2801 *et seq*.);
- Federal Insecticide, Fungicide, and Rodenticide Act (7 USC §136);
- Federal Pest Plant Act (7 USC §150a *et seq*.);
- EO 12865, Reduction of Pesticide Application by 50 percent by Fiscal Year (FY) 2000;
- EO 13112, Invasive Species;
- DOD Instruction 4150.07, May 29, 2008
- National Aquatic Invasive Species Act of 2003 (NAISA);
- Noxious Weeds - Control Boards (RCW 17.10); and
- State Noxious Weed List and Schedule of Monetary Penalties (WAC 16.750).

These laws are discussed in Appendix D**.**

Control of pests (e.g., flies in buildings, nuisance birds and rodents, mosquitoes, wasps and bees, and other insects) and invasive vegetation at Camp Murray is carried out by licensed CFMO personnel and contracted weed control companies.

6.8 Outdoor Recreation

Opportunities for outdoor recreation on Camp Murray include picnic facilities along the Murray Creek corridor, a campground, including RV hookups and a small boat launch, physical training trails, and a larger boat launch which is operated by the WDFW. All recreation facilities are available for use solely by military personnel, except the boat launch which is managed by WDFW and open to the public. The WDFW boat launch is open every day of the year during daytime office hours. The WDFW boat launch

and associated infrastructure is separated from Camp Murray by a fence to prevent unauthorized entry onto the installation.

Laws and regulations pertaining to outdoor recreation include the following:

- SAIA (16 U.S.C 670 *et seq*.);
- EO 12960, Recreational Fisheries;
- WAC 220. Fish and Wildlife, Fisheries; and
- WAC 232. Fish and Wildlife, Wildlife.

These laws are discussed in Appendix D**.**

Future efforts to manage Eurasian milfoil in American Lake may include posting signage and requiring boat launch users to clean their vehicles to prevent spreading the weed. CFMO-Env and the National Guard Association will coordinate on informing campers and visitors if/when there are toxic algae alerts.

6.9 Cultural Resources Management

6.9.1 Overview

Prior to any new projects, building alterations, or ground disturbing activities at Camp Murray, the Cultural Resource Manager in the CFMO-Env must be contacted. The CFMO-Env will assess whether an architectural and/or archaeological survey is required and what permits need to be obtained to comply with all federal and state regulations pertaining to cultural resources.

Cultural resources include sites, buildings, structures, or objects that may have significant archaeological and historic values, or properties that may play a significant traditional role in a community's history, beliefs, customs, and practices. Cultural resources, thus, encompass a wide range of sites and buildings from prehistoric Native American campsites to Military buildings constructed during the Cold War, as well as traditional cultural properties still used today. From a tribal perspective, Natural Resources also constitute cultural resources. Therefore, natural resources must also be considered in the review of cultural resources.

Sections 106 and 110 of the National Historic Preservation Act (NHPA, Public Law (PL) 89-655) provide the framework for federal review and protection of cultural resources, and to ensure that they are considered during federal project planning and execution. The implementing regulations for the Section 106 process (36 CFR Part 800), have been developed by the Advisory Council on Historic Preservation (ACHP). The Secretary of Interior administers the National Register of Historic Places (NRHP) and sets forth significance criteria (36 CFR Part 60) for inclusion in the register. Cultural resources as defined under NHPA are considered "historic properties" for the purpose of determining if there is a federal undertaking that may impact them. Historic properties are protected if they fall under one of the following categories: are formally placed in the National Register by the Secretary of the Interior, meet the criteria and are determined eligible for inclusion but have yet to be formally placed on the register, and historic properties that are yet undiscovered but may meet eligibility criteria.

The DoDI 4710.02 (DoD Interactions with Federally Recognized Tribes) provides guidance for interacting and working with federally-recognized American Indian and Alaska Native governments or tribes. This instruction supplements the *Annotated DoD American Indian and Alaska Native Policy* (27 Oct 99),

which governs compliance with EO 13175 (Consultation and Coordination with Indian Tribal Governments) and Presidential Memorandum for *Heads of Executive Departments and Agencies on Government-to-Government Relations with Native American Tribal Governments* (29 April 1994). The DoD policy requires that government agencies communicate with tribes on a government-to-government basis in recognition of their sovereignty to assess impacts of the federal agency's actions on resources of tribal interest. Addressing tribal concerns between tribes and military installations requires communication at both the tribal leadership-to-installation commander and the tribal staff-to-installation staff levels. The effect of a proposed DoD action that may have the potential to significantly affect protected tribal resources, tribal rights, and Indian lands must be assessed before decisions are made.

Camp Murray is comprised of state-owned land. However, those projects which do not meet federal criteria for being a federal undertaking still requires a review by the State Historic Preservation Officer (SHPO) and concerned tribes to determine the effects and mitigation measures as per the Governor's Executive Order 05-05 Archeological and Cultural Resources and RCW 27.53.060. Disturbing archaeological resource or site — Permit required — Conditions — Exceptions — Penalty. Nevertheless, projects and actions must first be reviewed to insure they do NOT fall under federal statutes.

The WAARNG updated the *Integrated Cultural Resources Management Plan* (ICRMP) for Washington Army National Guard in 2014 (WAARNG 2014). An ICRMP is a five-year plan required by AR 200-1 and DoDI 4715.3 for compliance with applicable federal laws and regulations concerning cultural resources. The ICRMP is a component of the installation's master plan and functions as a decision document for cultural resources management actions and specific compliance procedures. The plan's purpose is to integrate cultural resources requirements with ongoing mission activities so that the availability of mission-essential properties and acreage is maintained and compliance with requirements is achieved.

6.9.2 Camp Murray Cultural Resources

A complete installation-wide archaeological survey of Camp Murray was conducted in 2005 (WAARNG 2006), at which time archaeological sites were inventoried and evaluated for nomination for listing to the NRHP. A total of six archaeological sites and six structures were recorded, of which two are eligible for nomination to the NRHP and one (CMS-7) requires further work to evaluate its NRHP eligibility.

Of the 88 buildings and structures present at Camp Murray, 28 are currently 50-years old or older and have been evaluated. Seven buildings are eligible as contributing resources to a historic district for listing in the NRHP; two of those buildings are also individually eligible for the NRHP, and one is currently listed on the NRHP. Most of the historic buildings at Camp Murray are located in a central area known as the Camp Murray historic district. Additional structures and landscape elements considered to be part of the historic district include stonework, an outdoor stone fireplace, a 1923 memorial, and mature trees and other landscaping features.

Military records, documents, photographs, artifacts, and donated private collections that are associated with the WAARNG's military history and installations are curated and/or stored at the Washington National Guard State Historical Society Museum at Camp Murray (The Arsenal, Building 2), which is located in the historic district. The museum currently houses an extensive collection of military artifacts. It does have secure storage for weapons and high-value items, but does not meet the requirements of 36 CFR 79 (lacks appropriate climate controls). The museum is open on Wednesday and the last Saturday of the month.

No known cultural resources will be affected by proposed projects at Camp Murray. The proposed projects, although some of them will be implemented proximate to or where some archaeological structures are present, will not disturb or make modifications to any of these resources. No significant ground disturbance is expected to be performed in the implementation of the proposed projects. However, in the event of unexpected discovery of any archaeological or historic resources during the implementation of any of the proposed projects, such as vegetation restoration works and invasive species removal (under Goal 3) and installation of interpretive signs (under Goal 4), work will stop in the area of discovery, and individuals will follow standard operating procedures for inadvertent archaeological discoveries as outlined in the WAARNG ICRMP (2012).

6.9.3 Native American Consultation

Camp Murray has not previously been surveyed for sacred sites or traditional cultural properties. During the preparation of this INRMP, the WAARNG conducted formal consultation with federally recognized Native American tribes as required under DoDI 4710.02. During this process, the WAARNG considered the *Annotated DoD American Indian and Alaska Native Policy*, EO 13175, AR 200-1, and guidance in AR 200-1 Chapter 6, August 2007. The following three federally recognized tribes were identified as having potential ancestral ties to the Camp Murray area:

- Steilacoom Tribe
- Puyallup Tribe
- Nisqually Tribe

Copies of letters submitted to these federally recognized Native American tribes and their responses are included in Appendix B. A Memorandum for Record (MFR) is also included in Appendix B, which summarizes consultation efforts.

6.9.4 Management Guidelines

Management of Cultural Resources at Camp Murray will be consistently with the ICRMP (WAARNG 2007). The following management guidelines on cultural resources will be followed:

- Personnel shall not remove or disturb, or cause or permit to be removed or disturbed, any historical, archaeological, architectural or other cultural artifacts, relics, vestiges, remains or objects of antiquity. If these items are discovered on the premises, personnel shall immediately notify the CFMO-Env, and protect the site and the material from further disturbance until said officer gives further guidance.
- Follow established regulations on protecting cultural/archaeological resources on private and non-federal public lands (e.g., GEO 05-05 and RCW 27.53.060) and Standard Operating Procedure (SOPs) for protection of cultural resources established in the ICRMP (WAARNG 2007) during all ground disturbing activities will follow. For a copy of the SOPs, contact the CFMO -Env.
- The WAARNG SOP # 6 of the ICRMP in the case of inadvertent discovery of archaeological materials or human remains.

6.10 Natural Resource Law Enforcement

Many aspects of integrating the training mission with natural resources management require effective enforcement if they are to be successful. Such programs as fishing harvest controls, protection of wetlands, water pollution prevention, rare species protection, and others are dependent on law

enforcement. Currently, Camp Murray does not have an Environmental Management Officer (EMO) on site.

The Pierce County Sheriff's Department is the primary law enforcement agency, JBLM Lewis Main Fire Department provides fire control and prevention services. Emergency medical services is provided by the Pierce County Emergency Medical Services, which is a division of Pierce County Department of Emergency Management. The Camp Murray staff conducts occasional patrols, observing on-site activities, and notifies the appropriate federal, state, or local law enforcement agency when enforcement services are needed.

If any natural resources law enforcement actions or suspected violations have occurred, Camp Murray staff must notify the CFMO-Env at (253) 512-8177.

6.11 Public Outreach and Environmental Awareness

Camp Murray currently engages in no public outreach activities. AR-200-1 requires installations to develop and integrate environmental considerations into personnel training.

The CFMO-Env office coordinates and provides Unit Environmental Compliance Officer (UECO) training for two individuals per Washington Army National Guard unit. Additionally, the CFMO-Env office provides an overview of cultural and natural resources, stormwater, and spill procedures at Camp Murray New Employee Orientations and Building Managers' Trainings. The office is also evaluating and developing new outreach programs, such as new spill procedures, annual BioBlitz/photo contest events, and working with the Washington Youth Academy to provide cadets a chance to participate in restoration work.

6.12 Climate Change

WAARNG understands that there is a potential for climate change to locally impact the environment and modify the training opportunities currently available at Camp Murray. Shifts in precipitation regimes and temperature ranges can eventually reshape the current assortment of plant and animal species, promote noxious weed infestations, or compromise wildlife habitat. Lower summer rainfall and higher temperatures are likely to decrease fuel moisture, leading to increased forest fires by the end of the century. Concurrently, projected increases in the intensity and amount of precipitation at other times of year will likely lead to increased stream flows, storm water runoff, and elevated groundwater levels that increase the risks of flooding and streambank erosion. These conditions present greater vulnerability towards both the built environment and natural habitats.

WAARNG will support the development of vulnerability assessments to better understand the potential impacts of climate change at Camp Murray and other installations across the state. As the abundance and distribution of species and habitats on WAARNG properties may generally be too small in scale to address comprehensive climate change vulnerabilities, the WAARNG will consider existing regional plans, partnerships, or other studies conducted in Western Washington to assess, develop, and implement climate change adaptation strategies. The CFMO-Env office will also undertake site-specific vulnerability assessments, particularly in relation to infrastructure, surface, and groundwater resources near Building 1 and Murray Creek. Overall, the WAARNG will identify and implement sound adaptation strategies that help maintain water quality and native ecosystems in Camp Murray Natural Areas, while protecting the built environment.

7. MANAGEMENT GOALS AND OBJECTIVES

This chapter lists the goals and objectives for future natural resources management at Camp Murray. Previous chapters that presented important background information on resources, current conditions, and management issues at Camp Murray were used to formulate natural resources management goals. Goals listed below express the WAARNG's vision of the desired condition of the Camp Murray natural resources. These goals are supported by objectives and projects, which provide management strategies and specific actions to achieve these goals. A more detailed description of the planned projects is presented in the Project Table (Appendix H).

Goal 1: Improve coordination with JBLM Lewis Main regarding shared natural resources.

Objective 1.1: Identify shared resources to be managed cooperatively, including, but not limited to, invasive species (Japanese knotweed, reed canary grass and yellow flag iris), bald eagle nesting sites, bluebird and bat boxes, Murray Creek, and American Lake.

Goal 2: Enhance rearing and spawning habitat for kokanee salmon in support of DFW efforts to restore the native kokanee population in Murray Creek. Also enhance habitat for resident cutthroat and rainbow trout in Murray Creek.

Objective 2.1: Maintain fish support structures in Murray Creek.

Objective 2.2: Enhance and monitor baseline creek flow in Murray Creek.

Objective 2.3: Survey and monitor surface water quality, stream habitat condition, and kokanee salmon population.

Objective 2.4: Enhance and monitor the shoreline of American Lake within Camp Murray boundary.

Objective 2.5: Maintain, expand, and enhance riparian vegetation along Murray Creek.

Goal 3: Maintain vegetated communities in a condition that minimizes the threat to human health and safety, and maintains and enhances habitat for flora and fauna.

Objective 3.1: Control invasive species that threaten natural resources on the installation.

Objective 3.2: Allow large woody debris to accumulate in Murray Creek and the forest understory to increase wildlife habitat and nutrient cycling, while spreading out high stream flows.

Objective 3.3: Restore native vegetation and habitat functions in degraded natural areas, especially Oregon oak woodlands.

Objective 3.4: Protect and enhance sensitive natural resource areas (i.e., lakefront, wetland, and riparian ecosystems) by establishing protective buffers.

Objective 3.5: Provide forest conditions that support the military mission while maintaining healthy and sustainable forest ecosystems and complying with all applicable regulations.

Goal 4: Improve awareness of natural resources at Camp Murray to ensure compliance with all federal and state laws and regulations.

Objective 4.1: Educate all WAARNG personnel, contractors, civilians, and any other groups utilizing the Camp Murray facility regarding the locations of sensitive areas such as wetlands, streams, buffers, and other priority habitats on the installation, and potential activities that

could result in noncompliance (for example, filling of wetlands or disturbing bald eagles during the breeding season).

Goal 5: Protect and enhance existing habitat for bald eagles and other raptors including, but not limited to, hawks, owls and ospreys. Improve awareness of bald eagle habitat at Camp Murray to ensure compliance with all federal and state laws and regulations.

Objective 5.1: Increase awareness regarding eagle habitat on Camp Murray.

Objective 5.2: Limit disturbance to bald eagle habitat by following management guidelines provided by the WDFW and in the WAANG BEMP.

Objective 5.3: Maintain dead trees (snags) in the landscape for perching and nesting.

Objective 5.4: Determine the status of raptors nesting on Camp Murray.

Goal 6: Ensure that all biological resources at Camp Murray are appropriately inventoried and managed.

Objective 6.1: Conduct protocol-level surveys for species that have not been a target of previous surveys, including nocturnal communities and amphibians/reptiles.

Objective 6.2: Complete planning studies on flora and fauna and update, as needed.

Objective 6.3: Initiate protocols for ongoing monitoring of macroinvertebrate and water quality parameters

Goal 7: Foster community involvement within Camp Murray and the surrounding area (i.e., the Boy Scouts, elementary schools, installation personnel).

Objective 7.1: Help sustain natural communities on Camp Murray through environmental stewardship.

Goal 8: Ensure the quality of water on Camp Murray for use by people and wildlife.

Objective 8.1: Monitor ground and surface water to ensure water quality.

Goal 9: Promote the conservation and management of pollinators, their habitats and associated ecosystems.

Objective 9.1: Identify additional areas at Camp Murray that may be managed to support and conserve pollinator species including honey bees; continue managing existing pollinator habitat on the former landfill site

Objective 9.2: Support and, as feasible, undertake activities that conserve, protect, and restore pollinators and their habitats in accordance with WAARNG mission and policies.

Objective 9.3: Help train WAARNG personnel about pollinators and pollinator habitat conservation and management

Goal 10. Consider climate change impacts in the identification and implementation of sound natural resource strategies.

Objective 10.1: Support the development of a vulnerability assessment to better understand the potential impacts of climate change at Camp Murray, as well as other installations

throughout the state, to include wildlife habitat, vegetative communities, infrastructure, stormwater, flood, and water quality impacts.

Objective 10.2: Encourage vegetation growth in the Murray Creek riparian zone to shade the creek offset any water temperature increases that may be attributed to climate change.

8. NATURAL RESOURCES PROGRAM IMPLEMENTATION

The WAARNG depends on natural resources for the sustainability of many training programs and will manage natural resources to ensure sustainable use. This INRMP is not intended to impair the ability of the WAARNG to perform its mission. However, the INRMP does identify usage restrictions on sensitive attributes such as wetlands, as well as threatened and endangered species.

Implementation of this INRMP will be realized through the accomplishment of specific goals and objectives as measured by the completion of projects described within this INRMP. An INRMP is considered 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 staff are available to perform the tasks required by the INRMP;
- Coordinates annually with cooperating agencies; and
- Documents specific INRMP action accomplishments undertaken each year.

8.1 Annual Work Plans

8.1.1 Work Plans

The implementation schedule describing planned projects, objectives, and legal drivers are detailed in the table in Appendix H.

8.1.2 Funding

Implementation of this INRMP is subject to the availability of annual funding. The installation requests project review and funding through the Status Tool for the Environmental Program (STEP), an online computer program managed by the NGB developed for and accessible only to ARNG Environmental Program. Funding for the CFMO-Env staff and standard supplies come from direct funding sources. Funding sources for specific projects can be grouped into three main categories by source: Federal NGB Funds, Other Federal Funds, and Non-Federal Funds. Each is discussed in the following subsections.

Where projects identified in the plan are not implemented due to lack of funding, or other compelling circumstances, the installation will review the goals and objectives of this INRMP to determine whether adjustments are necessary.

The following discussion of funding options is not all-inclusive of funding sources. Since many funding sources rely on a variety of grant programs, award criteria and amounts can change considerably from one year to another. Funding through grant programs can occur on a one-time award, annually or in multiples of years.

8.1.2.1 *NGB/WAARNG Funding*

The NGB is the primary source of funding to support the management of natural resources at Camp Murray through a master cooperative agreement with the WMD. A budget of this type is managed by the Environmental Programs Manager at Camp Murray. The NGB provides funding for natural resource surveys, environmental monitoring projects, pollution prevention, and compliance-related projects.

The NGB Army Installations Division (NGB-ARI) provides funding for the personnel, equipment and supplies in support of the Camp Murray CFMO. This office is involved in planning, scheduling, and oversight of training, maintenance of roads and trails, vegetation management, pest management, facilities infrastructure, and military construction planning, all of which are critical to the natural resources management program.

8.1.2.2 *Other Federal Funds*

Cooperative agreements may be entered with states, local governments, non-governmental organizations, and individuals for the improvement of natural resources or to benefit natural and historical research on federally-owned training sites. Upon written concurrence of the Camp Murray INRMP by the USFWS and the WDFW, these agencies become signatory cooperators of this plan. Therefore, the potential for access to matching funds programs and services offered by these agencies will be available.

Program initiatives under the CWA provide funding through several sources. The USEPA's Office of Water sponsors those projects related to the CWA. Available funding may support programs such as cost-sharing for overall water-quality management (e.g., monitoring, permitting, and enforcement), lake water quality assessments and mitigation measures, and implementation of non-point source pollution control measures. Potential sources of funding may be available at the USEPA's Office of Water funding website (http://www.epa.gov/water/funding.html).

The Legacy Resource Management Program provides financial assistance to DoD efforts to conserve natural and cultural resources on federal lands. Legacy projects could include regional ecosystem management initiatives, habitat preservation efforts, archaeological investigations, invasive species control, and/or flora or fauna surveys. Legacy funds are awarded based on national visibility. Project proposals are submitted to the program.

8.1.2.3 *Non-Federal Funds*

Funding sources to be considered include 1) The Public Lands Day Program, which coordinates volunteers to improve the public lands they use for recreation, education, and enjoyment, and 2) the National Environmental Education & Training Foundation, which manages, coordinates, and generates financial support for the program.

8.1.2.4 *Soil and Plant Conservation Funding*

The NRCS manages the Federal Domestic Assistance Program (Plant Materials for Conservation) that assembles, evaluates, selects, releases, and introduces into commerce and promotes the use of new and improved plant materials for soil, water, and related resource conservation and environmental improvement programs.

8.1.3 Priorities and Scheduling

The STEP database will be used to validate projects and determine funding priority. Projects need to be funded consistent with timely execution to meet future deadlines. Projects are generally prioritized with respect to compliance. Highest priority projects are projects related to recurring or current compliance, and these are generally scheduled earliest. The Camp Murray projects and schedules are listed in Appendix H.

Recurring requirements include projects and activities needed to cover the recurring administrative, personnel and other costs that are necessary to meet applicable compliance requirements (federal and state laws, regulations, Presidential memoranda, EOs, and DoD policies) or which are in direct support of the military mission. Recurring costs include manpower, training and supplies; hazardous waste disposal; operating recycling activities; permits and fees; testing, monitoring, and/or sampling and analysis; reporting and record keeping; maintenance of environmental conservation tools and equipment; and compliance self-assessments.

Current compliance includes projects and activities needed because an installation is currently or will be out of compliance if projects or activities are not implemented in the current program year. Examples include:

- Environmental analyses, monitoring, and studies required to assess and mitigate potential effects of the military mission on conservation resources;
- Planning documents;
- Baseline inventories and surveys of natural and cultural resources (historical and archaeological sites);
- Biological assessments, surveys, or habitat protection for a specific listed species;
- Mitigation to meet existing regulatory permit conditions or written agreements;
- Wetland delineations in support of subsequent jurisdictional determinations and consequent permitting;
- Efforts to achieve compliance with requirements that have deadlines that have already passed; and
- Initial documenting and cataloging of archaeological materials.

Maintenance requirements include those projects and activities needed that are not currently out of compliance, but shall be out of compliance if projects or activities are not implemented in time to meet an established deadline beyond the current program year. Examples include:

- Compliance with future requirements that have deadlines;
- Conservation and GIS mapping to be in compliance;
- Efforts undertaken in accordance with non-deadline specific compliance requirements of leadership initiatives;
- Wetlands enhancement, to achieve the Executive order for “no net loss” or to achieve enhancement of existing degraded wetlands; and

- Public education programs that educate the public on the importance of protecting archaeological and natural resources.

Lower priority projects include those that enhance conservation resources of the installation mission, or are needed to address overall environmental goals and objectives, but are not specifically required under regulation or EO and are not of an immediate nature. These projects are generally funded after those projects of higher priority are funded. Examples include:

- Community outreach activities, such as "Earth Day" and "Historic Preservation Week" activities;
- Educational and public awareness projects, such as interpretive displays, oral histories, "Watchable Wildlife" areas, nature trails, wildlife checklists, and conservation teaching materials;
- Biological assessments, surveys, or habitat protection for a species;
- Restoration or enhancement of cultural or natural resources when no specific compliance requirement dictates a course or timing of action;
- Re-interment of Native American remains on DoD managed or controlled land; and
- Management and execution of volunteer and partnership programs.

8.2 Natural Resources Management Staffing

Training for WAARNG personnel, as well as others participating in the management of natural resources, will be practical and job-related. All training programs will involve at a minimum a review of legal compliance requirements, applicable DoD/DA regulations, pertinent State and local laws, and current scientific and professional standards as related to the conservation of natural resources. The following annual workshops, professional conferences, and classes are excellent means of obtaining interdisciplinary training for natural resources managers:

- North American Wildlife and Natural Resources Conference - http://www.wildlifemanagementinstitute.org/pages/main.html;
- Defense Environmental Network Information Exchange (DENIX) http://www.denix.mil/;
- Army Training Support Center – http://www.atsc.army.mil/;
- National Military Fish and Wildlife Association – http://www.nmfwa.org/;
- USACE Wetland Delineation Courses - http://www.hnd.usace.army.mil/to/pindex.html; and
- Locally available training through the Cooperative Extension Service, universities, professional and trade organizations, State government (e.g., WDOE, Department of Transportation), and commercial businesses.

Conferences and workshops will be evaluated for their usefulness, and decisions will be made based on appropriateness to ongoing projects and funding availability. Personnel will be trained in topics related to environmental fields, as appropriate. NEPA and State Environmental Policy Act (SEPA) training will be required of all supervisory personnel and those who review or prepare NEPA and SEPA documents.

8.3 Annual Review and Coordination Requirements

Per DoD policy, the WAARNG will review the INRMP annually in cooperation with the USFWS and WDFW. The WAARNG will coordinate with the agencies annually to determine if changes or issues indicate the need for a meeting. If warranted, a meeting will be held at Camp Murray with the USFWS, WDFW and WDNR and documented by meeting minutes. If a meeting is not necessary, the conversation will be documented via email correspondence or record of conversation. According to the *Updated Guidance for Implementation of the SAIA,* dated 5 November 2004, 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 revising the INRMP.
- All required coordination has occurred.
- All significant changes to the installation's mission requirements or its natural resources have been identified.

One source of information for these annual reviews is the Army's Environmental Quality Report (EQR) system. The EQR is the automated system used to collect installation environmental information for reporting to Department of Defense and Congress. The EQR system moved to the Army Environmental Reporting Online (AERO) portal in February 2005, creating a day-to-day management tool. The Army Environmental Database Environmental Quality module (AEDB-EQ) is a full update of the Web-based software EQR application used to convey the Army's environmental status to senior Army leadership, DoD, and Congress since 1997.

Established to fulfill a semi-annual requirement to report the status of DoD's Environmental Quality program to Congress, EQR collects detailed information on enforcement actions, inspections and other performance measures for high-level reports and quarterly reviews. EQR also helps the Army track fulfillment of DoD Measures of Merit requirements.

The module is designed to coordinate information management for conservation, compliance, pollution prevention and other Army environmental reporting. It can adapt easily to future changes in command structure or measures of merit.

AEDB-EQ provides for the collection, review, and retrieval of data in 14 program areas, from enforcement actions to conservation program metrics. The Environmental Program Requirements (EPRWeb) reporting system is a module of AEDB.

8.4 Monitoring INRMP Implementation

The Office of the Deputy Undersecretary of Defense (DUSD) *Updated Guidance for Implementation of the SAIA* updated *Conservation Metrics for Preparing and Implementing INRMPs*. Progress toward meeting these measures of merit is reported in the annual EQR to Congress. Reporting requirements include:

- The installation name and state.
- The year the most recent INRMP was completed or revised.
- Date planned for the next revision.
- Was the INRMP coordinated with appropriate military trainers and operators?
- Were projects added to the INRMP because of comments from military trainers and operators?
- Were segments of the INRMP concerning the conservation, protection and management of fish and wildlife resources agreed to by the USFWS Regional Director? (USFWS coordination)
- Were projects added to the INRMP because of USFWS comments?
- Has annual feedback been requested from the USFWS?
- Has annual feedback been received from the USFWS?
- Were segments of the INRMP concerning the conservation, protection and management of fish and wildlife resources agreed to by the State fish and wildlife agency Director? (State coordination)
- Were projects added to the INRMP because of State comments?
- Has annual feedback been requested from the State fish and wildlife agency?
- Has annual feedback been received from the State fish and wildlife agency?
- Does the INRMP contain a list of projects necessary to meet plan goals and objectives, as well as timeframes for implementation of any such projects?
- What was the dollar amount spent in the reporting fiscal year to implement the INRMP?
- Did the installation seek public comment on the draft INRMP?
- Were projects added to the INRMP because of public comments?

9. CONCLUSIONS

Per DoD policy, this INRMP will be implemented over a five-year period by WAARNG CFMO-Env personnel at Camp Murray. The five-year period will begin from the day of adoption of the NGB-approved final INRMP by the WAARNG. The WAARNG will conduct annual reviews of this INRMP in cooperation with the USFWS and WDFW. The WAARNG will converse with these agencies annually to determine if changes or issues indicate the need for revised management strategies for natural resources at Camp Murray. This INRMP will be revised or updated after a five-year period.

Implementation of this INRMP will result in improved coordination among CFMO-Env and natural resources managers at JBLM Lewis Main regarding the management of shared natural resources on Camp Murray. Improved cross-installation coordination will result in the conservation of regional biodiversity, while ensuring the sustainability of natural resources required to sustain the military mission. Implementation of this INRMP will also ensure that the WAARNG complies with all applicable laws regarding natural resources on the installation.

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