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DEPARTMENT OF THE AIR FORCE
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
JOINT BASE ELMENDORF-RICHARDSON



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(See INRMP signature pages for plan approval date)

10 **ABOUT THIS PLAN**

11 This installation-specific Environmental Management Plan is based on the Department of the Air Force's
 12 (DAF) standardized Integrated Natural Resources Management Plan (INRMP) template. This INRMP has
 13 been developed in cooperation with applicable stakeholders, which includes Sikes Act cooperating agencies
 14 and/or local equivalents, to document how natural resources will be managed. Where applicable, external
 15 resources, including Department of Air Force Instructions (DAFIs); Department of Defense Instructions
 16 (DoDIs); DAF Playbooks; federal, state, and local requirements; Biological Opinions; and permits are
 17 referenced.

18 Certain sections of this INRMP begin with standardized, DAF-wide "common text" language that address
 19 DAF and Department of Defense (DoD) policy and federal requirements. This common text language is
 20 restricted from editing to ensure that it remains standard throughout all plans. Immediately following the
 21 DAF-wide common text sections are installation sections. The installation sections contain installation-
 22 specific content to address local and/or installation-specific requirements. Installation sections are
 23 unrestricted and are maintained and updated by the approved plan owner.

24 *NOTE:* The terms "Natural Resources Manager," "NRM," and "NRM/Point of Contact (POC)" are used
 25 throughout this document to refer to the installation person responsible for the Natural Resources program,
 26 regardless of whether this person meets the qualifications within the definition of a natural resources
 27 management professional in DoDI 4715.03, *Natural Resources Management*.

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DOCUMENT CONTROL

Standardized INRMP Template

In accordance with (IAW) the Air Force Civil Engineer Center (AFCEC) Environmental Directorate (CZ) Business Rule (BR) 08, *Environmental Management Plan Review, Update, and Maintenance*, the standard content in this INRMP template is reviewed periodically, updated as appropriate, and approved by the Natural Resources Subject Matter Expert.

This version of the template is current as of 11 October 2024 and supersedes the 2020 version.

NOTE: Installations are not required to update their INRMPs every time this template is updated. When it is time for installations to update their INRMPs, they should adopt the most recent version of this template available in the Plan Tool.

Installation INRMP

Record of Review—The INRMP is updated no less than annually, or as changes to natural resource management and conservation practices occur, including those driven by changes in applicable regulations. IAW the Sikes Act and Department of Air Force Manual (DAFMAN) 32-7003, *Environmental Conservation*, the INRMP is required to be reviewed for operation and effect no less than every 5 years. An INRMP is considered compliant with the Sikes Act if it has been approved in writing by the appropriate representative from each cooperating agency within the past 5 years. Approval of a new or revised INRMP is documented by signature on a signature page signed by the Installation Commander (or designee), and a designated representative of the United States Fish and Wildlife Service (USFWS), state fish and wildlife agency, and National Oceanic and Atmospheric Administration [NOAA] Fisheries when applicable (DAFMAN 32-7003).

Annual reviews and updates are accomplished by the installation NRM, and/or a Section Natural Resources Media Manager. The installation shall establish and maintain regular communications with the appropriate federal and state agencies. At a minimum, the installation NRM (with assistance as appropriate from the Section Natural Resources Media Manager) conducts an annual review of the INRMP in coordination with internal stakeholders and local representatives of USFWS, state fish and wildlife agency, and NOAA Fisheries, where applicable, and accomplishes pertinent updates. Installations will document the findings of the annual review in an Annual INRMP Review Summary. By signing the Annual INRMP Review Summary, the collaborating agency representative asserts concurrence with the findings. Any agreed updates are then made to the document, at a minimum updating the work plans.

INRMP APPROVAL/SIGNATURE PAGES

673RD AIR BASE WING

CONCURRENCE WITH JOINT BASE ELEMENDORF-RICHARDSON

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Pursuant to the Sikes Act (16 US Code § 670 et seq.), Joint Base Elmendorf-Richardson has completed a 5-year update of the installation's Integrated Natural Resources Management Plan. The 673rd Air Base Wing has reviewed the INRMP and concurs with the findings and management recommendations therein.

LISA MABBUTT, Colonel, DAF

Date

Commander, 673d Air Base Wing

315 **ALASKA DEPARTMENT OF FISH AND GAME**
316 **CONCURRENCE WITH JOINT BASE ELEMENDORF-RICHARDSON**
317 **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**

318 Pursuant to the Sikes Act (16 US Code § 670 et seq.), Joint Base Elmendorf-Richardson has completed a
319 5-year update of the installation's Integrated Natural Resources Management Plan. The Alaska Department
320 of Fish and Game has reviewed the INRMP and concurs with the findings and management
321 recommendations therein.

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326 _____
DOUG VINCENT-LANG, Commissioner

Date

327 Alaska Department of Fish and Game

US DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

CONCURRENCE WITH JOINT BASE ELEMENDORF-RICHARDSON

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Pursuant to the Sikes Act (16 US Code § 670 et seq.), Joint Base Elmendorf-Richardson has completed a 5-year update of the installation's Integrated Natural Resources Management Plan. The US Fish and Wildlife Service has reviewed the INRMP and concurs with the findings and management recommendations therein.

STEWART COGSWELL, Field Supervisor

Date

US Fish and Wildlife Service Anchorage Field Office

EXECUTIVE SUMMARY

This Integrated Natural Resources Management Plan (INRMP) has been developed for Joint Base Elmendorf-Richardson (JBER) in accordance with the Sikes Act, as amended (16 US Code [USC] 670 et seq.). It was prepared per the guidance in DoD Instruction (DoDI) 4715.03, *Natural Resources Management* (22 July 2024); Department of Air Force Manual (DAFMAN) 32-7003, *Environmental Conservation* (26 June 2024); and Air Force Policy Directive (AFPD) 32-70, *Environmental Considerations in Air Force Programs and Activities*. Implementation of this INRMP will provide adaptive, ecosystem-based management of installation land, water, and air resources to support the JBER mission.

The physical scope of the plan includes lands within the JBER installation boundary, which encompasses 73,041 acres. However, several remote training and support sites will be managed under the same strategies outlined in this INRMP. The INRMP applies to internal and external organizations to the 673d Air Base Wing (673 ABW) that are involved with or interested in the management or use of natural resources and lands on JBER.

This plan is part of the installation comprehensive planning process. It contains management strategies, goals, objectives, and actions/projects to guide the management of JBER lands and natural resources. It is intended to supplement the JBER Installation Development Plan (673 ABW 2015) and is supplemented by annual, agency-coordinated updates and related management plans.

This document also outlines JBER's conservation and protection programs for threatened and endangered (T&E) species on or adjacent to the installation (specifically, the endangered Cook Inlet beluga whale [CIBW, *Delphinapterus leucas*]), as required under Section 4 (a)(3)(B)(i) of the Endangered Species Act (Public Law 95-632, 16 USC § 1531 et seq.), as amended through the 108th Congress.

INRMP Support of the Air Force Mission

This INRMP helps the 673 ABW comply with relevant federal and state laws, most notably laws associated with environmental documentation, wetlands, T&E species, and wildlife management. It also provides for coordination between JBER and the National Marine Fisheries Service (also known as NOAA Fisheries), the US Fish and Wildlife Service (USFWS), and the Alaska Department of Fish and Game. Compliance requirements that affect implementation of the INRMP are included in [Section 1.3](#). This plan describes how the 673 ABW will implement provisions outlined in DAFMAN 32-7003 on JBER and its adjacent waters.

Without an INRMP's guidance, adverse effects on wildlife, wetlands, and ecological resources can occur from personnel activities and military mission operations such as training activities, construction, and maintenance. Medium and long-term installation planning and mission changes should be coordinated across the installation and consider the natural resources described in the INRMP.

The management described in this INRMP protects and enhances the lands on which military training is critically dependent. This includes the avian and habitat monitoring projects that help airfield management monitoring and manipulate bird movement and reduce bird habitat near runways to minimize Bird/Wildlife Aircraft Strike Hazard risks. In addition, potential human-wildlife conflicts are monitored and animals are hazed if needed, to prevent interruption to military training. Catastrophic losses of personnel and/or aircraft are more likely to occur without these recurring natural resource initiatives.

Natural Resources Management Goals

With its philosophy of ecosystem management, this plan aims to maintain or restore native ecosystem types, including the plants and animals that inhabit them, across their natural range to healthy, functioning states

that allow for the sustainable, multipurpose use of natural resources, subject to safety requirements and military security. This landscape-level, ecological approach blends the needs of the military mission with the health of the environment to ensure that JBER ecosystems provide a landscape to support realistic military training and are diverse, productive, and economically sustainable.

The overarching mission of the JBER Natural Resources program is to “support the military mission and enhance readiness by sustaining natural environments on JBER for training, minimizing conflicts between mission requirements and land and the natural resources it supports” and to “serve as stewards of the land by maintaining natural landscape features and ecosystem integrity at a broad landscape scale.” In support of this mission, the following management goals are included in this plan:

- Goal 1—Minimize conflicts between the military mission, wildlife, natural resources, and land use.
- Goal 2—Manage JBER natural resources under the guidelines and principles of adaptive ecosystem management, which aims to maintain functional ecosystems and natural diversity to include sustainable populations, native species, and ecological communities.
- Goal 3—Manage human use of resources for long-term sustainability by offering products and services at levels compatible with the military mission and ecosystem diversity, health, and productivity and placing equal emphasis on consumptive and non-consumptive use and conservation and preservation of natural resources on JBER, consistent with Sikes Act requirements.
- Goal 4—Contribute to the recovery of the CIBW.

This INRMP is a living document that uses an adaptive management approach to sustain natural resources on JBER. The projects in this plan are designed to inform management decisions with the latest scientific information, experience, and input from stakeholders. As projects are implemented under this plan, their results will be reviewed. If some assumptions prove to be invalid, managers will adapt accordingly. This adaptive approach allows resource managers to make slight corrections in a timely fashion to conserve resources and ensure mission flexibility.

INRMP Review and Update and Changes in Management Direction

This 2025 INRMP has been updated to (1) support DAF and Army missions on JBER, (2) respond to requirements agreed to by the DoD, USFWS, and Association of Fish and Wildlife Agencies (2013) when all parties signed the updated *Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations* (29 July 2013), (3) enact actions required in response to regulations by other federal agencies or the State of Alaska, and (4) respond to requirements of DAF regulations, e.g., DAF Instruction 91-202, *The Department of the Air Force (DAF) Mishap Prevention Program* (6 March 2025).

This INRMP does not substitute for an environmental document prepared to satisfy the requirements of the National Environmental Policy Act (NEPA). Prior to implementation of land-disturbing actions or other proposed projects, the Environmental Impact Analysis Process will be undertaken, per 90 Federal Register 27857, *DoD Implementation of the NEPA* (30 June 2025), under which the projects proposed in this INRMP will likely qualify for Categorical Exclusions (CATEX). Further information is provided [Section 9.0](#); DAFMAN 32-7003, Section 3.9, *Environmental Impact Analysis Process and INRMP Implementation*; and DAFMAN 32-7003, Section 3.11, *INRMP Implementation*.

1.0 OVERVIEW AND SCOPE

This Integrated Natural Resources Management Plan (INRMP) was developed to provide for effective management and protection of natural resources. It summarizes the natural resources present on the installation and outlines strategies to adequately manage those resources. Natural resources are valuable assets of the Department of the Air Force (DAF, formerly US Air Force [USAF]). They provide the natural infrastructure needed for testing weapons and technology, as well as for training military personnel for deployment. Sound management of natural resources increases the effectiveness of DAF adaptability in all environments. The DAF has stewardship responsibility for the physical lands on which installations are located to ensure all natural resources are properly conserved, protected, and used in sustainable ways. The primary objective of the DAF Natural Resources program is to sustain, restore, and modernize natural infrastructure to ensure operational capability and no net loss in the capability of DAF lands to support the military mission of the installation. The plan outlines and assigns responsibilities for the management of natural resources, discusses related concerns, and provides program management elements that will help to maintain or improve the natural resources within the context of the installation's mission. The INRMP is intended for use by all installation personnel. The Sikes Act is the legal driver for the INRMP.

1.1 Purpose and Scope

The purpose of this INRMP is to manage and provide continued access to installation lands, waters, airspace, and natural resources to support the Joint Base Elmendorf-Richardson (JBER) mission for realistic military training. It also aims to sustain the long-term ecological integrity of the base's resources and the ecosystem services they provide, in accordance with (IAW) the Sikes Act.

JBER is the congressionally directed combination of US Army Garrison Alaska's Fort Richardson (FRA) with Elmendorf Air Force Base (EAFB) under the overriding management of the DAF, effective 1 October 2010. For the purposes of this document, the terms "Fort Richardson Alaska" and "Elmendorf Air Force Base" reflect actions conducted prior to joint-basing. The usage of JBER, JBER-Richardson (JBER-R), and JBER-Elmendorf (JBER-E) represent post-joint-basing, current, and future actions.

This is a routine annual update of the INRMP. The INRMP applies to internal and external organizations to the 673d Air Base Wing (673 ABW) that are involved with or interested in the management or use of natural resources and lands on JBER.

The physical scope of the plan covers JBER lands within the JBER installation boundary. The Eklutna Mountain Training Site, Gulkana Army Training Site, Kenai Airport Annex, and Alaska Air Combat Maneuver Instrumentation (ACMI) Sites 1 to 8 are remote training and support sites that are part of JBER but are not actively managed by the strategies outlined in this INRMP. [Figure 2-1](#) shows the location of these sites. Further discussion of these remote sites is included in [Section 2.1](#).

This plan is part of the installation comprehensive planning process. It contains management strategies, goals, objectives, and actions/projects to guide the management of JBER lands and natural resources.

1.2 Management Philosophy

The principal purpose of DoD lands, waters, airspace, and coastal resources is to support mission-related activities. IAW Section 670a–670o of Title 16, United States Code (USC), also known as the Sikes Act (Department of Defense Instruction [DoDI] 4715.03), all DoD natural resources conservation program activities shall work to support the long-term ecological integrity of the installation's natural resources to sustain the military mission. DoDI 4715.03, *Natural Resources Management* (22 July 2024), provides that the DoD "promote adaptive, landscape-level, and ecosystem-based management approaches to natural

resources-related practices and decisions using scientifically sound conservation procedures, techniques, and data.” Additionally, natural and cultural resources are closely related within JBER and in the surrounding region ([Section 7.14](#)).

Ecosystem Management

DoDI 4715.03 defines ecosystem management as “a process that considers the environment as a complex system functioning as a whole, not as a collection of parts, and recognizes that people and their social and economic needs are a part of the whole.”

Ecosystem management is complex because of the variability and uncertainty found within ecosystems. Ecosystem management often takes substantial labor, time, money, education, and analysis. However, the benefits of managing natural resources using ecosystem management are enormous, affecting all biological systems within the parameters of the ecosystem.

Department of Air Force Manual (DAFMAN) 32-7003, *Environmental Conservation* (26 June 2024), states that the INRMP shall implement ecosystem management on DAF installations by setting goals for attaining a desired land condition. The DAF principles for ecosystem management, identified in DAFMAN 32-7003, Section 3.10, *Ecosystem Management*, are as follows:

- Maintain or restore native ecosystem types across their natural range, where practical and consistent with military mission.
- Maintain or restore ecological processes such as fire and other disturbance regimes, where practical and consistent with the military mission.
- Maintain or restore the hydrological processes in streams, floodplains, and wetlands, when feasible and practical and consistent with the military mission.
- Use regional approaches to implement ecosystem management on an installation by collaboration with other DoD components; other federal, state, and local agencies; and adjoining property owners.
- Provide for outdoor recreation, agricultural production, harvesting of forest products, and other practical utilization of the land and its resources, provided that such use does not inflict long-term ecosystem damage or negatively impact the military mission.

Department of Defense Directives for Biodiversity

In the early 1980s, biodiversity and ecosystem management began to emerge nationwide as better ways of managing natural resources and public lands. DAF policy began to move in this direction as well. In 1989, DoD Directive 4700.4, *Natural Resources Management Program* (24 January 1989), called for integration of the various natural resources programs (such as forestry, wildlife, and outdoor recreation) and the development of INRMPs. This important first step led to the military establishing partnerships with other natural resources and land management agencies that were already utilizing principles of ecosystem management.

The DAF identifies biodiversity conservation as an integral part of ecosystem management. DAFMAN 32-7003 includes the following directives:

- Maintain or reestablish viable populations of all native species on DAF-controlled lands, when practical and consistent with the military mission and not in conflict with airfield operations and flight safety.
- Consider the effects of environmental variability in plans to restore native ecosystems.

Management Strategy at Joint Base Elmendorf-Richardson

The key to effective natural resource management is identifying compatible and sustainable multipurpose landscape components that are capable of supporting military training requirements and consumptive or non-consumptive recreational use. Management of biodiversity on JBER includes projects and tasks to identify and protect the critical habitats and travel corridors of sensitive wildlife species, minimize habitat fragmentation, and ensure that sustainable populations of native species and communities remain intact and functional. Important ecological features are illustrated on GeoBase layers (the DAF's geographic information system [GIS]) as a planning tool.

Numerous studies have quantified biodiversity on JBER throughout the history of the installation, both prior to and since joint-basing. Both stand-alone and recurring studies are conducted to assess biodiversity and the ecological environment on the installation and measure the impact of mission-related activities on the environment. Focused biodiversity studies (e.g., marine mammal surveys, boreal forest and wetland bird surveys, vegetation ecology surveys, fish speciation and enumeration studies, furbearer studies) are frequently integrated across disciplines to efficiently gather information on habitat availability, usage, and quality.

Effective habitat management is necessary to ensure the sustainability of plant and wildlife populations on the installation. Changes in the landscape, whether from anthropogenic influences or naturally occurring conditions, have the potential to affect biodiversity. Wildlife surveys aim to fill in information gaps on species presence, abundance, and distribution across JBER and can be used to track the impacts of environmental and management changes. Certain wildlife surveys also support management decisions related to human-wildlife conflict and impacts to military training.

Interfacing with military trainers, collecting and storing data, and using available tools (e.g., GIS) to analyze those data provides a better understanding of where compatible and sustainable multipurpose landscape components exist. Sustainable biodiversity can be attained by understanding military training requirements and identifying limiting ecological conditions.

Cultural Resource Management and Tribal Cooperation

Natural resource management activities can adversely impact cultural resources, requiring cooperation between the natural and cultural resource programs to ensure that the goals of each program are met. New developments or management activities must be evaluated to preserve the condition of- or access to- cultural and historical resources found on JBER and should involve coordination with local Tribes, as described below. Additionally, surveys for cultural resources are conducted prior to any ground or habitat-disturbing activities to ensure there is no loss of cultural resources or to inform future mitigation efforts. These practices will ensure compliance with the requirements of the National Historic Preservation Act (NHPA), Native American Graves Protection and Repatriation Act (NAGPRA; 25 USC § 3001 et seq.), Archaeological Resources Protection Act (ARPA; 16 USC § 470aa-47011), and American Indian Religious Freedom Act (AIRFA; 42 USC).

Cooperative management and consultation with Federally Recognized Tribes is a high priority for the JBER natural and cultural resources programs, especially concerning projects to manage fisheries, marine mammals, forestry, and wildland fire. Not only does regular consultation improve access and the sustainable use of natural and cultural resources on the installation, but it also provides new opportunities to manage and conserve resources that benefit the Tribes and JBER mission. This includes the identification of naturally and culturally significant plants and animals that may not otherwise be known to inhabit certain areas of the installation, which allows for more informed management. Additionally, the heavy overlap

between natural and cultural resources on JBER creates further incentive and funding for additional management and conservation. Cooperative management and consultation is supported by multiple Memoranda of Agreement (MOAs; [Section 14.3](#)), and JBER is currently developing additional MOAs for the implementation of future management and conservation projects. Specific goals and projects regarding Tribal consultation can be found in the JBER Integrated Cultural Resources Management Plan (ICRMP; [Appendix E](#)).

Adaptive Management

As described in DAFMAN 32-7003, Section 3.41.3, INRMPs include provisions for monitoring that support adaptive management. Adaptive management is a process used by managers to address and handle uncertainties and complexities inherent in natural systems by treating ecosystem management as an experiment (Leslie et al. 1996). Adaptive management is an approach that explores alternative ways to meet management objectives by predicting the outcomes of alternatives based on the current state of knowledge, implementing these alternatives, monitoring the impacts of management actions, and using the results to update knowledge and adjust management actions.

The 673d Civil Engineer Squadron Environmental Element, Compliance/Conservation (673 CES/CEIEC) recognizes that current management methods are continually evolving and uses control treatments and monitoring to measure the effects and efficiency of management techniques. Emphasis is placed on monitoring activities to help facilitate adaptive management. Results of monitoring management activities can change future management for JBER and other installations.

1.3 Authority

The Sikes Act (16 USC § 670 et seq.) is the cornerstone legislative mandate that provides for natural resources management on DoD lands. The Sikes Act states that “the Secretary of Defense shall carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. To facilitate the program, the Secretary of each military department shall prepare and implement an Integrated Natural Resources Management Plan for each military installation.”

The Sikes Act (16 USC § 670c-1) allows the Secretary of a military department to enter into cooperative agreements with states, local governments, Federally Recognized Tribes, nongovernmental organizations, and individuals to provide for the maintenance and improvement of natural resources or to benefit natural and historic research on and, under certain circumstances, off DoD installations.

The Sikes Act (16 USC § 670a(a)(2)) requires that the military prepare INRMPs in coordination with relevant federal and state agencies.

The Sikes Act (16 USC § 670a(a)(4)) neither enlarges nor diminishes the responsibility and authority of any state for the protection and management of fish and resident wildlife.

DoDI 4715.03 and DoD Manual (DoDM) 4715.03 have provisions for INRMP self-assessment and external reviews, including annual engagement with stakeholders and external reviews for operation and effect no less than every 5 years, using natural resources conservation metrics. INRMPs are to be updated or revised and evaluated as necessary, based on results of these review standards.

DAFMAN 32-7003 describes implementation of DAF and DoD policy directives. It explains how to manage environmental resources on DAF property in the United States to comply with state, federal, and local laws and standards for environmental management.

673 ABW Instruction (ABWI) 32-7001, *Conservation and Management of Cultural and Natural Resources* ([Table 1-1](#)) describes implementation of DAF environmental and natural resources policy directives at the installation or wing level. It prescribes policies and responsibilities for the management and conservation of water, forests, fish, and wildlife; outdoor recreation access; law enforcement; and historical and archeological site protection on JBER. It details management priorities, program staffing, and requirements for plans and cooperative agreements. Basic objectives of the various programs are also described, as are responsibilities of various base-level offices and units.

Other DAF guidance documents that have bearing on natural resources management include Air Force Manual (AFMAN) 32-1053, *Integrated Pest Management*, which details pest management programs for the installation; JBER Instruction 32-2001, *Fire Prevention Program*, which covers wildland firefighting procedures and policy; and Air Force Policy Directive (AFPD) 32-70, *Environmental Considerations in Air Force Programs and Activities*.

Other related authorities: [Appendix A](#) lists federal laws, executive orders (EOs), Presidential memoranda, DoD directives/instructions, DAF regulations, state laws, and other regulatory instruments that may affect implementation of this INRMP. The INRMP ensures compliance with these regulatory authorities.

Table 1-1. Installation-specific policies (including state and/or local laws and regulations)

Policy	Description
673d Air Base Wing Instruction 32-7001	<i>Conservation and Management of Cultural and Natural Resources</i>

1.4 Integration with Other Plans

The INRMP is a component of the JBER Installation Development Plan (IDP; 673 ABW 2015) and is supplemented by annual, agency-coordinated updates and other related JBER plans, including the ICRMP ([Appendix E](#)), Installation Restoration Management Plan, Storm Water Pollution Prevention Plan (SWPPP; 673 ABW 2020b), Landscape Design Guide, Integrated Pest Management Plan (IPMP; [Appendix F](#)), Bird/Wildlife Aircraft Strike Hazard (BASH) Plan ([Appendix C](#)), the 11th Airborne Division (Arctic) (11 ABN DIV) and US Army Alaska Integrated Training Area Management (ITAM) Plan (US Army Alaska, draft report, 2011), FRA Range Regulation, and Wildland Fire Management Plan (WFMP; [Appendix B](#)). Coordination with these plans' appropriate JBER offices is imperative to the success of this INRMP.

This INRMP will guide JBER's natural resources management program. The INRMP has been developed primarily by JBER natural resources personnel, but other related functions (e.g., Cultural Resources, Pest Management, Public Affairs, ITAM, Air Quality, Environmental Restoration, Flight Safety and Community Planning) have also contributed to ensure that the plan is fully integrated with other programs. The INRMP has been reviewed by operations and mission functions to ensure it fully supports the Army, DAF, and National Guard missions on JBER. Coordination with federal and state agencies involved with the management of natural resources in the region ensures that this INRMP complies with and supports federal and state natural resources-related laws and mandates.

2.0 INSTALLATION PROFILE

Table 2-1. Joint Base Elmendorf-Richardson (JBER) installation profile

Office of Primary Responsibility (OPR)	673d Air Base Wing has overall responsibility for implementing the natural resources management program and is the lead organization for monitoring compliance with applicable federal, state, and local regulations.
Natural Resources Manager/Point of Contact (POC)	Name: Kylene Lang Phone: (907) 384-2440 Email: kylene.lang.1@us.af.mil
State and/or local regulatory POCs (Include agency name for Sikes Act cooperating agencies)	US Fish and Wildlife Service Alaska Department of Fish and Game National Marine Fisheries Service
Total acreage managed by installation	73,041 acres on main JBER installation; 78,467.31 acres including Geographically Separated Units
Total acreage of wetlands	7,177.5
Total acreage of forested land	39,053
Does installation have any Biological Opinions? (If yes, list title and date, and identify where they are maintained)	No current Biological Opinions
Natural Resources Program Applicability (Place a checkmark next to each program that must be implemented at the installation. Document applicability and current management practices in Section 7.0)	☒ Fish and Wildlife Management ☒ Outdoor Recreation and Access to Natural Resources ☒ Conservation Law Enforcement ☒ Management of Threatened, Endangered, and Host Nation-Protected Species ☒ Water Resource Protection ☒ Wetland Protection ☒ Grounds Maintenance ☒ Forest Management ☒ Wildland Fire Management ☐ Agricultural Outleasing ☒ Integrated Pest Management Program ☒ Bird/Wildlife Aircraft Strike Hazard (BASH) ☒ Coastal Zone and Marine Resources Management ☒ Cultural Resources Protection ☒ Public Outreach ☒ Geographic Information Systems (GIS)

2.1 Installation Overview

2.1.1 Location and Area

JBER is strategically located at the air crossroad connecting the United States with the Pacific Far East and Europe. JBER is located within the Municipality of Anchorage in Southcentral Alaska (61° 15' N/149° 42' W). The 73,041-acre installation is bordered on the east by the community of Eagle River and Chugach State Park, on the south by the Bureau of Land Management (BLM) Campbell Tract and Stuckagain Heights, on the southwest by Bicentennial Park and the communities of Muldoon and Mountain View, and on the north and west by Government Hill and the Knik Arm of Cook Inlet, respectively ([Figure 2-1](#)). The Glenn Highway to the north and the Seward Highway to the south connect JBER to other road-accessible portions of Alaska. The Alaska Railroad passes through JBER as it runs from Seward to Fairbanks. Utility lines between Anchorage and areas to the north run along both the Glenn Highway and the Alaska Railroad.

Table 2-2. Installation/Geographically Separated Unit location and area descriptions

Installation/ Geographically Separated Unit	Main Use/Mission	Acreage	Addressed in INRMP*?	Describe Natural Resource Implications
Joint Base Elmendorf- Richardson	Air Force and Army Missions	73,041.00	Yes	Wildlife Management, vegetation management, threatened and endangered species and species of concern management, invasive species management, wildland fire management (Section 7.0)
Eklutna Mountain Training Site	Glacier training	68.53	Not included in the INRMP	N/A
Gulkana Army Training Site	Convoy rendezvous and staging area	44.06	Not included in the INRMP	N/A
Kenai Airport Annex	Civil Air Patrol hangar	5.51	Not included in the INRMP	N/A
Alaska Air Combat Maneuver Instrumentation (ACMI) Site 1	Aerial combat training and analysis	1.00	Not included in the INRMP	N/A
Alaska ACMI Site 2	Aerial combat training and analysis	1.00	Not included in the INRMP	N/A

Table 2-2. Installation/Geographically Separated Unit location and area descriptions

Installation/ Geographically Separated Unit	Main Use/Mission	Acreage	Addressed in INRMP*?	Describe Natural Resource Implications
Alaska ACMI Site 3	Aerial combat training and analysis	1.04	Not included in the INRMP	N/A
Alaska ACMI Site 4	Aerial combat training and analysis	1.02	Not included in the INRMP	N/A
Alaska ACMI Site 5	Aerial combat training and analysis	1.03	Not included in the INRMP	N/A
Alaska ACMI Site 6	Aerial combat training and analysis	1.07	Not included in the INRMP	N/A
Alaska ACMI Site 7	Aerial combat training and analysis	1.00	Not included in the INRMP	N/A
Alaska ACMI Site 8	Aerial combat training and analysis	1.05	Not included in the INRMP	N/A

*INRMP=Integrated Natural Resources Management Plan

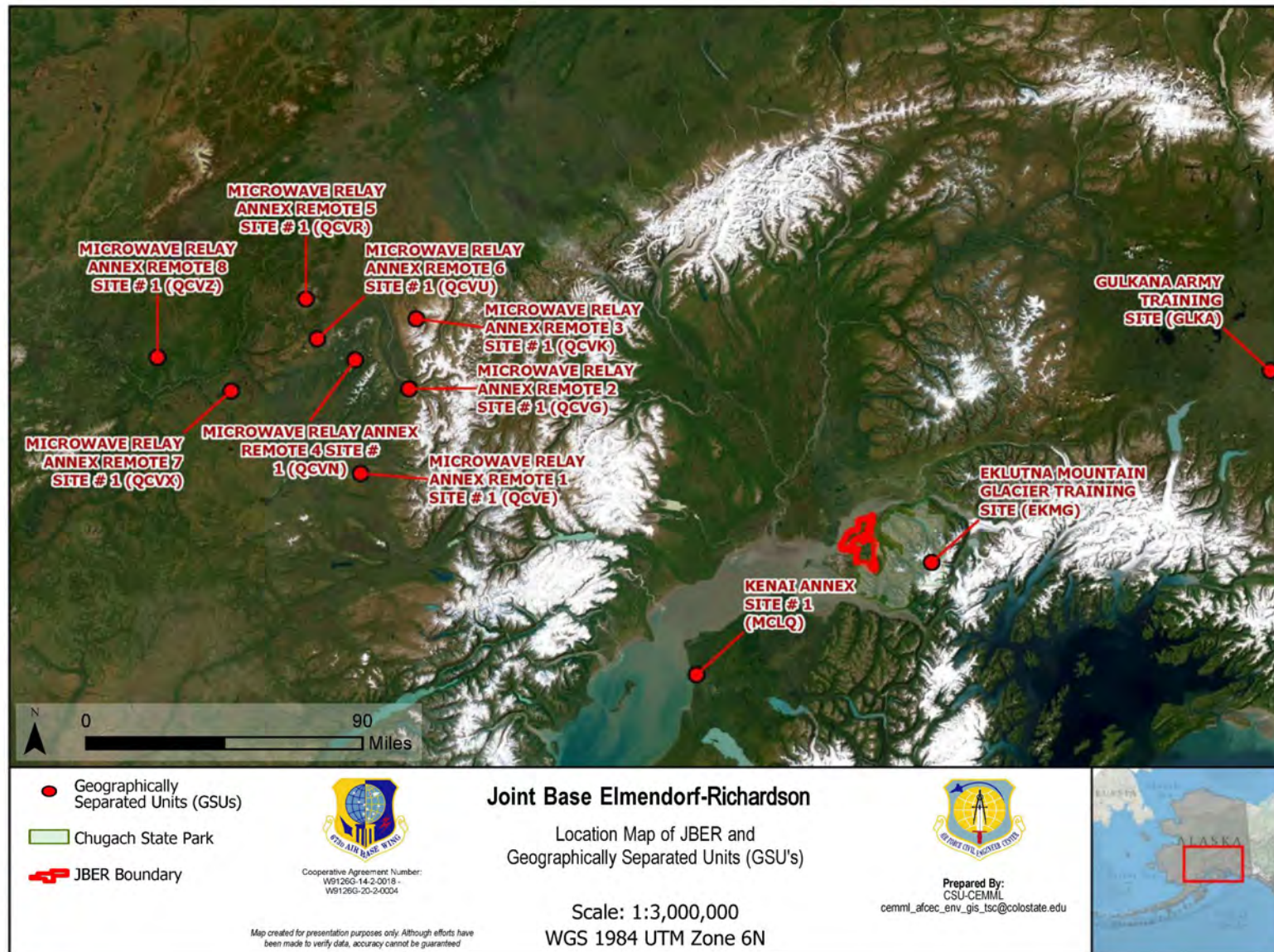
JBER includes 5,534.31 additional acres at 12 locations that are outside of the contiguous JBER boundary. The remote training and support sites are part of JBER but are not actively managed by the strategies outlined in this INRMP. These sites are the Eklutna Mountain Training Site, Gulkana Army Training Site, Kenai Airport Annex, and ACMI Sites 1 through 8. [Figure 2-2](#) shows the location of these sites. These lands are associated with the JBER military mission in the following ways:

- **Eklutna Mountain Training Site:** Not currently in use. Formerly used for training on the glacier.
- **Gulkana Army Training Site:** Used as a rendezvous and staging site for Army convoys.
- **Kenai Airport Annex:** Used by the Civil Air Patrol. The site consists of a hangar for storing Civil Air Patrol aircraft. The Kenai Airport airstrip is also used by C130s for touch and go operations.
- **ACMI sites 1 through 8:** The ACMI sites are approximately 1-acre satellite sites located on mountain tops. These sites consist of a radio/satellite tower and small generator buildings supplied by propane tanks used to record an aircraft's inflight data during aerial combat training and analysis.



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652 Figure 2-1. Map of Joint Base Elmendorf-Richardson, Alaska



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654 Figure 2-2. Map of Joint Base Elmendorf-Richardson and Geographically Separated Units, Alaska

2.1.2 Installation History

The most recent Indigenous inhabitants of the Cook Inlet Region are the Dena'ina, who speak one of the 11 Athabascan languages that are still spoken throughout Alaska. The area where JBER is now located was inhabited by the Dena'ina at the time of Russian exploration in the late 1700s until the establishment of the installation. The Dena'ina people of Knik, Eklutna, and Tyonek and the Ahtna of Chickaloon have historical ties to the installation's land and resources. The diversity of marine and terrestrial subsistence resources allowed them to inhabit the area year-round.

Early minors and settlers first became established in the area in the late 1800s through the Homestead Act of 1862. Development of the region continued to expand until the city of Anchorage was established in 1916 with the creation of a railroad that connected to Ship Creek. Development associated with the railroad increased homesteading on JBER lands. Between 1914 and 1939, there were 79 homestead applications for lands that would eventually become JBER. The homestead program was designed to encourage agriculture, which included livestock (pigs, cows, and cattle) and crops (hay, strawberries, and various vegetables).

In 1939, an EO withdrew 36,570 acres of land in Southcentral Alaska from the public domain, placing it under War Department jurisdiction for the creation of Fort Richardson and Elmendorf Field. The homesteads in the area were condemned or purchased to make room for the installation development (Daugherty and Saleeby 1998, Hollinger 2001). Land clearing began in 1940 at Whitney Station and soon expanded to house an Army infantry regiment. By January 1941, the 7,500-foot runway was completed.

Fort Richardson's first mission was to defend southern Alaska by establishing a permanent air base, supply depot, and garrison. When the Japanese attacked Pearl Harbor in 1941, Fort Richardson was charged with defending Alaska from invasion and coordinating the Alaskan war effort. As the war progressed, Fort Richardson's mission expanded significantly as the logistics base for numerous Army garrisons and the Air Corps. Between 1939 and 1945, approximately 151,180 acres of land were withdrawn. Before the outbreak of World War II, military strength in Alaska was less than 3,000 troops; it soon grew to 7,800 troops stationed at Fort Richardson alone, including the 4th Infantry, 81st Field Artillery, and 75th Coast Artillery (Anti-Aircraft).

From 1945 to 1955, the military returned approximately 84,555 acres to the Department of the Interior via EOs. A letter from the Secretary of the Interior, dated 27 October 1952, granted permission for the military to retain jurisdiction over withdrawn lands until they were not needed for military use. In 1950, 9,042 acres were transferred to the USAF. The Army vacated Elmendorf Field, moving east to its present location in 1951. During the 1950s, EAFB was established as the location for many radar and communication improvements. From 1953 to 1965, the Department of the Army released approximately 10,000 acres to various entities, such as the USAF (to complete EAFB acreage), State of Alaska, and BLM, and it acquired approximately 6,000 acres for Army use. In 1972, the Army acquired 3,340 acres (via Public Land Order) for use of the Fort Richardson-Davis Range. Numerous EOs and public land orders occurred over time to create JBER. These orders are further described in the IDP (673 ABW 2015).

Army troops were redesignated as the US Army Alaska in 1947 and assigned to the Alaskan Command, the nation's first unified command staffed jointly by Army, Navy, and USAF officers. Three off-post Nike-Hercules missile sites were built in 1959. The missile unit was deactivated in 1979. Sites at Goose Bay and Point Campbell were decommissioned, and the Army retained Nike Site Summit. The area and its associated buildings were listed on the National Register of Historic Places (NRHP) in 1996.

In 1974, US Army Alaska was inactivated, and Fort Richardson became the headquarters of the 172d Infantry Brigade (Alaska) in 1975. In 1986, the 172d gave way to the 6th Infantry Division (Light) and US

Army Garrison, Alaska. In 1989, the division began reporting to the US Army Western Command in Hawaii (later redesignated United States Army Pacific). In 1990, the headquarters for the 6th Infantry Division was moved to Fort Wainwright, and FRA became the headquarters for United States Army Alaska. In 1998, the 1st Brigade, 6th Infantry Division (Light), was deactivated and the 172d Infantry Brigade was reactivated. In 2004, the 172d Infantry Brigade was converted to a Stryker Brigade Combat Team and the 1st-501st Airborne Battalion to an Airborne Task Force. In late 2005, the 1st-501st Airborne Task Force was converted to the 4th-25th Airborne Brigade Combat Team (4-25 ABCT). On 6 June 2022, the 11 ABN DIV was activated and existing Army units on JBER were integrated into the new divisional structure, including the 4-25 ABCT, the 17th Combat Sustainment Support Battalion, and the 9th Army Band. The 4-25 ABCT was redesignated as the 2d Infantry Brigade Combat Team (Airborne), 11 ABN DIV.

EAFB has served as a vital location for aircraft responding to aggression and defense of the northern Pacific. The first unit assigned to Elmendorf Airfield was the 18th Pursuit Squadron in 1941. The 23d Air Base Group arrived shortly afterwards to provide base support. The 11th USAF was formed at Elmendorf in 1942. The 11th USAF was redesignated as the Alaskan Air Command in 1945, when Elmendorf Airfield became EAFB. In 1947, the Alaskan Command was formed at EAFB, tasked as a unified command under the Joint Chiefs of Staff, and although it was disestablished in 1975, it was reestablished in 1989. The 43d Tactical Fighter Squadron arrived in 1970, providing a new flexible role for Elmendorf-based units as the Vietnam War was winding down. The 18th Tactical Fighter Squadron was activated in 1977 but was reassigned to Eielson Air Force Base in 1982. The 3d Wing was reassigned from Clark Air Force Base to replace the 21st Tactical Fighter Wing in 1991 as the host for units at EAFB.

From 1966 to 2010, Fort Richardson boundaries remained stable. Leases from the BLM expanded the boundary to the east and in the south. Between 1980 and 2010, Fort Richardson acreage was reallocated to the Municipality of Anchorage for a municipal landfill and to EAFB for privatized housing. In 2005, the Base Realignment and Closure Commission called for the realignment of EAFB and Fort Richardson into a single joint installation. The new joint installation became Joint Base Elmendorf-Richardson, effective 1 October 2010. In addition, the 176th Wing, Air National Guard, associated aircraft, and Expeditionary Combat Support from Kulis Air Guard Station became tenants on JBER. The 3d Wing transferred JBER managing responsibility to the 673 ABW. In 2013, after careful mapping, a boundary error was identified. BLM concurred that the extreme southeastern boundary near Long Lake was inaccurate. The BLM and JBER agreed on a redrawn land boundary and reported the information to USAF and BLM headquarters. The redrawn boundary resulted in a loss of 1,283 acres of military training land.

The North Anchorage Land Agreement (NALA), signed in 1982, was a federally approved agreement that resolved several longstanding land ownership disputes between Eklutna, Inc.; the State of Alaska; and the Municipality of Anchorage. NALA provides for the future reallocation of existing military lands in Anchorage, in the event that any segments or areas are declared excess to future DoD needs. NALA governs the disposition of most JBER lands north of the east-west runway, which encompasses approximately 42,300 acres. While the DoD was not a signatory to this agreement, JBER has separately agreed to notify Eklutna, Inc. of new land use or management actions, including but not limited to outgrants, leases, the development of mineral resources, and gravel extraction.

The United States holds fee simple title to all federally owned lands. [Figure 2-3](#) is labeled using Automated Civil Engineer System database codes, Public Land Orders, or EOs to show how the DAF holds authority to the lands and determines if the real property has usage restrictions. Lands identified as “Fee” in [Figure 2-3](#) are government-owned property acquired from private landowners through purchase or condemnation proceedings (almost all are former homesteads); those labeled as public domain, Public Land Order, and EO lands are within the public domain and have withdrawal restrictions associated with their use.



2.1.3 Military Missions

The 673 ABW is the host unit for JBER and is responsible for providing expeditionary combat support and day-to-day operations of the installation, including ensuring timely fire, medical, and emergency services; providing deployment and redeployment support for nearly 12,000 deployable Soldiers and Airmen; planning, building, and sustaining a \$15-billion infrastructure; and much more.

The 673 ABW is composed of the 673d Medical Group, 673d Civil Engineer Group, 673d Logistics Readiness Group, 673d Mission Support Group, and more than a dozen Wing Staff Agencies, including Staff Judge Advocate, Public Affairs, and the Sexual Assault Prevention and Response Office. The 673 ABW's vision, mission, and priorities are as follows:

- **Vision:** A united team of Alaska tough warfighters
- **Mission:** *Project Forces—Protect the Homeland—Empower the Joint Base*
- **Priorities:** *Ready Airman, Ready Base, Ready Community*

As JBER's host unit, the 673 ABW provides administrative and logistical support to the US Army components of 11 ABN DIV; 11th Air Force; 3d Wing; 176th Wing; 732d Air Mobility Squadron; 373d Intelligence, Surveillance, and Reconnaissance Group; the Pacific Air Forces Regional Support Center; the USAF Reserve's 477th Fighter Group; the Canadian Forces Detachment; the Marine Corps' Reserve Training Center; the US Army Corps of Engineers (USACE) District Office; and many other smaller supporting units.

JBER's proximity and access to Asia, Europe, and North America provide a strategic location with significant importance to global military operations. The installation's location is ideal for deploying aircraft, troops, and equipment around the world and providing air defense, with some units on alert 24 hours a day, year-round.

JBER has approximately 12,500 Active-Duty military personnel that are a part of, and are supported by, its host and tenant units. In addition, JBER has approximately 3,500 civilian personnel and is home to an estimated 15,300 military dependents.

Fort Richardson is also the home installation for the 11 ABN DIV. The 11 ABN DIV's mission is to deploy combat-ready forces to support joint military operations worldwide and serve as the Joint Force Land Component Command to support Joint Task Force Alaska. Other missions of 11 ABN DIV are the defense of Alaska and coordination of Army National Guard and Reserve activities in the state.

The 11 ABN DIV has one brigade that calls JBER home: the 2d Infantry Brigade Combat Team (Airborne). The mission of the Airborne Brigade Combat Team is to "train to strategically deploy and conduct decisive action operations, to include joint forcible entry, in order to deter and defeat adversaries, facilitate security cooperation, and to contribute to a stable and secure Indo-Pacific area of responsibility."

Table 2-3. Listing of tenants and natural resources responsibility

Tenant Organization	Natural Resources Responsibility
673d Air Base Wing	Wildlife management, vegetation management, threatened and endangered species and species of concern management, wildland fire management, wetlands management, waterbody management, stormwater management, forest management, and National Environmental Policy Act (NEPA) support

Table 2-3. Listing of tenants and natural resources responsibility

Tenant Organization	Natural Resources Responsibility
773d Civil Engineer Squadron	Invasive and pest species management
US Army 11th Airborne Division (Arctic)	Integrated Training Area Management, wetlands management, water management, stormwater management, and forest management on Joint Base Elmendorf-Richardson—Richardson
US Army National Guard	Stormwater management and NEPA coordination
11th Air Force	N/A
176th Wing Air National Guard	N/A
373d Intelligence, Surveillance, Reconnaissance Group	N/A
3d Wing	N/A
477th Fighter Group Air Force Reserve	N/A
732d Air Mobility Squadron	N/A
Air Force Office of Special Investigations, Detachment 631	N/A
Alaskan Command (ALCOM)	N/A
Alaskan North American Aerospace Defense Command Region	N/A
Area Defense Council	N/A
Army & Air Force Exchange Service (AAFES)	N/A
Company D (-), Anti-Terrorism Battalion, US Marine Corps Reserve	N/A
Defense Commissary Agency	N/A
Defense Logistics Agency Energy, Alaska Office	N/A
Military Sealift Command, Anchorage	N/A
US Army Corps of Engineers, Alaska District	N/A
US Army Reserves	N/A
US Coast Guard	N/A
US Navy Reserves	N/A

2.1.4 *Natural Resources Needed to Support the Military Mission*

Natural resources are critical to JBER's military mission. The DAF uses natural areas as a buffer for airfield activities while the Army uses natural areas for mounted and dismounted maneuver training and weapons training. Natural resources are managed to minimize aircraft-wildlife conflicts and human conflicts with dangerous animals. The mission is also reliant on stable soils to support installation roads, buildings, and infrastructure. Healthy and resilient vegetative communities are essential for supporting stable soils and healthy wildlife and are more resilient against the establishment of invasive species. In addition, sustained wildlife populations and their habitats are required for outdoor recreation opportunities for JBER personnel and the public. Ecosystem-based management ensures that natural resources will sustainably provide the proper arena for supporting the military mission and personnel.

2.1.5 *Surrounding Communities*

The surrounding Municipality of Anchorage influences much of the planning on JBER. Anchorage Borough had an estimated population of 291,247 in the 2020 census (US Census Bureau 2021). Expansion of the city is greatly restricted by JBER to the east and north, Knik Arm to the west, Turnagain Arm to the south, and Chugach State Park to the south and east.

The communities of Eagle River, Chugiak, Eklutna, and Birchwood to the northeast are part of the Municipality of Anchorage. Further north, Palmer and Wasilla, the primary communities of the Matanuska-Susitna Borough, serve as residential communities for many employees of Anchorage businesses and agencies. The 2020 estimated population of the Matanuska-Susitna Borough was 107,081, with 20.3% growth from 2010 (US Census Bureau 2021). [Figure 2-2](#) shows the communities surrounding JBER.

Transportation Links

JBER is bisected by the Glenn Highway (Alaska Route 1), which provides primary access to the installation. It is the most heavily used highway in the state, connecting Southcentral Alaska to Interior Alaska and Canada. JBER is accessed from the Glenn Highway by Richardson Drive, Muldoon Road, and Boniface Parkway highway exits. Richardson Drive passes through the JBER-R cantonment area, becoming the Davis Highway as it approaches the JBER-E cantonment. JBER is also accessible from Post Road and the A/C Street Couplet.

JBER is intermittently served by the Alaska Railroad Corporation. The railroad's main line crosses between the 2 cantonment areas, and a spur extends to a loading facility and an ammo storage complex. The railroad provides both freight and deployment services with access to Fairbanks and port facilities in Anchorage, Whittier, and Seward, which is a deep-water port at the southern terminus of the railroad. The Municipality of Anchorage operates a deep-water seaport and fuel terminal at the Port of Alaska.

There are 2 airfields on JBER. The Elmendorf airfield provides JBER's primary air link. The airfield can support any type of military aircraft, including the C-5 Galaxy and the C-17 Globemaster III. Runway 06/24 (east/west) is 10,000 feet long by 200 feet wide, and Runway 16/34 (north/south) is 7,500 feet long by 150 feet wide. Runway 16/34 is under construction to extend it to 10,000 feet long, with anticipated completion in 2026. The runway is also projected to be renamed Runway 17/35 to align with changes in magnetic variation over time. Bryant Army Airfield, adjacent to the JBER-R cantonment area and the Glenn Highway, has a main, hard-surfaced, north/south runway, which is 3,000 feet long. The Bryant Army Airfield was outgranted to the Alaska Army National Guard as a base for their fixed-wing and rotary aircraft. Large parking aprons and several hangars are within the airdrome. The Morale, Welfare, and Recreation (MWR) program's 673d Force Support Squadron (673 FSS) maintains a recreational aircraft

gravel airstrip on the southern shore of Lower Sixmile Lake and a winter ski and summer floatplane strip on the lake.

There are 4 airports near JBER. Merrill Field is a municipal-owned public use airport currently used by general aviation and commercial aircraft in downtown Anchorage. Ted Stevens Anchorage International Airport is 10 miles southwest of JBER. It is the largest airport in Alaska for both passenger and air cargo operations. More than 30 carriers provide passenger service, and it is the second largest air cargo handler and transfer site in the United States. The Lake Hood Seaplane Base, comprised of lakes Hood and Spenard, is adjacent to the Ted Stevens Anchorage International Airport and is the largest and busiest floatplane base in the world. Birchwood Airport is a state-owned, public-use airport northeast of JBER.

Regional Land Use

JBER lies within the geographical confines of the Municipality of Anchorage. The current economic growth of the municipality and the demand for new housing and business expansion has nearly maximized development on private and municipal lands outside of legislatively designated special areas. The need for more development has precipitated frequent attempts to design and fund a bridge to largely undeveloped lands across Knik Arm by passing through or adjacent to JBER. The Port of Alaska expansion required the transfer of EAFB land. Two large shopping malls were also constructed near JBER boundaries. The overall effect of these non-DoD developments is rapidly diminishing wildlife habitat outside JBER boundaries, which, in turn, affects wildlife on JBER. This issue is further discussed in [Section 2.4.4](#).

2.1.6 Local and Regional Natural Areas

There are 9 significant natural areas within 5 miles of the base that are managed by state, municipal, and Native Corporation offices. The most significant natural area is the Chugach State Park, which encompasses approximately half a million acres east of JBER ([Figure 2-2](#)). Being within and adjacent to the Municipality of Anchorage and JBER, respectively, it serves to provide numerous recreational opportunities (e.g., mountaineering, hiking, fishing, hunting, skiing, camping) and unique Alaskan ecosystems. The park is within a portion of the Chugach Mountain Range, which is home to numerous Alaskan megafauna that also visit JBER.

Additional natural areas include the Anchorage Coastal, Susitna Flats, Goose Bay, and Palmer Hay Flats state game refuges, which border Upper Cook Inlet and provide thousands of acres of important coastal wetlands for waterfowl, shorebirds, and other wildlife. Eklutna, Inc. also manages over 1,000 acres of conservation easements around Eklutna, Knik Arm, Jim Creek, and Mud Lake. While these areas provide valuable habitat for waterfowl, they also present BASH risks for JBER aircraft. The Far North Bicentennial Park is south of JBER and connects to the western border of Chugach State Park. Aside from the military reservations, this is the largest, mostly intact, lowland boreal forest remaining in the Anchorage Bowl. Recreational and land development demands are threatening the integrity of the wildlife habitat in this park (Municipality of Anchorage 2012).

2.2 Physical Environment

2.2.1 Climate

JBER spans elevations from sea level to more than 5,000 feet in the Chugach Mountains, falling within 2 ecoregions: Coastal Trough Humid Taiga (Cook Inlet-Susitna Lowlands) and Pacific Coastal Mountain (Bailey 1995). The installation is situated in a transitional zone between the maritime climate effects to the south and the interior or continental climate zone to the north. Principal factors affecting the climate of the installation include terrain, latitude, altitude, and proximity to the ocean. Coastal mountains to the south act

as a barrier to the maritime influences of the northern Pacific Ocean, and the Alaska Range to the north and west protects the area from the extreme cold air masses of the interior region. The proximity of Cook Inlet also affects the area's temperature.

There are 2 weather stations located on JBER. One is located at the Elmendorf airfield and the other at Bryant Army Airfield. The official temperature recording station for the area is located at the Ted Stevens International Airport. Average yearly temperatures range between approximately 8 °F and 65 °F, with the highest monthly average occurring in July. The highest temperature recorded was 90 °F on 4 July 2019 and the lowest temperature recorded was -34 °F on 5 January 1975 (National Weather Service 2024a, 2024b). [Table 2-4](#) provides a summary of monthly temperature and precipitation averages recorded at the Elmendorf airfield from 1953 to 2022.

Table 2-4. Joint Base Elmendorf-Richardson climate summary

Variable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Maximum Temperature (°F)	22.2	26.3	32.9	43.8	55.3	62.5	65.7	63.5	55.72	41.2	28.1	23.03
Average Minimum Temperature (°F)	9.6	12.9	17.8	28.8	39.2	47.5	52.0	50.0	41.9	29.4	16.6	11.2
Average Total Precipitation (inches)	0.79	0.88	0.67	0.55	0.67	1.00	1.93	2.84	2.86	1.91	1.15	1.18
Average Total Snowfall (inches)	10.5	12.5	10.0	4.9	0.2	0.1	0.0	0.0	0.3	6.6	11.7	16.3

Period of Record 1953 to 2022

Source: Western Regional Climate Center 2022

On JBER, spring is marked by a rapid rise in temperature known as ice “breakup”, which usually starts by early April and lasts into May. Summer conditions last from June to early September, with a daily mean of 57 °F, an average high of 64.7 °F, and an average low of 48 °F (Figure 2-4; Western Regional Climate Center 2022). Periods where the weather drops to 28 °F, referred to as “killing frosts”, usually start around 30 September and can occur until 2 May. These killing frosts reduce the growing season to approximately 124 days. The fall season on JBER is brief, lasting from mid-September to late October and ending with the first persistent snowfall. The winter on JBER normally stays below freezing from mid-October to mid-April. Average daily mean temperature during this period is around 17 °F, with an average high of 24 °F and low of 10 °F (Western Regional Climate Center 2022). High-pressure weather systems during winter can lead to successive days with temperatures below -35 °F.

The average annual temperature has increased by 0.39 °F per decade and the growing season temperature has increased by 0.5 °F per decade between 1916 and 2014 (Dial et al. 2015). Increases across seasons (months) have not been consistent. More specifically, increases of 0.54 °F per decade in May and July indicate that growing season temperatures are increasing at a higher rate than increases during other months and that spring thaw occurs more than 2 weeks earlier (Dial et al. 2015). Temperature increases in May result in faster and more extensive snowmelt, depleting high-elevation, seasonally persistent snowbeds, which can have impacts on stream and groundwater recharge and the phenology of alpine plants.

Anchorage experienced record-setting environmental conditions in summer 2019, with June and July being the hottest months on record, reaching the all-time high temperature of 90 °F on 4 July. Smoke from wildfires on the Kenai Peninsula also shrouded the Anchorage Bowl, leading to the smokiest summer on record. Thunderstorms were observed on 4 separate occasions that year, which was more than any other year on record. Despite these early-summer storms, Anchorage received just 20% of its typical rainfall and was considered to be in an “extreme drought” for most of the summer (National Weather Service 2024a).

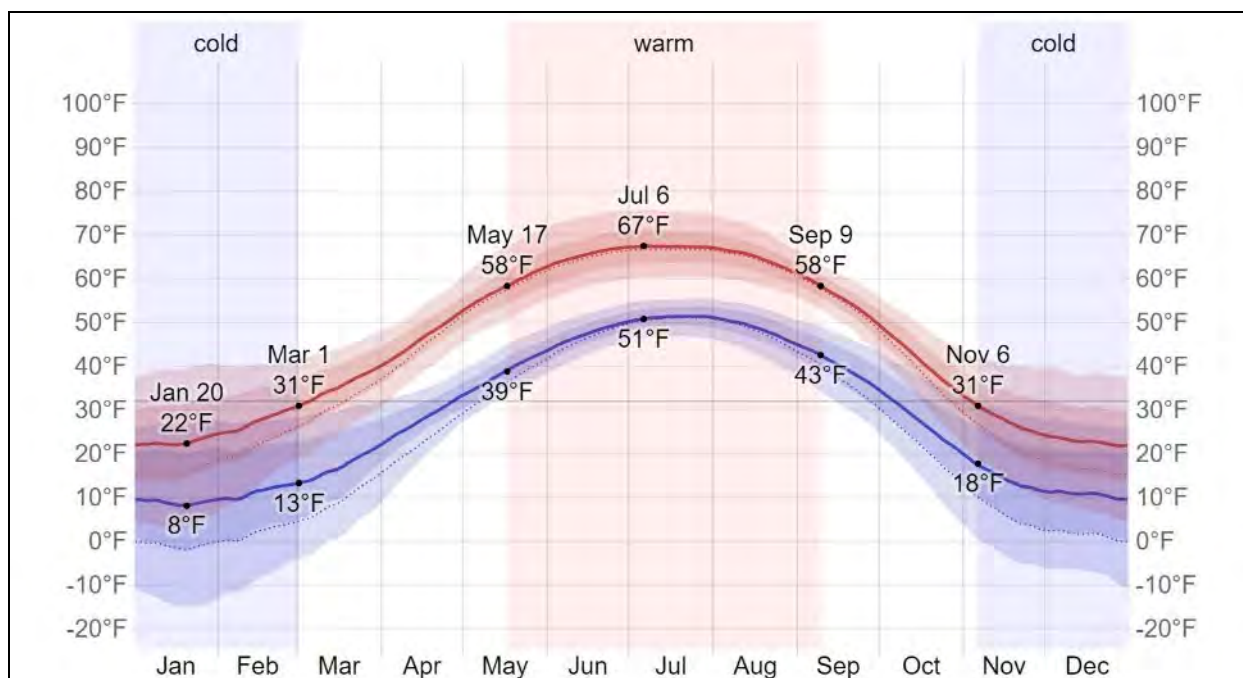


Figure 2-4. Daily average high and low temperatures at Elmendorf Weather Station with 25th to 75th percentile (inner band) and 10th and 90th percentile (outer band) (Weather Spark 2024)

Precipitation Patterns

Average annual precipitation for the JBER area is 15.6 inches. Most of this precipitation falls from June through October as rain. Snow with minor amounts of rain is prevalent from October through April. Average snowfall is 63.0 inches (approximately 6.3 inches of water). Rainfall during the winter averages 0.4 inch (approximately 3% of the total winter precipitation). [Figure 2-5](#) depicts the average precipitation recorded at the 2 JBER weather stations from 1990 to 2016. [Figure 2-6](#) depicts the projected probability for precipitation events throughout the year.

The total annual precipitation in the Anchorage Bowl has increased at a rate of between 0.3 and 0.35 inches per decade (Dial et al. 2015). The combination of changes in temperature and precipitation or potential evapotranspiration, however, has a more relevant effect on vegetation than does each factor alone. Despite increased temperature and precipitation in the area, the overall impact to water balance in the Anchorage Bowl is negligible, which contrasts to strong “drying” trends that have been observed in the nearby Kenai Lowlands (Dial et al. 2015).

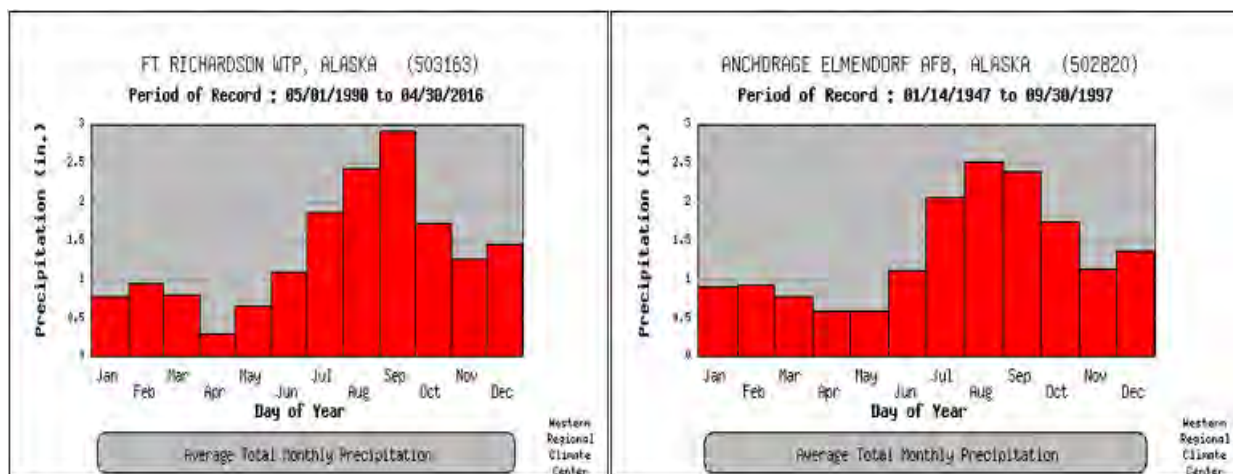


Figure 2-5. Monthly average total precipitation on Joint Base Elmendorf-Richardson (Western Regional Climate Center 2022)

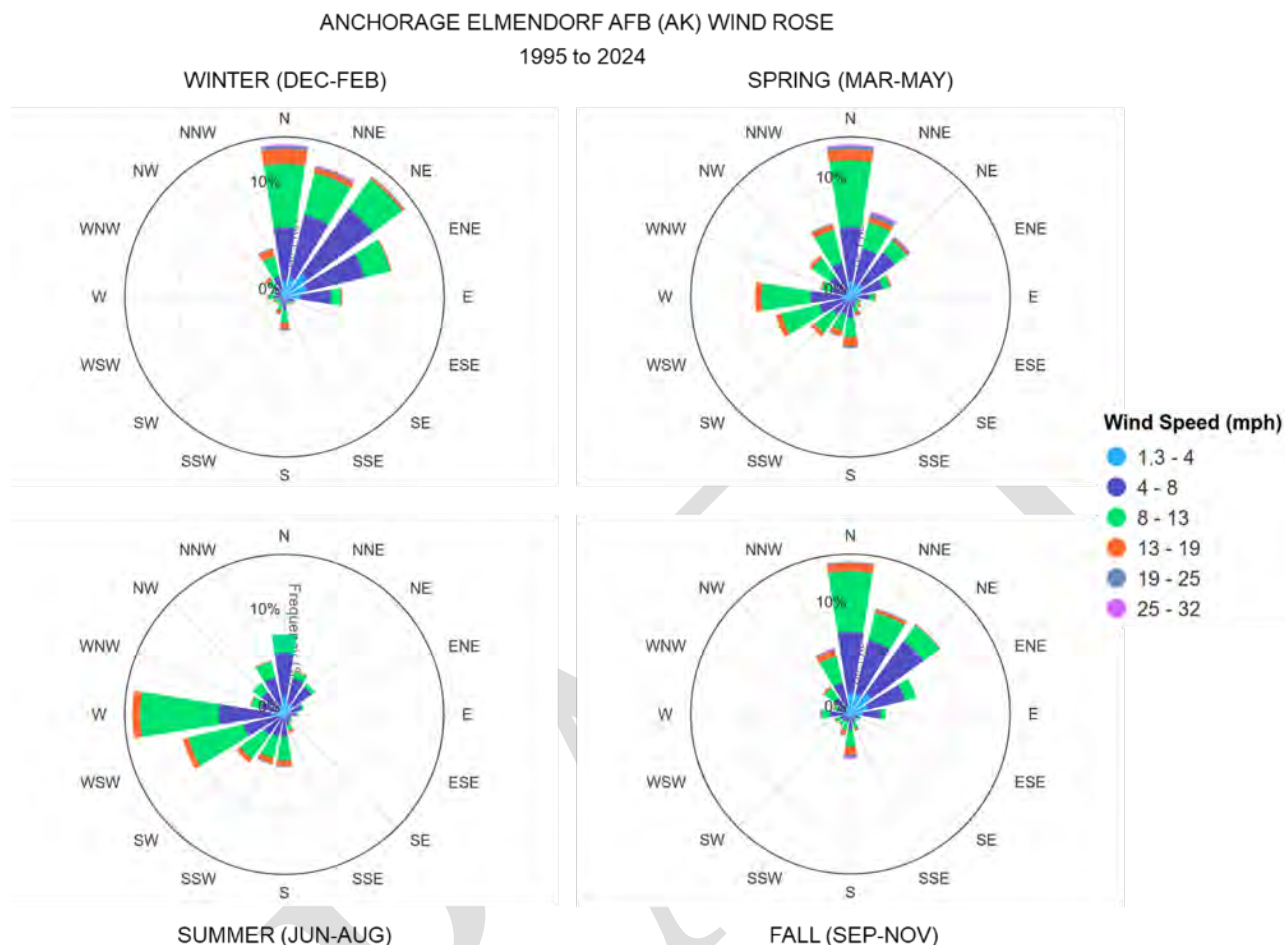


Figure 2-6. Probability of precipitation at Elmendorf Weather Station, 2015–2023 (Weather Spark 2024)

Wind

High-altitude airflow in the JBER area is generally toward the northeast and northwest (Figure 2-7). Surface flow is more variable and shows a distinct seasonal variation. During spring and summer, prevailing winds come from the west and southwest, drawing warmed air from the northern Pacific and outer Aleutian region, whereas in the winter, strong winds from the north and northeast dominate, bringing cold, dry polar air with them. Surface wind velocities average about 6 miles per hour, although wind velocities of 70 knots (80.5 miles per hour) have been recorded in the Anchorage area. Channeling of the winds near Ship Creek is common, with gusts reaching 53 knots. Channeling of south and southeasterly winds passing over the Chugach Mountains during low-pressure systems can lead to “Chinook” wind gusts of up to 100 miles per hour. These gusts can inflict significant property damage (Gossweiler 1984).

934



935

936 Figure 2-7. Compass-rose diagrams depicting wind direction and relative frequency at the Anchorage
 937 Elmendorf Air Force Base station (Station ID 26401) by season (Pyramids point towards the direction of
 938 wind origin and are color-coded by speed ranges shown on right; Midwestern Regional Climate Center
 939 2025)
 940

941 Remote Climate Monitoring Stations on JBER

942 Temporary weather stations were installed in Snowhawk Valley and on Eagle River Flats (ERF) in 2018 to
 943 gather site-specific data from climatically distinctive areas. The Snowhawk Valley station is approximately
 944 2,654 feet above mean sea level (AMSL) in a U-shaped valley near the headwaters of Snowhawk Creek, a
 945 tributary of Ship Creek in the Chugach Mountains. The ERF station is 13 feet AMSL at the mouth of Eagle
 946 River at Eagle Bay, along the shore of the Knik Arm of Cook Inlet. These temporary weather stations will
 947 remain operational as practicable. [Figure 2-8](#) depicts temperature data recorded at the remote, JBER, and
 948 Chester Creek weather stations.

949

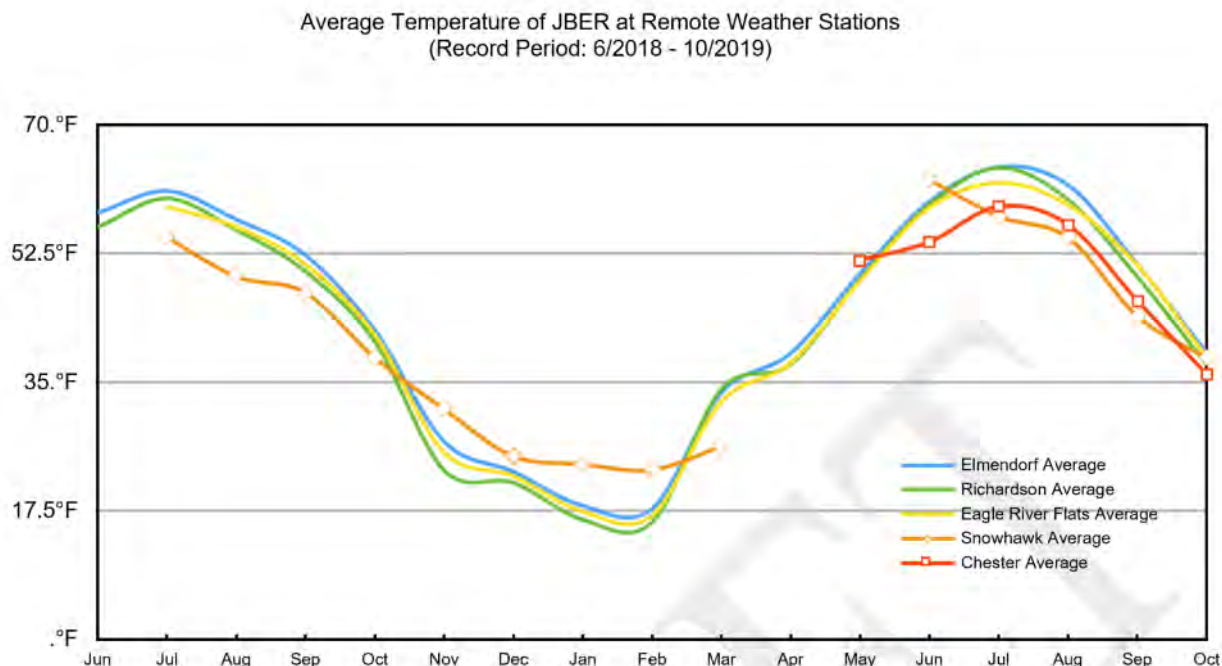


Figure 2-8. Data recorded from remote weather stations alongside data from the Elmendorf Airfield and Bryant Army Airfield Remote Automatic Weather Stations (RAWS; May 2018 to October 2019); RAWS data are from <https://mesowest.utah.edu>

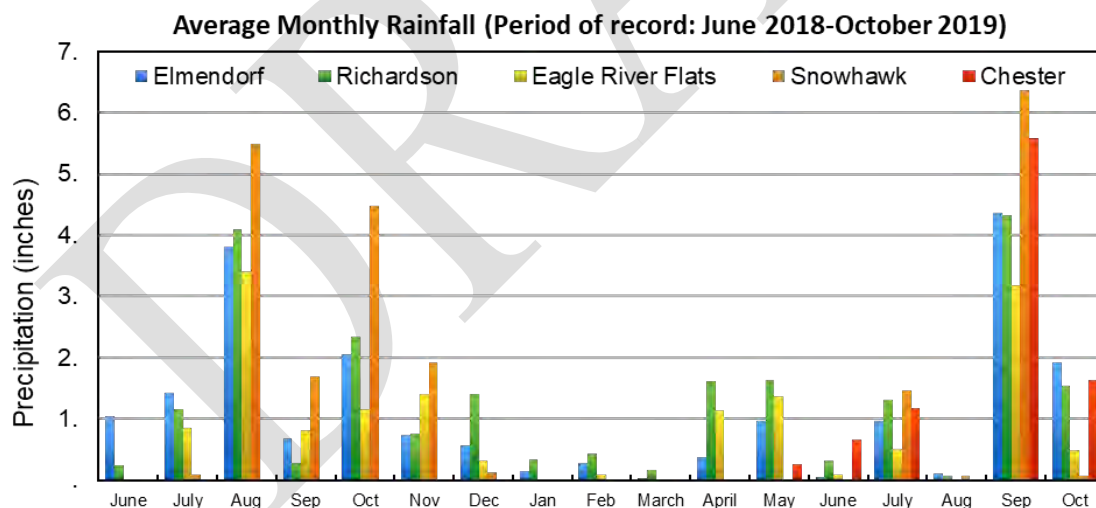


Figure 2-9. Average monthly rainfall recorded at remote weather stations alongside data from the Elmendorf Airfield and Bryant Army Airfield Remote Automatic Weather Stations (RAWS); RAWS data are from <https://mesowest.utah.edu> (Note: RAWS data does not include snowfall)

Precipitation records for alpine weather stations indicate greater precipitation at higher elevations (Figure 2-9) than at lower elevations. Orographic effects stall and accumulate vapor at higher, cooler elevations,

commonly referred to as the “rain shadow” effect. The weather stations that provided data for [Figure 2-9](#) do not collect snowfall data.

Wind metrics measured at remote stations on JBER indicate a variety of patterns that occur with respect to major landforms and waterbodies. Seasonal variation is expected, concurrent to expected seasonal air mass patterns. There are not enough data to reasonably analyze land mass specific air movement patterns at this time, but as data accumulate over a number of years, distinct patterns of air movement are expected to emerge between montane and maritime regions of the installation.

Plant Hardiness Zones

Hardiness zones are determined from patterns of primary productivity, nutrient and energy transfer, and biological functions of local food webs (Livingston and Loucks 1978). The longer and the better the growing conditions, the more productive a vegetation community can be. The US Department of Agriculture (USDA) regularly updates their assessment of plant hardiness throughout the United States and develops maps of the average annual minimum weather temperatures to guide planting decisions in each respective area. Based on the 2023 USDA map, most of JBER lies within Zone 5a, which includes extreme minimum temperatures between -20 °F and -15 °F. Smaller sections of JBER are also found within Zones 4b (-25 °F to -20 °F) and 5a (-15 °F to -10 °F) on the northern and western edges of the installation, respectively (USDA 2023).

2.2.2 Landforms

JBER lies between the Turnagain Arm and the Knik Arm of the Cook Inlet, at the north end of a roughly triangular-shaped lowland referred to as the “Anchorage Plain.” To the east, the Chugach Mountains rise abruptly to elevations of over 5,000 feet. From an elevation of 500 feet at the base of the mountains, the land declines into the Anchorage Plain to the coast. The Anchorage Plain is a glacial moraine that extends from the mountain front westward and northwestward. Steep bluffs, broken only by principal streams such as Eagle River, characterize the edge of the plain as it drops sharply to the sea (Hunter et al. 1999). Major landform features identified on JBER include the Chugach Mountains, coastal trough humid taiga, Elmendorf Moraine, ground moraine, and alluvial fan. These major landforms were largely formed by glacial formation and movement, and are described further below.

Chugach Mountains

A portion of JBER lies in the Chugach Mountains, a part of the Pacific Mountain physiographic unit, which spans the west coast of North America and southeastern Alaska, arcing northwest through the Wrangell-St. Elias Mountains, Kenai-Chugach Mountains, Talkeetna Mountains in coastal Southcentral Alaska, to the Aleutian Islands (Gallant et al. 1995). The western face of the Chugach Mountains is the visibly dominant geological feature of JBER, rising from the Anchorage Plain to 5,200 feet within the JBER installation boundary. It includes steep side slopes and narrow, U-shaped valleys such as those occupied by Eagle River and Ship Creek. On JBER, the Chugach Mountains are composed of both metamorphic and sedimentary rock formations, which are more prevalent along the Border Range Fault.

Coastal Trough Humid Taiga

JBER is partially situated in the Cook Inlet-Susitna Lowlands, an ecological province within the Coastal Trough Humid Taiga Province. The Cook Inlet-Susitna Lowlands cover an extensive area, part of which is submerged under the waters of Cook Inlet. The area is bordered on the west by the Alaska Range, on the east by the Kenai and Chugach mountains, and on the north by the Alaska Range and the Talkeetna Mountains (Bailey 1995, Gallant et al. 1995).

Elmendorf Moraine

The southern edge of the Elmendorf Moraine, a hummocky, long series of ridges, runs east to west across JBER, roughly parallel to Knik Arm. This system of ridges marks the terminus of the last glacial advance in this area. The moraine is 0.5- to 1-mile wide and reaches an elevation of 389 feet at its highest point on JBER. In most places, south-facing slopes are steep and north-facing slopes are gentle. Much of the moraine is covered by kettles (steep-sided depressions) and kames (conical hills or short irregular ridges) that were created by melting blocks of ice during the glacial retreat. Many kettles on the moraine contain ponds and lakes, while others contain bog deposits and some remain unfilled. None of the ponds or lakes are drained by streams (Hunter et al. 2000).

Ground Moraine

Landform features formed under or adjacent to glacier ice are part of a ground moraine that underlies roughly the entire northern third of the installation, beginning on the northern side of the Elmendorf Moraine. Along the Knik Arm, the ground moraine is almost continuously exposed, forming bluffs ranging in height from 20 to 100 feet. Away from the Knik Arm, the surface is pitted with kettles and many drumlins (elongated gravel hills parallel to glacial movement) that are oriented towards the southwest. The entire ground moraine is an area of relatively low relief, seldom varying more than 75 feet in elevation. Drainage of the ground moraine is not well integrated, although small streams occupy channels cut during the glacial retreat. Sixmile and Otter creeks occupy a 125-foot deep, abandoned channel cut by Eagle River, which is now 3 miles farther north. Most channels are oriented towards the southwest and give the area a distinctive, striated appearance from the air. Most kettles on the ground moraine are shallow depressions that form bog lakes or unfilled depressions. Typically, streams do not drain them. Moraine kettle wetlands may be interconnected to waters via groundwater or other physical, biological, or chemical connections (Hunter et al. 2000).

Alluvial Fan

Glacioalluvial, alluvial, and alluvial fan deposits, including outwash plain, are found south of the Elmendorf Moraine in a broad, gently sloping surface composed of sand and gravel. These areas cover approximately the southern third of JBER-E and were formed from alluvial deposits placed down in layers by the Eagle River during glacial advances and by Ship Creek in modern times. Ship Creek has cut a floodplain channel that varies in depth from 20 to 50 feet below the surface of the plain. The plain's low relief, combined with deep gravel, provides perfect conditions for the construction of buildings and runways. The JBER cantonment area and flight line were built almost entirely on the alluvial fan. The high-quality sand and gravel soils also promote high-quality, productive browse plant species for moose (*Alces alces*) (Hunter et al. 2000).

2.2.3 Geology and Soils

The geology of the JBER area was shaped by the formation of the Chugach Mountains in the late Paleozoic and Mesozoic eras and the subsequent flow of sediments into lowlands during the Tertiary period (Gossweiler 1984). JBER straddles both the alluvial fan of the Anchorage Plain and the moraine and glacial alluvium complex near the shore of Knik Arm.

The Chugach Mountains have bedrock of metamorphic rocks of the McHugh complex, believed to have originated in the late Jurassic or Cretaceous periods, composed of a mixture of metamorphose siltstone, lithic sandstone, arkose, and conglomerate sandstone. These are fossil bearing formations, including some

bivalves (Clark 1973). This bedrock is exposed in places along the Chugach Mountains western flank on the southeastern portion of JBER.

The gravel alluvium of the Anchorage Plain underlies the JBER main cantonment. Well-bedded and well-sorted gravels and sands provide good foundation conditions and plentiful construction material. The confined gravel aquifer is 200 to 400 feet below the surface in this area of the installation. Groundwater flow in this confined aquifer is a generally west to northwest (CH2M Hill 1994).

The Elmendorf Moraine is chiefly till, including diamicton and poorly sorted gravel. North of the Elmendorf Moraine is a complex of moraine and glacial alluvium deposits in the form of irregularly shaped hills (CH2M Hill 1994).

JBER's lowland bedrock is composed of sedimentary rocks of conglomerate sandstone, mudstone, and coal. It is connected with metamorphic rocks of the mountains along the vertical Border Ranges Fault, which lies at the base of the Chugach Mountains (CH2M Hill 1994).

Bedrock in lowlands rarely surfaces because it is covered by thick deposits of unconsolidated material that accumulated during the Holocene Period (Gossweiler 1984). These surficial deposits begin at the mountain front and thicken as they slope downward to Cook Inlet. Thickness varies from 0 feet at the foot of the mountain range to 900 feet at Point Woronzof (CH2M Hill 1994). The upper part of the deposits is composed of gravels and sands ranging from 30 to 100 feet thick. Underlying the gravel is Bootlegger Cove Clay, a 60- to 200-foot layer of clay and silt with inter-bedded sand. Below the clay is a 100- to 200-foot layer of sand and gravel that provides the major groundwater aquifer for the area (CH2M Hill 1994). Between the aquifer layer and the bedrock is a layer of poorly sorted glacial sediments (Gossweiler 1984).

Bootlegger Cove Clay is nearly impermeable and serves as a confining layer between upper and lower gravel layers. It inhibits downward flow of pollutants from groundwater in upper layers and results in an artesian aquifer in the lower gravel layer. Water from this aquifer flows into the Knik and Turnagain Arms at an estimated rate of 75 million gallons per day (CH2M Hill 1994).

Regional Tectonics

The Alaska Earthquake Information Center detects and reports approximately 40,000 earthquakes annually in Alaska. Alaska has had 12 of the 15 largest earthquakes on record in the United States. JBER is within this tectonically active region and experiences numerous earthquakes every year. JBER is bordered by 2 fault systems: the Bruin Bay-Castle Mountain fault system to the north and west and the Border Ranges fault system to the south, which runs parallel to the base of the Chugach Mountains. Another fault, located in the Chugach Mountains, skirts the Arctic Valley ski area.

The largest earthquake recorded in Alaska was the 9.2-magnitude Good Friday Earthquake that occurred in 1964 in Prince William Sound (Alaska Earthquake Information Center 2018). A record number (55,000) of earthquakes was recorded in Alaska in 2018, including the 7.1-magnitude Anchorage Earthquake that hit on 30 November 2018. Aftershocks from this earthquake lasted for approximately 2.5 years.

Soils

The USDA Soil Conservation Service mapped Anchorage area soils in 1979. Soils were inventoried again on JBER-E by the USDA Natural Resources Conservation Service (NRCS) in 1997 (Wikgren and Moore 1997). Soils of the Anchorage area were most recently surveyed by Moore (2001). Current soil data is managed on the USDA NRCS (2024) Web Soil Survey.

In general, soils on JBER are dominated by 3 types of unconsolidated deposits, which are classified by grain size, sorting, permeability, and depositional method. These 3 types are described below.

- **Coarse-grained deposits** consisting of sand and gravel deposited by streams (glacial outwash) are found in the outwash plain and along modern stream channels, lakes, or estuaries. This material is generally well layered and well sorted, with moderate to high permeability. This type of deposit also consists of sand placed by streams and wind or found in stillwater ponds, lakes, and estuaries. These are generally well stratified and sorted with moderate to high permeability. Coarse-grained deposits are also composed of sand and gravel that are deposited mainly by moving water within or adjacent to glacier ice. This material is generally moderately well stratified and well sorted but is less homogenous than stream deposits, has moderate to high permeability, and is represented by ground moraine features such as kames and eskers.
- **Fine-grained deposits** consisting of silt and clay deposited in stillwater, such as former lakes and ponds in the ground moraine, former marine estuaries, and tidal zones, are often found interbedded with sand and gravel and with till. Silts and clays are usually saturated with water but transmit it so slowly that they can be, and commonly are, impermeable in a practical sense. Fine-grained materials also include the Bootlegger Cove clay. This material may contain interbeds of fine sand and is also usually saturated with water but is classified as impermeable because of slow transmittal time.
- **Till**, a mixture of coarse and fine-grained material consisting of boulders, gravel sand, silt, and clay, is found in well-sorted interbeds or poorly sorted single beds. It originated as the result of glacial deposition; however, it is found intermixed as part of a combination of glacial, marine, and lacustrine deposits. Till deposited by glaciers includes long ridges marking the margins of former glaciers; Elmendorf Moraine is an example. Till of mixed origins includes such elongate hills as drumlins. Till, although saturated with water, can be relatively impermeable because of slow transmittal time; however, water-yielding sand and gravel are commonly present in shallow till.

[Figure 2-10](#) depicts a generalized map of JBER soil orders that was created by taking a higher-level view of JBER soils from all existing data. In the United States, all soils are classified into 12 orders and 64 suborders. JBER has representative soils of 4 orders and 10 suborders, which are described briefly below. The prefix “cry-” refers to cold temperature regimes and “aqu-” refers to water and is used to name soils that are permanently or frequently saturated.

Entisols show little or no soil development (e.g., horizons, mineral leaching):

- Aquents form in recent sediments, frequently associated with river systems, and support vegetation that is tolerant of permanent or periodic wetness.
- Fluvents are freely drained soils formed in recent water-deposited sediments and are frequently flooded. Like aquents, they support flood-tolerant vegetation.
- Orthents are common on erosional surfaces and support a variety of vegetation used for wildlife habitat.

Histosols are predominantly organic (vs. mineral) and are generally called mucks, peats, etc. These soils do not have permafrost:

- Fibrists are wet, slightly decomposed organic soils that support widely spaced vegetation such as small trees, shrubs, and grasses.
- Hemists are wet, moderately decomposed organic soils that support woodlands.

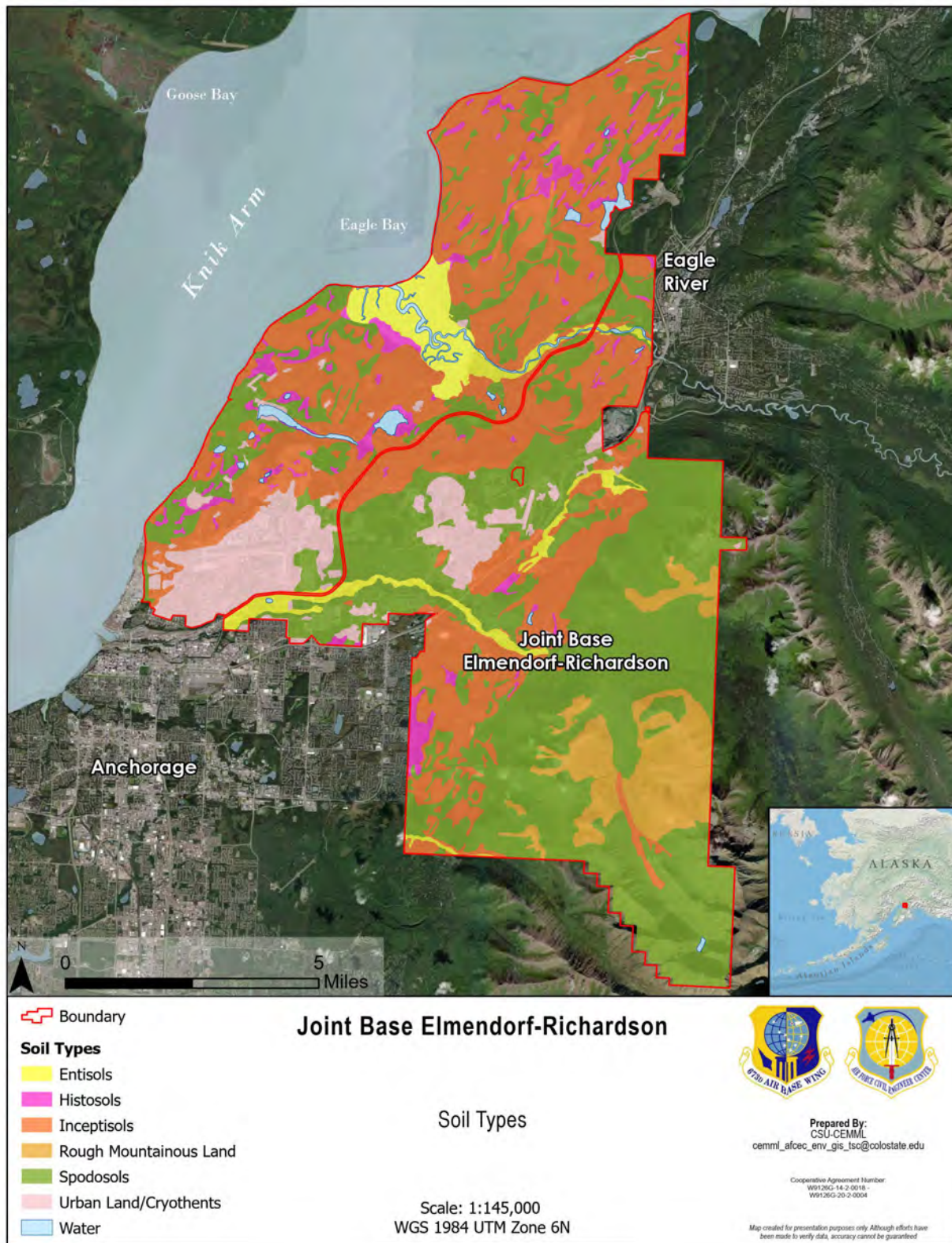
1125 Inceptisols are mineral soils characterized by the loss of iron and some bases, but also retain some
1126 weatherable materials:

- 1127 • Cryepts are found at high altitudes or latitudes that support mostly conifer or mixed conifer forests.
- 1128 • Aquepts are soils that, unless artificially drained, usually have water at or near the surface for part
- 1129 of the year. Many of these types of soils formed under forest vegetation but can support almost any
- 1130 type of vegetation.

1131 Spodosols are mineral soils characterized by the accumulation of organic matter (but less than in Histosols)
1132 and aluminum, with or without iron:

- 1133 • Cryods are found at high altitudes or latitudes and mainly support coniferous forests.
- 1134 • Aquods are characterized by a shallow and fluctuating water table that is capable of supporting
- 1135 small trees, shrubs, and moss.
- 1136 • Orthods are relatively freely drained mineral soils with a moderate accumulation of organic carbon,
- 1137 and they mainly support forest vegetation.

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1140 Figure 2-10. Map of soils within Joint Base Elmendorf-Richardson

2.2.4 Hydrology

Most JBER streams flow westward from headwaters in the Chugach Mountains to the Knik Arm of Cook Inlet (saltwater). Major rainfall flood events in Upper Cook Inlet that have historically caused flooding of Ship Creek and Eagle River occur during the August to October rainy period (Papineau and Holloway 2011). Ship Creek has incurred significant changes to the stream course and structure as a result of major storms. Hydrological resources on the installation are depicted in [Figure 2-12](#).

Watersheds

The JBER watersheds at the USGS Hydrologic Unit Code (HUC) 12 level include Ship Creek (headwaters), Ship Creek (outlet), lower Eagle River, Chester Creek, North Fork Campbell Creek, Fire Creek, Knik Arm (north and south), and Snowhawk Creek ([Figure 2-11](#)).

Ship Creek Headwaters Watershed (HUC 12: 190204010402)

Ship Creek is a fourth-order stream that empties into the Knik Arm. From its headwaters in the Chugach Mountains east of JBER, Ship Creek flows through the installation for 13.3 miles, draining approximately 52,989 acres. At the HUC 12 level, the Ship Creek Headwaters and the Ship Creek Outlet watersheds are separated into 2 distinct watersheds. The Ship Creek Headwaters Watershed drains approximately 30,411 acres, including approximately 3,903 acres within JBER. As Ship Creek enters JBER, it initially flows through a 3-mile canyon of whitewater, beginning at an elevation of 1,100 feet AMSL. It then enters the Ship Creek Outlet Watershed. Hydrologic storage in small but frequent depressions in valleys that are located high within the watershed are significant to upper headwater storage, water resource recharge to streams and groundwater, and management of flooding in the spring.

Land use within the Ship Creek Headwaters includes very limited development. Natural training areas located in the Chugach Mountains, including portions of Snowhawk Valley, high altitude training ranges and landing zones, portions of Arctic Valley Road, and Site Summit lie within this watershed. Drainage from the headwaters is relatively undisturbed.

Ship Creek Outlet Watershed (HUC 12: 190204010401)

The Ship Creek Outlet Watershed drains approximately 22,579 acres, within which JBER lands comprise approximately 19,945 acres. Upon entering the Ship Creek Outlet Watershed from the Ship Creek Headwaters Watershed, at an elevation of approximately 500 feet, Ship Creek continues across the forested coastal plain to the western boundary of JBER at a 50-foot elevation. Before exiting JBER, the channel flows over 2 sheet pile dams that act as effective barriers to anadromous fish passage. After flowing past the William Jack Hernandez Sport Fish Hatchery, Ship Creek exits JBER's border and the channel is approximately 20 feet wide and 2 feet deep, with an average 3% fall over a rocky/gravelly bottom. After leaving JBER, Ship Creek continues through heavily developed portions of Anchorage to its final outfall directly into the Knik Arm of Cook Inlet, a tidal water.

The average stream flow is 144 cubic feet per second, but this varies greatly over the year, with highs in spring and lows in late winter. Due to the porous nature of the gravel substrate, portions of the channel show no surface flow during winter low flow periods. The creek loses water over some stretches and gains water over others, with most of this gain taking place in lower stretches before leaving the installation. Flooding has occurred 3 times since 2010. All flooding events resulted in extensive damage to channelization structures along the former Eagle Glen Golf Course and the Moose Run Golf Course. Flooding normally occurs in early June (in years when rapid snowmelt combines with late-spring or early-summer rains) and in September, the wettest month of the year. In the late 1980s, a 50-year flood event

occurred in September. Another major flooding event, which was reportedly a 500-year flood event, occurred in September 2012. This flood caused extreme erosion along Ship Creek, particularly near bridge abutments. In 2012, the abutment for the Moose Run Golf Course washed away and the bridge collapsed into the river. Major events such as these typically result in significant changes to the stream course, especially at turns and where impediments obstruct the surge in flow.

Since 1912, Ship Creek has been impounded in various locations to serve as the water source for the Municipality of Anchorage and JBER. The upper dam on Ship Creek forms a 2.8-acre reservoir, which provides most of the potable water for JBER and a portion of the water for the Municipality of Anchorage. JBER and Anchorage have separate water treatment plants and delivery systems. JBER also has several backup water wells that are fed by a shallow aquifer along Ship Creek, just north of Moose Crossing Housing (Daly et al. 2019).

The Ship Creek floodplain upstream of the Glenn Highway received minimal disturbance throughout the 2010s. However, the Creek Course Golf Course constructed in 1997 reduced the riparian vegetation associated with the creek. Protecting the integrity of the course has created the desire to stabilize and modify streambanks. More importantly, the drinking-water dam, constructed in 1952, continues to severely affect the creek's hydrology and stream dynamics.

The portion of Ship Creek on JBER west of the Glenn Highway has been more severely impacted. The creek bottom that once flowed from Cottonwood Park to a since-decommissioned and demolished Central Heat and Power Plant has been channelized, and the north (river right) bank has been stabilized to prevent erosion. The power plant received water for operation from a nearby low dam and intake pond that have also since been removed. The decommissioned JBER-R hatchery had several water wells that were drilled in the shallow aquifer near Ship Creek. The wells were used to supply fresh water for the hatchery raceways. A bridge carried a steam line across Ship Creek, about a half mile downstream from the JBER-R hatchery. Most of Ship Creek between the decommissioned JBER-R hatchery and the Eagle Glen Fitness Park remains in its undisturbed natural condition. However, portions of the bank have been reinforced with rip-rap, asphalt and concrete slabs, creosote boards, and in some stretches, gravel-filled drums, which reappear on the banks periodically. The stream is dammed at the former cold-water intake pipe for the Elmendorf power plant, which was decommissioned and removed in 2005.

McVeigh Creek (Gunnery Creek) flows through the Ship Creek Outlet Watershed. Military infrastructure includes the Small Arms Complex, live fire ranges and safety fan, several training areas, and the main cantonment and residential area of JBER (Daly et al. 2019).

Lower Eagle River Watershed (HUC 12: 19020410306)

Eagle River is a fifth-order stream that flows northwest through JBER for 8.2 miles. At the HUC 12 level, Eagle River is split into an upper and lower watershed. JBER contains about 14,330 acres of the 27,873-acre Lower Eagle River Watershed. Snow and ice melt from Eagle Glacier (at the headwaters of the Upper Eagle River Watershed) is a major source of flow during the summer months. River flow reaches its peak of more than 2,500 cubic feet per second during July and August. Periods of heavy rainfall or rapid melting from the glacier can generate water flow in excess of 10,300 cubic feet per second (National Oceanic and Atmospheric Administration [NOAA] 2014). Notably, during the major flooding event in September 2012, an abutment supporting the military modular "Bailey Bridge" was severely compromised and required emergency replacement.

Upstream of JBER, the Eagle River passes through the community of Eagle River. From there, the river flows into the northwestern portion of JBER and through ERF tidal marsh before it empties into the Knik

1226 Arm of Cook Inlet. In winter, Eagle River is a clear stream with good water quality. From spring to summer,
1227 however, there are significant levels of suspended sediment from runoff and glacial melt. Overall sediment
1228 loads, however, are fairly low in comparison with other glacially fed streams in Alaska (CH2M Hill 1994).

1229 Notably, the ERF Impact Area is within this drainage as Eagle River transitions into the tidal influences of
1230 Knik Arm. Currently, winter mortar/artillery firing takes place in this impact area. Extensive white
1231 phosphorus residue remediation activities were completed in the ERF. The Explosive Ordinance Disposal
1232 (EOD) range and munitions storage are also located within the Lower Eagle River Watershed.

1233 Clunie and Otter creeks are also within the Lower Eagle River Watershed. Clunie Creek drains Clunie Lake
1234 and other small ponds among the moraines northeast of ERF. While Clunie Creek does not have a
1235 permanent surface water connection to Eagle River, it effectively drains into the river via groundwater,
1236 subsurface flow, and overland sheet flow, after the stream channel dissipates approximately 1.3 miles prior
1237 to reaching ERF.

1238 Otter Lake, an important recreational lake south of the ERF Impact Area, is a tributary drainage of Eagle
1239 River. The lake is primarily fed by springs from the same aquifer as Upper Sixmile Lake. It is a natural lake
1240 that was historically enlarged. Otter Creek departs the lake through an outfall that was constructed in winter
1241 2016 to 2017, which removed fish passage barriers. Beavers (*Castor canadensis*) dammed a section of Otter
1242 Creek for several decades, which severely limited anadromous fish from reaching further up the creek
1243 towards the lake. Natural deterioration of the beaver dam, restoration and construction of a portion of the
1244 stream channel at the lake outlet, and replacement of a culvert under Otter Lake Road restored anadromy
1245 to this system. The water-level control structure that previously provided outfall for Otter Lake was replaced
1246 with a section of sheet piling and earthen berm to close off the old outlet. Otter Creek continues to the north
1247 into ERF, discharging into Eagle River. Return of adult salmon to Otter Lake was first recorded in 2015.

1248 Although not connected to Eagle River by surface flow, Lake Kiowa and Gwen, Thompson, and Waldon
1249 lakes are also within the Lower Eagle River Watershed.

1250 Chester Creek Watershed (HUC 12: 190204010806)

1251 The Chester Creek Watershed is JBER's third largest watershed, encompassing 19,513 total acres, 8,133
1252 acres of which are within JBER. Chester Creek, a third-order stream, is located south of the Glenn Highway
1253 on JBER and is the fourth-longest stream on the installation, with almost 7 miles of main channel flowing
1254 within the installation boundary. Chester Creek originates on the western face of the Chugach Mountains,
1255 flows west, and leaves JBER as it enters the Muldoon neighborhood. Chester Creek continues through the
1256 Municipality of Anchorage to its outfall in the Knik Arm of Cook Inlet. Hydrologic storage in small but
1257 frequent depressions in headwater valleys that are high within the watershed are significant to upper-
1258 headwater storage, water resource recharge to streams and groundwater, and management of flooding in
1259 the spring. Frequent drainages have been found along the hillside, where groundwater seeps emerge from
1260 the hillside and run down the hill toward the creek. Hillsides may be vulnerable to erosion in these areas.

1261 The Davis Range and most of Bulldog Trail are within the Chester Creek Watershed. There are a number
1262 of heavily used training assets in this area, including the Infantry Squad Battle Course, Urban Assault
1263 Course, Shoot House, Convoy Live Fire Loop, and numerous helicopter landing zones. Although it is a
1264 shallow creek, it usually has a constant flow of water.

1265 North Fork Campbell Creek Watershed (HUC 12: 190204010603)

1266 The North Fork Campbell Creek watershed is approximately 18,288 total acres, of which about 1,578 acres
1267 are within JBER. Approximately 1 mile of the North Fork of Campbell Creek, a third-order stream, flows

1268 through the very southern portion of JBER. This creek is located just north of the Stuckagain Heights
1269 subdivision outside the installation's border. Campbell Creek is an important anadromous stream in the
1270 Anchorage Bowl, and it discharges directly into the Knik Arm of Cook Inlet.

1271 Snowhawk Creek Watershed (HUC 12: 190204010403)

1272 Snowhawk Creek, a third-order stream with a base flow averaging 6 cubic feet per second, flows northwest
1273 through Snowhawk Valley for approximately 6 miles until its confluence with Ship Creek at the Ship Creek
1274 Outlet Watershed boundary. It drains approximately 6,803 acres of alpine and subalpine lands in the
1275 Chugach Mountains, including 6,558 acres within JBER's installation boundary. Several alpine drainages
1276 feed into Snowhawk Creek from the peaks and ridges surrounding the valley. Hydrologic storage in small
1277 but frequent depressions in high-altitude valleys are significant to upper headwater storage, water resource
1278 recharge to streams and groundwater, and management of flooding in the spring. Tanaina Lake is located
1279 at the head of the south fork of Snowhawk Valley but does not have a surface water connection to the
1280 headwaters of Snowhawk Creek, as was observed during field reconnaissance in July 2016 and August
1281 2017.

1282 In July 2019, Airmen from the 673 CES, Installation Support GeoBase Program and biologists from the
1283 673 CES/CEIEC conducted a survey of the left and right banks' ordinary high water marks and thalwegs
1284 to evaluate the extent of the streambed of the South Fork of Snowhawk Creek toward Tanaina Lake. This
1285 was conducted IAW the definition of "Waters of the United States" (WOTUS) in the Clean Water Act
1286 (CWA; 33 Code of Federal Regulations [CFR] Part 328.4c) and other federal regulatory guidance. The
1287 findings are included in the Alpine Training Support Final Report (Johnson et al. 2022). The limits of the
1288 defined bed and bank are located approximately 1.32 miles upstream along the stream course, from the
1289 confluence of the north and south forks of Snowhawk Creek or 1.40 miles along the valley bottom,
1290 northwest of Tanaina Lake. The upper reaches of the south fork begin as seasonal drainages and then
1291 become intermittent channels before the headwater stream becomes a perennial stream 1.06 miles from the
1292 confluence. At the northern fork, however, the headwater stream is persistent from the eastern terminus of
1293 the valley and continuous through most of the north fork valley. Snowhawk Valley contains military
1294 training features, including several landing zones and the Geronimo Drop Zone.

1295 Fire Creek Watershed (HUC 12: 190204010804)

1296 Fire Creek is a third-order stream that drains 10,835 total acres, of which 191 acres on the extreme northern
1297 end are within JBER. Fire Creek drains into Fire Lake, which lies within the Municipality of Anchorage.
1298 None of the Fire Creek streambed is within the JBER boundary.

1299 Knik Arm–Frontal Cook Inlet (HUC 12: 190204010808)

1300 The Knik Arm–Frontal Cook Inlet watershed includes Knik Arm and areas of land that direct sheet flow
1301 into Knik Arm. On JBER, 2 distinct areas sheet-flow into Knik Arm: Knik Arm North and Knik Arm South.

1302 Knik Arm North drains about 9,572 acres, with about 8,563 acres within JBER. It abuts the Lower Eagle
1303 River and Fire Creek watersheds to the south. It includes minor drainages between Fire Creek and Eagle
1304 River and a section of ERF, all of which flow directly into the Knik Arm. Portions of this watershed are
1305 heavily used for military training. The area includes the Infantry Platoon Battle Course, Arctic Warrior
1306 Maneuver Corridor and Bivouac Site, Malemute Drop Zone, ERF Impact Area, and Multi-Purpose Training
1307 Range.

1308 Knik Arm South drains about 10,151 acres, with about 9,701 acres within the installation. It includes many
1309 smaller drainages, such as Sixmile Creek. Sixmile Creek is a first-order stream in western JBER that flows

into the Knik Arm of Cook Inlet. It lies within a historical channel of Eagle River but not within the existing Eagle River Watershed, and it consists of 1 mile of creek channel and 2 miles of human-made lakes, all originating from springs on the southern side of Upper Sixmile Lake. Average flow of the system is 3 cubic feet per second and varies no more than 0.5 cubic feet per second between winter and summer (Rothe et al. 1983). The stream averages 5 feet wide and 10 inches deep, with an average 3% grade over a rocky/gravelly bottom. A portion of the stream channel flows through a bog and has a substrate of peat and silt in this area.

Another drainage within Knik Arm South is EOD Creek, a first-order stream that drains approximately 1,500 acres. EOD Creek consists of 0.44 mile of stream channel, originating from seeps in a bog wetland area. The summer flow rate has been estimated at approximately 0.75 cubic feet per second. The stream substrate alternates between silt, gravel, and organic peat deposits.

Green Lake and its outflow, Moonshine Creek, drain into Knik Arm south of the Sixmile Creek drainage. Moonshine Creek drains approximately 696 acres. Cherry Hill Ditch is a storm drainage system that receives flow from developed portions of the JBER-E cantonment area (2,912 acres), including the flightline. It has a maximum flow of 3 cubic feet per second after heavy rains but is normally less than 1 cubic feet per second. Flow is year-round but minimal during winter.

Knik Arm South contains kettle formations within the Elmendorf Moraine, between Sixmile Lake and the Elmendorf Flightline. These kettle formations consist of depressional ponds and lakes (e.g., Fish, Triangle, Spring and Hillberg lakes) and other low-lying wetlands, typically containing peat deposits. These types of depressions are typically surrounded by uplands and may have no distinguishable inlet or outlet; however, they are still components of the watershed. Kettles are fed either by groundwater or by surface water in the form of sheet flow and are important for water storage, filtration, and groundwater recharge.

Knik Arm South contains numerous maintained roads, hiking trails, snowmobile trails, and a floatplane landing strip on Lower Sixmile Lake. This area supports a high degree of recreational use, including boating, fishing, moose hunting, birdwatching, and snowmobiling.

Freshwater Lakes and Ponds

On JBER, there are 35 natural and human-made lakes and ponds that are 1 acre or larger in size, with the largest (Otter Lake) having a surface area of 145 acres. The total acreage of JBER lakes and ponds that are 1 acre or larger in size is 628.2 acres. Twelve of these lakes and ponds are managed for their wildlife or recreational value. There are numerous ponds on the installation that are smaller than 1 acre and others that are only seasonally flooded. These ponds provide varying amounts of wildlife habitat that are not actively managed. [Table 2-5](#) lists larger lakes and ponds (2 acres or more) occurring on JBER, and [Figure 2-11](#) shows the watersheds, surface waters, and topography on JBER.

Table 2-5. Larger lakes and ponds on Joint Base Elmendorf-Richardson

Lake/Pond	Acres*	Lake/Pond	Acres*
ADR (EOD) Pond	2.9	Lake Kiowa	2.0
Chain Pond	2.4	Lower Sixmile Lake	122.2
Clunie Lake	114.0	Landing Zone 27 Pond	5.5
Cochise Lake	2.2	McVeigh Marsh	9.5
Dishno Pond	4.2	Otter Lake	145.7
Eagleleglen Pond	3.4	Oval (Beebe) Lake	7.3
Fish Lake	4.0	Spring Lake	9.6

Table 2-5. Larger lakes and ponds on Joint Base Elmendorf-Richardson

Lake/Pond	Acres*	Lake/Pond	Acres*
Former Cooling Pond	6.0	Tanaina Lake	19.4
Fossil Pond	6.1	Thompson Lake	6.7
Grady Pond	4.5	Triangle Lake	3.8
Green Lake	19.6	Upper Sixmile Lake	27.8
Gwen Lake	9.7	Waldon Lake	39.6
Hillberg (Tuomi) Lake	11.0	Web Pond	5.0

*GeoBase Geographic Information System 2016

Subsurface Water

Two freshwater aquifers underlie most of JBER. These aquifers flow west from the Chugach Mountains to the Cook Inlet and are recharged by groundwater originating from precipitation in the mountains. The 2 aquifers lie in different soil strata and are separated by a 60- to 200-foot layer of impermeable Bootlegger Cove Clay (CH2M Hill 1994).

The upper, unconfined aquifer lies in a 30- to 100-foot-deep layer of well-bedded and well-sorted gravel near the surface. This aquifer can usually be accessed at depths of less than 50 feet (CH2M Hill 1994). There seems to be no interconnection between the 2 aquifers. Shallow aquifer groundwater movement follows, for the most part, that of the surface topography. Flow is to the northwest along the northern limb of the moraine and to the southeast along the southern limb. The groundwater divide coincides with the crest of the moraine. This aquifer is not used for drinking water.

The lower, confined aquifer lies in a 100- to 200-foot layer of sand and gravel. Impermeable clay above produces artesian conditions and protects the lower aquifer against seepage and pollutants from the surface; thus, water quality of this artesian aquifer is excellent. An estimated 75 million gallons of water originating from the mountains recharges the aquifer each day. This aquifer can usually be accessed at 200 to 400 feet below the surface. Wells drilled into the aquifer can produce up to 1,500 gallons of water per minute (CH2M Hill 1994). JBER does not use this aquifer for its main source of drinking water but as standby drinking water supply when surface water supplies cannot meet demand. The Municipality of Anchorage, bordering JBER, uses water from this aquifer for various services, including industrial, commercial, domestic, and public supply.

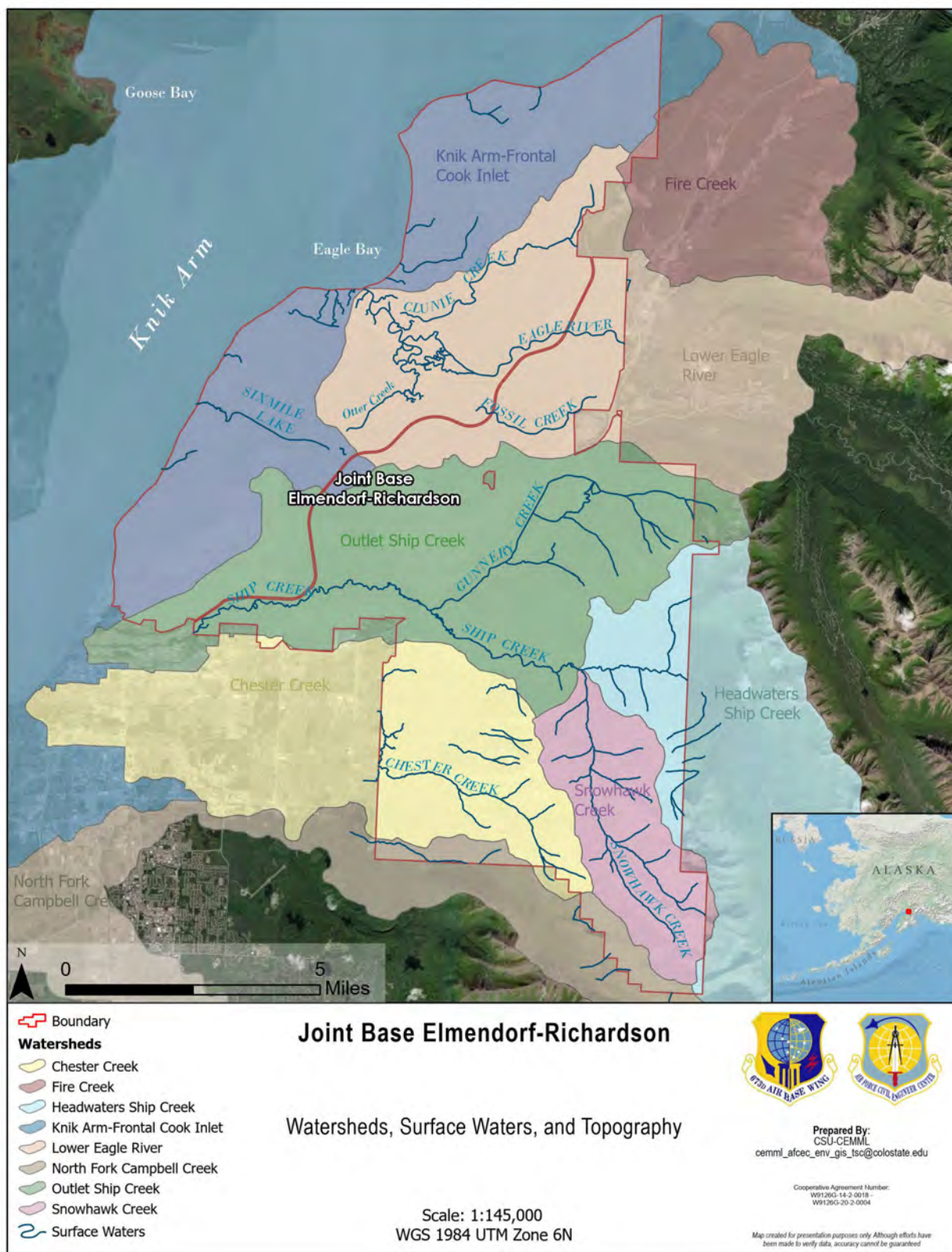


Figure 2-11. Map of watersheds, surface waters, and topography at Joint Base Elmendorf-Richardson

Salt Water

The Knik Arm of the Cook Inlet borders JBER to the west and north for approximately 20 miles. Water is generally shallow and murky and tides in this area are extreme, with high and low tide differentials reaching over 36 feet. This creates a tidal zone with minimal vegetation, with the exception of ERF.

Eagle Bay is located where Eagle River empties into Knik Arm. Tidal activity in Eagle Bay has created an estuarine salt marsh encompassing ERF. Numerous ponds dot the marsh. Many of these are shallow mudflat ponds that are less than 6 inches deep and often dry up during summer. Others are more permanent, with depths over 20 inches. These deeper ponds are often fed by freshwater streams and springs.

In 1994, a comprehensive evaluation of ERF was conducted to address the water quality of these ponds (CH2M Hill 1994). The salinity level varied from 1 to 46 parts per thousand. Salinity in most ponds was below 10 parts per thousand. Tidal flooding of ERF infuses ponds with saltwater and sediments from Eagle Bay. Elevation determines frequency of floods, varying from mean sea level to 18 feet AMSL. Flooding may occur daily during high tides in areas less than 12 feet AMSL. In areas 12 to 13 feet AMSL, flooding occurs only with the highest tide each month, and in areas above 13 feet, flooding occurs only during extremely high tides. Several ponds were drained IAW Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements to remove white phosphorus.

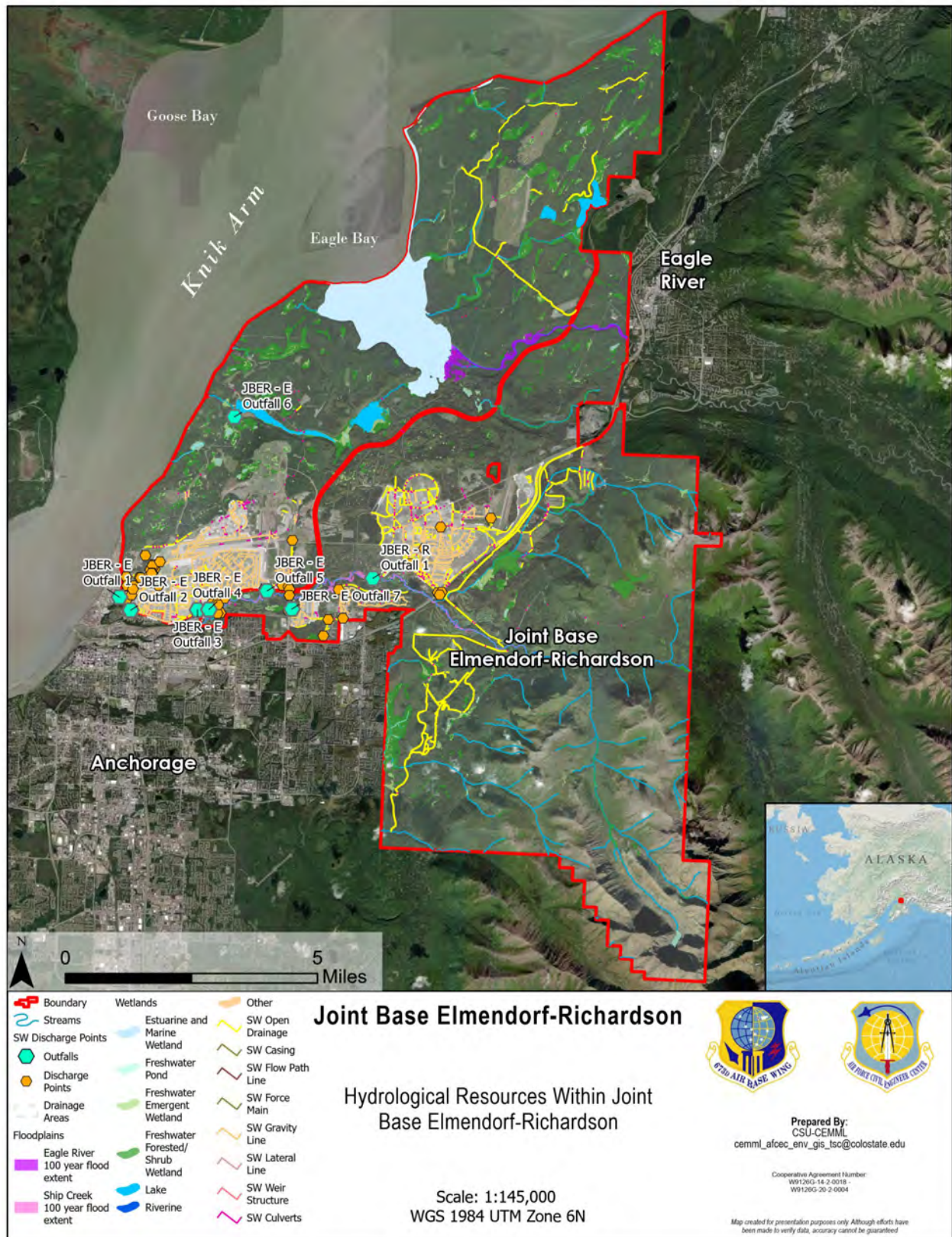
Infrastructure Drainage

Installation drainage infrastructure in JBER-E includes 7 drainage areas with 7 outfalls that empty directly into Ship Creek and Knick Arm. [Figure 2-12](#) depicts the hydrological resources, floodplains, outfalls, discharge points, and water lines found within JBER. JBER has 2 National Pollutant Discharge Permits that regulate stormwater on the installation. The installation's stormwater Multi-Sector General Permit (MSGP) and the Municipal Separate Storm Sewer Systems (MS4) Permit regulate Outfalls E-1, E-2, E-3, E-5, and E-7. The MS4 Permit also regulates Outfall E-4 and the MSGP regulates Outfall E-6. [Figure 2-13](#) depicts the outfalls and drainage areas on JBER, as well as the stormwater permit associated with each outfall. The sections of JBER that are associated with each drainage area and outfall are as follows.

Drainage Area 1 encompasses 3,586 acres of the installation, including the JBER-E airfield, and directs stormwater from this developed portion of the base into the subsurface sewer system that discharges into the Cherry Hill Ditch. This ditch then directs water into Knik arm via Outfall E-1. Drainage Area 2 encompasses 378 acres adjacent to Drainage Area 1 and directs stormwater south of the Cherry Hill Ditch, which then flows to Knik Arm through Outfall E-2. Drainage Area 3 encompasses 96 acres to the east, where stormwater is funneled into a series of culverts that discharge into an engineered wetland via Outfall E-3. This wetland and Outfall E-3 were designed as part of a system to remediate contaminated groundwater in the area owned by the Alaska Railroad Corporation. The wetland and outfall are associated with JBER's hazardous waste facility, although the containment capacity of both facilities exceeds their hazardous waste capacity, meaning that any spills will be contained before reaching Outfall E-3. Drainage Area 4 encompasses 97 acres that directs stormwater into Outfall E-4, which drains into an unnamed waterbody adjacent to the installation. This waterbody is then connected to Ship Creek via an urban drainage channel. Drainage Area 5 encompasses 154 acres that pipe stormwater under the railroad tracks to Outfall E-5, which drains into Ship Creek. Drainage Area 6 encompasses 2,517 acres around Sixmile Lake and the northern portion of JBER-E, which all drains into Sixmile Creek through Outfall 6 before flowing into Knik Arm. Finally, Drainage Area 7 was created in 2024 to direct stormwater runoff from Buildings 3786 and 3829 into the new Outfall 7. This outfall then discharges runoff into a wetland area adjacent to Ship Creek.

1409 At JBER-R, both natural and urban runoff flow to a single outfall, Outfall R-1, which leads to Ship Creek.
1410 Surface water from the developed areas either infiltrates the soil or enters the storm sewer system,
1411 eventually flowing into an unlined ditch and an infiltration basin before reaching Ship Creek. Additionally,
1412 runoff from the Glenn Highway enters JBER-R via a 24-inch culvert at Arctic Road and a roadside ditch
1413 near the main gate, which are both prone to minor flooding during spring breakup. The Alaska Army
1414 National Guard's Bryant Army Aviation Support Facility is also part of the drainage network but is under
1415 a separate MSGP. Runoff from its airfield and taxiways infiltrates the ground (673 ABW 2020b).

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1416

1417 Figure 2-12. Map of hydrological resources within Joint Base Elmendorf-Richardson



1418

1419 Figure 2-13. Map of stormwater outfalls within Joint Base Elmendorf Richardson

2.3 Ecosystems and the Biotic Environment

2.3.1 Ecosystem Classification

According to Nowacki et al. (2001), JBER lies within the Cook Inlet Basin, an ecological province of the Coastal Trough Humid Taiga (Bailey 1995, Gallant et al. 1995). A portion of JBER also lies in the Chugach-Kenai Mountains, an ecological province of the Pacific Mountain System (Bailey 1995, Gallant et al. 1995). The Coastal Trough Humid Taiga (Tayga) includes a broad range of vegetation types, but notably dominant are needleleaf (white spruce [*Picea glauca*], black spruce [*Picea mariana*]), broadleaf (paper birch [*Betula papyrifera*], balsam poplar or cottonwood [*Populus balsamifera*]), and mixed forests. The Pacific Coastal Mountain region includes alpine slopes which range from barren to occupied by dwarf or low scrub to tall scrub in lower alpine and upper subalpine reaches. Subalpine forests are occupied by krummholz (dwarfed, windswept) white spruce and mountain hemlock (*Tsuga mertensiana*) in the upper subalpine regions and paper birch, balsam poplar, and tall shrubs including green alder (*Alnus viridis*) and willows (*Salix* spp.) in the lower subalpine and lowlands.

More specifically, 5 physiographic zones of vegetation habitat are on JBER:

- **Coastal Halophytic Zone**—This zone is comprised of shoreline and intertidal flats along Cook Inlet.
- **Lowland Interior Forest Zone**—This zone is comprised of lowland boreal forest at elevations of up to 1,500 feet. Mesic to dry forest types include paper birch forest, white spruce, quaking aspen (*Populus tremuloides*), balsam poplar, black cottonwood (*P. balsamifera* ssp. *trichocarpa*) and mixed birch-spruce forest. Wetlands include black spruce and treeless bogs with graminoid forbs. Alder (*Alnus* spp.) is the dominant shrub community.
- **Subalpine Zone**—This zone is comprised of intermittent forest, shrub, and meadow habitats from approximately 1,500 to 2,500 feet in elevation. Mesic to dry sites include white spruce, white spruce–paper birch, balsam poplar, and mountain hemlock. Forests are interspersed with alder shrub and grass forb meadows. Treeless bogs are occasionally present in this zone.
- **Alpine Zone**—This is a mountain landscape habitat above the treeline. Low shrubs and dwarf shrubs occupy wet and mesic to dry habitats. The latter include mesic to dry vegetated sites, such as rock talus and block fields. Wetter habitats include late-melting snowfields and snow-beds.
- **Artificially Cleared or Disturbed Area Zone**—This zone includes cantonment areas and airfields, roadsides, rights-of-way, borrow pits, pipelines, moose mitigation areas, small arms ranges, firing points, landing zones, and other human-modified areas.

The ecotypes present on JBER are described in Jorgenson et al. (2003) and Pullman et al. (2003). While the study focused on the Richardson Training Areas, the ecotypes have been extended and mapped for all regions of JBER. Vegetation classifications within each ecosystem are based on the Alaska Vegetation Classification System (Viereck et al. 1992).

2.3.2 Vegetation

2.3.2.1 Historical Vegetation Cover

The old-growth, mixed forests that are currently found throughout the Anchorage area are the last vestiges of what was once the dominant vegetation before Euro-American colonization in the mid-1700s. Many of these forested areas originated after major fires that occurred as a result of land-clearing practices during that time (Gabriel and Tande 1983, Lichvar et al. 1997, Lipkin and Tande 2001). The second most abundant vegetation type is the young birch-white spruce, closed, mixed forests, which developed as a result of forest

fires in the old-growth stand between 1895 and 1935. Homesteaders clearing their land may have been responsible for many of the fires that occurred during this time period (Daugherty and Saleeby 1998). Various floristic and ecological surveys conducted prior to joint-basing have identified gradual changes in the vegetation communities present on the installation, although the dominant types have remained largely the same since the base's establishment (CH2M Hill 1997, Lichvar 1997, Walker et al. 1997, Jorgenson et al. 2003).

2.3.2.2 Current Vegetation Cover

JBER is within a vegetation transition zone between the areas dominated by the boreal spruce–birch forests of the Alaska Interior and the black cottonwood/western hemlock (*Tsuga heterophylla*)-dominated forests of the Pacific Coast. These vegetation types represent the transitional nature of the climate between maritime and continental zones. The wetter maritime climatic influence has resulted in a lower frequency of lightning-induced wildland fires at JBER than at other spruce-hardwood forests in the Interior region of Alaska, resulting in the dominance of old-growth forests (Gabriel and Tande 1983). Neither of these areas are represented in the Cook Inlet Basin, which is composed largely of wetlands and bogs that are dominated by black spruce and scrub communities (Nature Conservancy of Alaska 2003). JBER maintains a comprehensive vegetative inventory that is annually updated with species occurrences observed during field surveys for all natural resource projects. A total of 816 individual vascular plant taxa across 85 families are included in the JBER Vascular Plant List. Additionally, there are more than 80 mosses and nearly 80 lichens and liverworts catalogued on JBER, mostly from work done in alpine studies. A comprehensive JBER plant list is in [Appendix I](#). Invasive and noxious species are further described in [Section 7.11](#).

Ecotypes

JBER is comprised of 78 ecotypes. The top 5 ecotypes, by order of dominance, are Upland Rocky Moist Mixed Forest, Upland Rocky Moist Broadleaf Forest, Alpine Rocky Dry Dwarf Scrub, Lowland Gravelly Moist Mixed Forest, and Alpine Rocky Moist Dwarf Scrub. Vegetation of the Upland Rocky Moist Mixed Forest ecotype is closed quaking aspen-spruce, which covers about 22% of JBER (about 16,410 acres). Vegetation of the Upland Rocky Moist Broadleaf Forest ecotype is closed paper birch, which covers about 14% of JBER or about 9,974 acres. Vegetation of the Alpine Rocky Dry Dwarf Scrub ecotype is dry as-lichen tundra, which covers about 6% of JBER or about 4,584 acres. Vegetation of the Lowland Gravelly Moist Mixed Forest ecotype is closed quaking aspen-spruce, which covers about 6% of JBER or about 4,597 acres. Vegetation of the Alpine Rocky Moist Dwarf Scrub ecotype is cassiope tundra, which covers about 4% of JBER or about 3,174 acres. Ecotypes are depicted in [Figure 2-14](#).

The BLM retains vegetation management rights on much of JBER forest lands under various Public Land Orders. Any management activity involving forest management or removal of vegetation on those lands must be coordinated through the BLM, with revenues deposited in to the US Treasury General Fund, except under the terms for sale of personal use firewood, according to a 2018 MOA.

The vegetation descriptions included below are derived from Jorgenson et al. (2003), except where otherwise noted. All nomenclature is derived from Flora of North America, as used on the USDA Plants Database website (USDA NRCS 2017).

Forest

Forest systems on JBER include both open (25 to 60% total forest cover) and closed (>60% total forest cover) broadleaf, needleleaf, and mixed forest that occur in both dry and moist habitat throughout the installation. Broadleaf forest occurs in varying proportions of paper birch and resin birch (*Betula*

neolaskana), balsam poplar, black cottonwood, and quaking aspen. Needleleaf forest occurs where white spruce, black spruce, or mountain hemlock are dominant. While white spruce occurs in upland and dry sites, black spruce occurs in both wetlands and in moist upland areas. Both black and white spruce form mixed assemblages with broadleaf forest species in mixed forests. Between approximately 500 and 2,132 feet elevation, needleleaf forest habitat comprised of mountain hemlock and occasional white spruce in krummholz formations occur. The most common forest type found on JBER is Open Spruce–Paper Birch, comprising more than 25% of the total vegetated area on JBER. Needleleaf, broadleaf, and mixed forests occur throughout JBER, except within the estuarine Eagle River mudflats and at elevations above the treeline (approximately 2,133 feet AMSL).

Shrub

Shrub scrub habitat is described as dominated by tall shrubs (greater than 4.9 feet tall), low shrubs (0.7 to 4.9 feet tall), and dwarf shrubs (less than 0.7 feet tall). Shrub dominated habitats commonly occur in moist upland to wet sites and are typically dominated by alder and willow species. Dwarf shrubs predominate alpine habitat since their low-profile form is specifically adapted to harsh, windy climates. Dwarf shrubs common in the alpine tundra include dryas (syn., eightpetal mountain-avens, *Dryas octopetala*), cassiope (*Cassiope tetragona*, *Cassiope stelleriana*), dwarf birch (*Betula nana*), dwarf willow (*Salix arctica*), and crowberry (*Empetrum nigrum*). Lowland bogs and other wetlands may also be dominated by wetland-adapted dwarf and low shrubs, including bog blueberry (*Vaccinium uliginosum*), sweetgale (*Myrica gale*), and willow (Bebb willow [*Salix bebbiana*], Scouler's willow [*Salix scouleriana*], diamondleaf willow [*Salix planifolia*], tealeaf willow [*Salix pulchra*]).

Herbaceous

Herbaceous meadows are dominated by vegetative assemblages of sedges, grasses, and/or non-grass and non-woody forbs, and they lack trees or shrubs. Most upland herbaceous dominated habitat has been modified by humans and is further described below. Naturally occurring herbaceous habitat is often associated with wetlands and other moist uplands, where high soil moisture may discourage establishment of trees that are not adapted to wet soil conditions. Canada bluejoint grass (syn., bluejoint, *Calamagrostis canadensis*) occurs commonly throughout all habitat types on JBER but is most abundant in moist uplands and wetland areas. Upland graminoid habitat, most commonly occurring as disturbed or human-modified habitat, is also dominated by grass species such as foxtail barley (*Hordeum jubatum*), other grasses (*Poa* spp.), rye (*Elymus* spp.), and fescue (*Festuca* spp.). Mixed herb habitats occurring in subalpine and lower-elevation habitats are typically dominated by fireweed (*Chamerion angustifolium*), wild geranium (*Geranium erianthum*), white burnet (*Sanguisorba canadensis*), Sitka valerian (*Valeriana sitchensis*), and bunchberry dogwood (syn., creeping dogwood, *Cornus canadensis*), along with the other abovementioned associated grasses and sedges.

Aquatic sites in the littoral zone or throughout shallow lakes (16.4 to 32.8 feet deep) may be habitat for aquatic herbs such as pond lily (*Nuphar* sp.), alpine pondweed (*Potamogeton* spp.), and mare's tail (*Hippuris tetraphylla*). Lakes that are subject to recreation, watercraft or floatplane activity may be vulnerable to the introduction of highly invasive *Elodea* species.

Partially vegetated habitats (with 5 to 30% total vegetative cover) frequently occur in alpine areas, where exposed rock frequently occurs between patches of vegetation typically including an assemblage of dwarf shrubs and other alpine grasses and herbs such as geranium, sweet grass (*Hierochloe alpina*), gentian (*Gentiana* spp.), and lutkea (*Lutkea pectinata*). Partially vegetated habitats may be vulnerable to erosive forces, especially if naturally or anthropogenically disturbed.

The most common naturally occurring herbaceous habitats found on JBER are halophytic (salt-tolerant) grass, sedge, and herb wet meadows and marshes associated with freshwater to brackish estuarine habitat, such as those that occur throughout the ERF. These habitats are commonly dominated by arrowgrass (*Triglochin maritima*), Lyngbye's sedge (*Carex lyngbyei*), alkali grass (*Puccinellia nutkaensis*), bulrush (*Scirpus paludosus*), softstem bulrush (*Schoenoplectus tabernaemontani*), and goose tongue (*Plantago maritima*), among many others. The species assemblages are specifically adapted to a range of salinity driven by saltwater influence from the tidal waters of Knik Arm.

Unvegetated Barrens (Exposed and Mudflats)

Naturally occurring barrens include habitats with exposed rock outcrops or mudflats that are comprised of less than 5% total vegetative coverage and occur in alpine and estuarine areas, respectively, including the ERF. Alpine barrens occur on exposed slopes or ridgelines and are considered highly erodible by wind, water, and other disturbance since little vegetation is able to establish to hold soil and broken rock in place. Mudflats in the Eagle River estuary are extremely dynamic, comprised of highly erosive silt loam deposits that are inundated by tidal wash multiple times daily, inhibiting vegetation establishment. Barrens may also occur in riverine systems, including along riparian shorelines and abandoned river channels such as Ship Creek.

Human-Modified Forest, Shrub, and Herbaceous

While it is comprised of similar species that are found in the vegetative classes above, human-modified vegetation, excluding turfed and landscaped areas, typically occurs in areas that have been cleared, thinned, or otherwise manipulated to facilitate training exercises and other mission-dependent operations on JBER.

Partially vegetated (5 to 30% vegetative cover) areas occur in and around gravel pits, landing zones, firing points, and firing ranges. Firing ranges and drop zones are cleared of woody vegetation and frequently subject to prescribed burns to maintain a low abundance of dry fuels (grasses and other vegetation) that may pose wildland fire hazards during live fire exercises. Forest habitat may be thinned into bivouacs to facilitate orienteering and other training operations. Forest and shrub habitat may also be altered to encourage wildlife habitat, especially for grouse, ptarmigan, and moose. Human-modified shrub habitat may be successional regrowth after clearing and prior use as rangeland, which is undergoing natural restoration or purposefully maintained as wildlife habitat.

Human-modified habitats are most vulnerable to the introduction of invasive weeds, including but not limited to reed canary grass (*Phalaris arundinacea*), bird vetch (*Vicia cracca*), Canada thistle (*Cirsium arvense*), orange and yellow hawkweed (*Hieracium* spp.), and European bird cherry (*Prunus padus*).

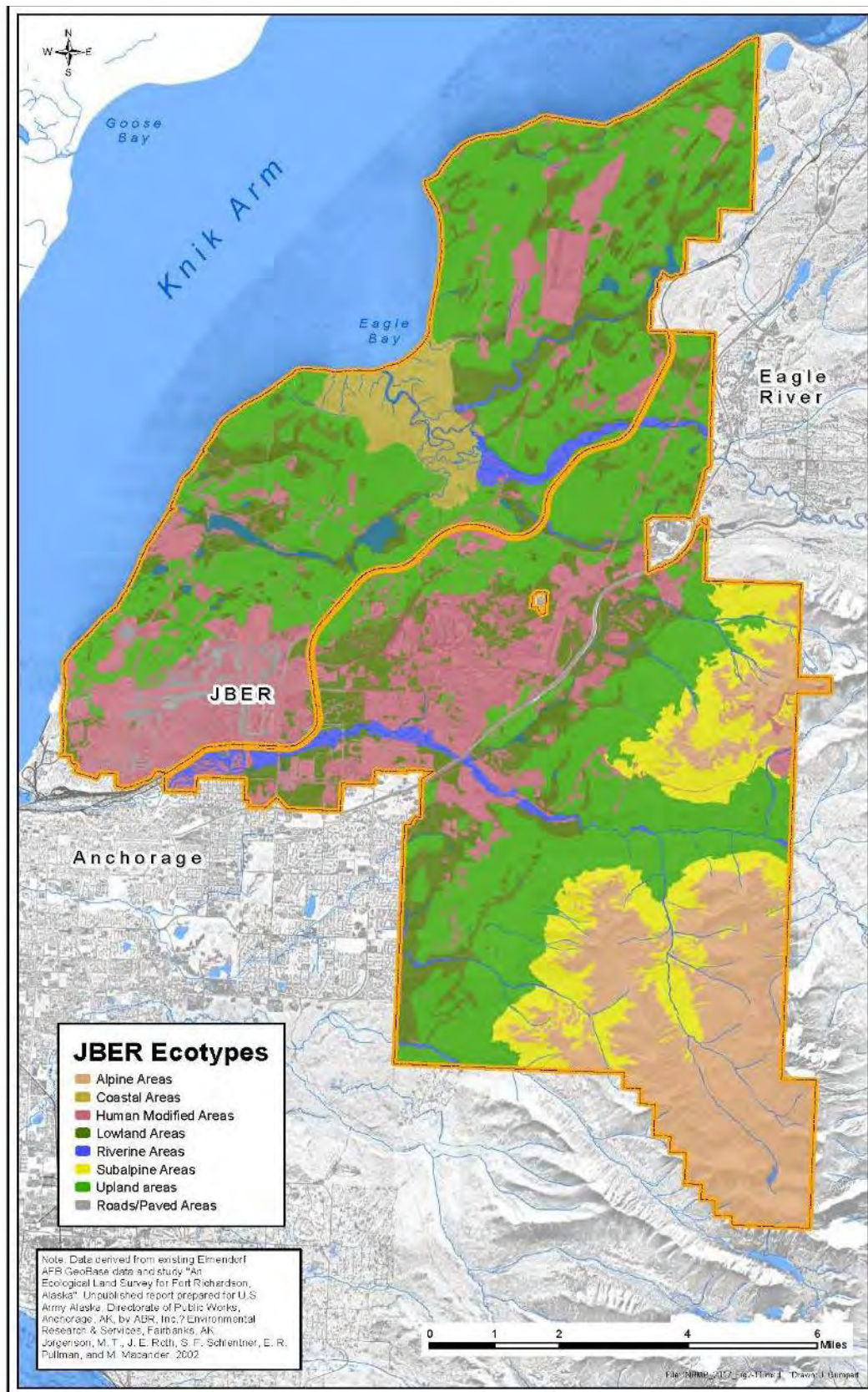


Figure 2-14. Map of ecotypes within Joint Base Elmendorf-Richardson

Vegetative Communities

A vegetation classification completed for JBER in 2022 identified 52 unique vegetative communities throughout the installation. The 5 most common, in order of dominance, are the Paper Birch–Resin Birch Southern Forest Association, Paper Birch–Resin Birch–White Spruce Forest Alliance, Paper Birch–Resin Birch–White Spruce Woodland Alliance, Sitka Alder (*A. viridis* ssp. *sinuata*) Shrubland Alliance, and the White Spruce–Black Spruce Forest Alliance (Center for Environmental Management of Military Lands at Colorado State University [CEMML] 2022). Descriptions of these communities and the most commonly found species, along with their associated Alaska Vegetation Classification title, are listed below. The primary vegetation types are also depicted in [Figure 2-15](#).

Paper Birch–Resin Birch Southern Forest Association (Closed Paper Birch Forest)

This vegetative community encompasses 14.17% of JBER and is commonly found on flat to moderate slopes in areas with well- to moderately well-drained soils. These areas are dominated by paper birch and resin birch, which often hybridize and create a dense canopy with coverage ranging from 75 to 100%. The understory of these communities often include 5- to 10-foot tall white and black spruce stands that are limited by the lack of sunlight. Shrubs often include green alder, bearberry (*Arctostaphylos uva-ursi*), and bunchberry dogwood. Common forbs and grasses include yarrow (*Achillea millefolium*), red baneberry (*Actaea rubra*), and Canada bluejoint grass. When unmanaged, this community often transitions into the Paper Birch–Resin Birch–White Spruce Forest Alliance.

Paper Birch–Resin Birch–White Spruce Forest Alliance (Closed Spruce–Paper Birch Forest)

This community encompasses 10.42% of JBER and occurs on moderate slopes with well- to moderately well-drained soils. The canopy cover is dominated by paper and resin birch, with 10 to 25% white spruce coverage, which makes it distinct from the previous community type. The shrubs, forbs, and grasses of this type are similar to the previous community, although green alder, bearberry, and balsam poplar are more prominent in disturbed areas.

Paper Birch–Resin Birch–White Spruce Woodland Alliance (Open Spruce–Paper Birch Forest)

This community encompasses 10.29% of JBER and occurs in upland areas with poorly drained soils. This type is characterized by a mix of birch and spruce with a 25 to 60% canopy cover, allowing shrubs and grasses to become more dominant in the understory. Green alder often becomes dominant in areas with lower canopy density, and areas that are regularly flooded are often dominated by Canada bluejoint grass. This classification also includes training areas where forests have been cleared into rows to support mission activities.

Sitka Alder Shrubland Alliance (Open Tall Alder Shrub)

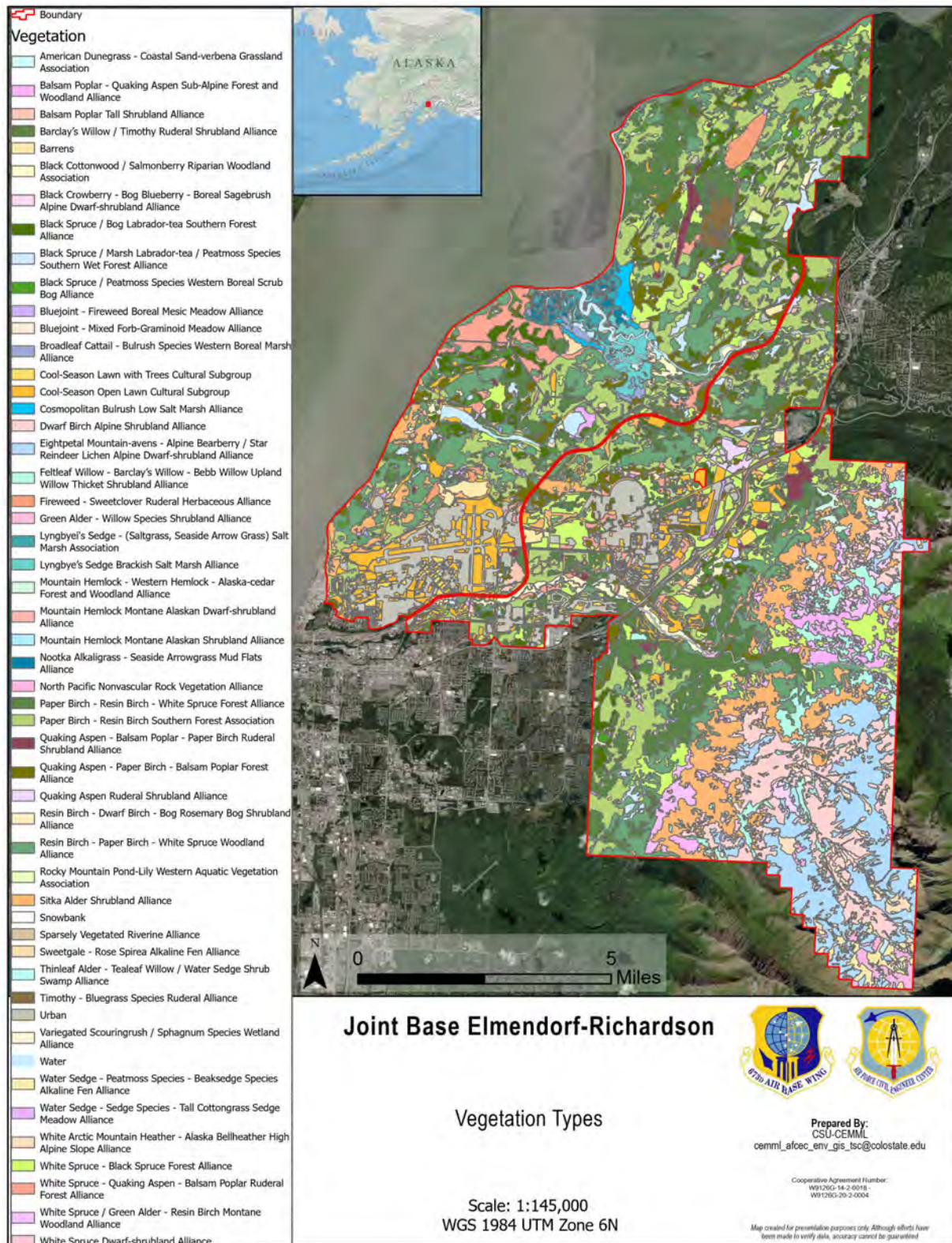
This community encompasses 7.37% of JBER and occurs primarily on steep or exposed slopes that experience regular landslides or heavy disturbances that inhibit trees growth. This type is typically composed exclusively of dense thickets of Sitka alder and Siberian alder (*A. viridis* ssp. *fruticosa*) that transition to a more open scrubland as the elevation increases into alpine. As the community approaches the tree line, scattered trees become more common, reaching up to a 25% cover of white spruce, balsam poplar, and quaking aspen. The understory is generally sparse due to the limited sunlight under the shrubs, but additional species can include resin birch, red birch (*Betula occidentalis*), paper birch, and creeping dogwood. This community is also common throughout southwestern Alaska, the Alaska Peninsula, Kodiak Island, and the Aleutian Islands.

1622 White Spruce–Black Spruce Forest Alliance (Closed White Spruce Forest)

1623 This community encompasses 5.86% of JBER and occurs on well-drained, lowland areas with productive
 1624 soils. It is characterized by a densely packed (60 to 100%) canopy cover of white spruce, with anywhere
 1625 from 0 to 30% canopy cover of black spruce. The understory is typically composed of mountain alder
 1626 (*Alnus incana* ssp. *tenuifolia*), bearberry, and red birch. Forbs and grasses include yarrow, Canada bluejoint
 1627 grass, and fireweed. This alliance is often found in plantation areas that are no longer actively managed and
 1628 have since begun to transition into a natural forest.

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1630

1631 Figure 2-15. Map of vegetation classifications within Joint Base Elmendorf-Richardson

2.3.2.3 Future Vegetation Cover

If recent temperature and precipitation trends continue in the region, it will likely favor shrub species such as birch, willow, and alder, and these shrubs will likely expand into the boreal and tundra communities that are highly adapted to cold winters and short summers. Abnormally warm temperature increase the thawing of tundra permafrost and the frequency of wildland fires, the latter which may be further exacerbated by the shrubification of these areas. Abnormally warm temperatures also increase soil decomposition, resulting in reduced plant productivity in drier areas. More variable and extreme precipitation could pair with increasing soil decomposition to increase erosion throughout all of the primary ecosystems, resulting in more changes to vegetation composition and boundaries, especially in downstream and riparian ecosystems (Myers-Smith et al. 2011). Changing conditions could open niches for invasive species to expand onto the installation.

Alternatively, continued increases in growing degree days (average annual accumulated growing degree days with base temperature range of 50 °F to 80 °F) could strengthen vegetation throughout some of JBER's ecosystems. The impacts will depend on the vegetation's ability to adapt to the shorter-term changes in temperature and precipitation (Table 2-4). Regular surveys to monitor changes and proactive management based on projected and observed patterns will be important tools to support natural resources through these changes.

Tree growth studies conducted by the University of Alaska Fairbanks have identified the effects of shifts in temperature and precipitation patterns on forest health. These studies have found that normal cycles of forest growth changed in the early to mid-1970s and continued to experience increased stressors since then. Spruce beetle (*Dendroctonus rufipennis*) infestation rates and impacts have increased in Alaska since the 1990s, likely due to the warmer-than-average summers and shifting forest conditions. Infestation spread and persistence has resulted in widespread loss of spruce trees with a larger than 9-inch diameter at breast height (DBH) in certain areas of the state. These infestations reduce forest diversity and increase fuel loading, which substantially increases forest fire danger in affected areas (University of Alaska Fairbanks 2017). Heightened monitoring throughout JBER and the state in 2018 revealed that spruce beetles have been maturing in approximately 1 year, instead of the customary 2-year cycle. Weather conditions from 2014 to 2017 are likely to have greatly contributed to the outbreak.

Much of JBER is old-growth boreal forest or recovering disturbed sites dominated by alder and blue joint grass. The regionwide beetle infestation of the 1990s and subsequent salvage logging of dead spruce trees resulted in further blue joint grass dominance. Significant patterns of range expansion by tall woody shrubs into dwarf and low alpine habitats have also been mapped on JBER (Rinas et al. 2017) in response to thermal shifts on alpine slope not otherwise colonized by tall shrub species such as alder and typically low-elevation willows. Similar observations during field reconnaissance in 2017 showed green alder on south-facing slopes as high up as 2,720 feet, white spruce and paper birch seedlings as high up as 2,887 feet, and Barclay's willow (*Salix barclayi*) and tealeaf willow, which are dominant species at subalpine elevations (Collet 2010), as high up as 3,150 feet.

2.3.2.4 Turf and Landscaped Areas

There are about 11,000 acres of developed land in the cantonment areas that are managed as turf or landscaped areas, which are depicted as the Cool-Season Lawn with Trees Cultural Subgroup in Figure 2-15. These include housing areas, golf courses, and areas around the runway. Most of these areas consist of mowed red fescue (*Festuca rubra*), tufted hairgrass (*Deschampsia cespitosa*), and Canada bluejoint grass. Trees that are planted or can become established in these areas include white spruce, paper birch, black cottonwood, and diamondleaf willow. Additional species that can be found within and on the border

of maintained areas include yarrow, field horsetail (*Equisetum arvense*), and fireweed (CEMML 2022). Outside of these areas, turf and landscape maintenance occurs as required for mission activities. Turf and urban forest management is further described in [Section 7.7](#).

2.3.3 Fish and Wildlife

Most indigenous species to Southcentral Alaska can be found on JBER, and the species confirmed on the installation are listed in [Appendix J](#). The following subsections detail the most prominent species that have been identified on the installation. Threatened and endangered (T&E) species, marine mammals, and species of special concern that use habitat on the installation are described in [Section 2.3.4](#). Invasive and pest species are listed and described in [Section 7.11](#).

2.3.3.1 Fish

Pacific Salmon

According to the Alaska Department of Fish and Game (ADF&G) Anadromous Waters Catalog, JBER hosts all 5 Pacific salmon (*Oncorhynchus* spp.) species found in North America, which return to JBER waterbodies to spawn. [Table 2-6](#) depicts the waterbodies that Pacific salmon use on JBER, as identified in the Anadromous Waters Catalog. The presence of Pacific salmon and other species within each waterbody is further described below.

Table 2-6. Salmonid species in Joint Base Elmendorf-Richardson waters

Joint Base Elmendorf-Richardson Waterbody	Chinook	Sockeye	Coho	Chum	Pink
Campbell Creek	X	X	X	—	—
Chester Creek	—	X	X	—	—
Eagle River	X	X	X	X	X
EOD Creek	—	—	X	—	—
Jerry's Creek	—	—	X	X	—
Otter Creek	X	X	X	X	—
Otter Lake	X	X	X	—	—
Ship Creek	X	X	X	X	X
Sixmile Creek	X	X	X	X	X
Sixmile Lakes	X	X	X	X	X

Ship Creek

Ship Creek has enhanced runs of Chinook (*Oncorhynchus tshawytscha*) and coho (*Oncorhynchus kisutch*) salmon, with natural returns of chum (*Oncorhynchus keta*), pink salmon (*Oncorhynchus gorbuscha*), and small numbers of sockeye (*Oncorhynchus nerka*). Ship Creek is the only anadromous creek on JBER that runs through developed lands on base, and as a result, soil erosion is a continuous problem. The dam at the William Jack Hernandez Sport Fish Hatchery, located just below where the stream continues off JBER property, prevents most (but not all) salmon from moving upstream. Historically, there have been undocumented accounts of small numbers of Chinook and coho salmon passing this dam. A second concrete dam, located at the decommissioned ADF&G hatchery on JBER-R, was removed in January 2015 to prevent public safety issues caused by ice damming. ADF&G fishery enhancement programs for coho and Chinook salmon have resulted in increased numbers of fish returns to lower Ship Creek. Upstream of the

Moose Run Golf Course, fish species are limited to small rainbow trout (*Oncorhynchus mykiss*), Dolly Varden (*Salvelinus malma*), and slimy sculpin (*Cottus cognatus*). Upstream activities in the Chugach State Park and JBER-R are critical to the health of this ecosystem. Discussions concerning possible removal/modification of dams have taken place. The issue was resolved in 2009, when the lease agreement for land expansion of the ADF&G William Jack Hernandez Sport Fish Hatchery on JBER cited potential human-wildlife conflicts, mission risks (BASH), and facility-maintenance risks associated with additional modification of the dams.

Jerry's Creek

Jerry's Creek is a small tributary of Ship Creek, extending approximately 0.6 miles through the Eagleleglen Fitness Park. Jerry's Creek flows into Ship Creek downstream of the dam and the ADF&G William Jack Hernandez Sport Fish Hatchery collection weir. This creek supports spawning and rearing habitat for coho and chum salmon.

Sixmile Lakes

The Sixmile system includes Upper and Lower Sixmile lakes and Sixmile Creek and is managed as a single system. This anadromous system flows into Knik Arm, supporting natural runs of sockeye, pink, chum, and coho salmon, three-spine stickleback (*Gasterosteus aculeatus*), Dolly Varden, and stocked populations of rainbow trout. Rearing juvenile Chinook salmon were also documented in the early 2000s but have not been identified since 2009. ADF&G regularly stocks Upper Sixmile Lake with rainbow trout for recreational sport fishing.

Sixmile Creek

Sockeye, coho and other salmon species have been enumerated at the Sixmile Creek fish weir annually since 1988. In 1998, the weir location was moved to the outlet of Lower Sixmile Lake. Stream walks along Sixmile Creek have been conducted to enumerate pink and chum salmon. Salmon smolt from the Sixmile Lake system have been monitored periodically since 2003 and annually since 2012, using a modified weir with a live box at the outlet of Lower Sixmile Lake. The coho run is small, with typically fewer than 200 fish annually. Adult sockeye begin returning in late July and are present through the end of October, with the other species returning between July and September. Since the beginning of weir operation in 1988, documented adult sockeye escapement has ranged between 317 and 4,768, with a long-term average (1998 to 2022) of 1,809.

EOD Creek

EOD Creek, north of Sixmile Creek, has a very small population of coho salmon, but the extent and viability of this population remains low due to the poor available habitat and a culvert that the ADF&G identified as a barrier to fish passage. Coho salmon smolt were first observed in EOD Creek during a wildlife survey in 1983 (Rothe et al. 1983) and again during a 2015 sampling effort (Schoofs and Zonneville 2016).

Eagle River

Eagle River supports all 5 Pacific salmon species found in North America. The approximate run timings are estimated using sonar project data and are subject to annual variability. A review of the daily escapement over several years indicates that the adult salmon run in Eagle River typically begins in late May, with modest escapement spikes during June and early July. Historically, the bulk of the escapement occurs from mid-July through late August. The adult salmon runs steadily decrease from mid- to late August through September and typically terminate by early October. However, peak escapement varies considerably by

year. Chinook salmon are the first and least abundant salmon to return to Eagle River each year. The start of the Chinook run is unknown, but it is usually over by early July. Sockeye are the second species to return, with run timing from early July until the end of August. The chum and pink salmon run timing begins at the end of July, with the pink salmon run complete by the end of August and the chum run ending in the first part of September. Coho salmon return to Eagle River around the end of July and the run continues through September. In 2021, a large number of smaller fish (<10-inch lengths) were recorded on the sonars passing upstream in early May. It is hypothesized that these fish were eulachon (*Thaleichthys pacificus*).

Otter Creek and Otter Lake

Otter Creek connects Otter Lake to Eagle River and Knik Arm. Juvenile salmonids appear to use much of this creek, including the tidally influenced reaches, as a rearing area. There is evidence of juvenile coho presence in the lake from as early as 1978 and of spawning sockeye in 1982, despite the presence of a spillway. In 2010, JBER and ADF&G initiated an Otter Lake/Creek restoration project. This project involved rotenone (pesticide) application in Otter Lake/Creek waters to remove northern pike (*Esox lucius*), an invasive fish to Southcentral Alaska; removal of obstructions to salmon passage; enhancement of spawning habitat; and reintroduction of salmon into the system. Baseline data were collected in 2011 to 2012. In 2015, before the lake was treated with rotenone, several adult coho salmon were spotted in the lake. Sockeye, coho, and chum salmon have been observed spawning within Otter Creek. Since the rotenone and restoration effort, adult coho and sockeye have been documented reaching and spawning in Otter Lake ([Section 7.11](#)). Juvenile coho have also been documented rearing in both the lake and creek. In 2022, Chinook salmon were documented entering Otter Lake by the video weir at the lake outlet.

Chester Creek

US Army Garrison, Alaska, partnered with the US Geological Survey in 2003 and 2004 to survey water quality and fisheries habitat in upper Chester Creek. A total of 877 fish, representing 4 species, were captured during the study. Of this total, 54% were Dolly Varden, 35% were slimy sculpin, 10% were rearing coho salmon, and 2% were rainbow trout. Additional foot surveys of the creek found 80 adult coho salmon spawning in the upper reaches. In 2015 and 2016 stream surveys, CEMML documented 390 fish within the surveyed reaches. Of this total, 67% were Dolly Varden, 23% were coho salmon, 10% were slimy sculpin, and fewer than 1% were rainbow trout (Schoofs and Zonneville 2016, Johnson et al. 2022)

JBER personnel have periodically conducted annual stream walk surveys of adult coho salmon in South Fork Chester Creek on JBER lands to determine the timing and relative abundance of these fish and delineate important spawning areas along the stream. During summer 2007, stream walks on the South Fork Chester Creek were conducted in tandem with the collection of brown bear (*Ursus arctos*) hair samples for the population estimation component of a brown bear telemetry project. In summers 2014 and 2015, JBER investigated the number of out-migrating smolts from lower section of the South Fork Chester Creek. During the 2016 stream walks, 8 sockeye were observed in Chester Creek for the first time. Currently, stream walks on Chester Creek are not conducted due to human–wildlife safety concerns.

Campbell Creek

North Fork Campbell Creek is closed to salmon fishing on JBER. Adults and smolts of 4 species of salmon (Chinook, sockeye, coho, and pink) and Dolly Varden have been recorded within the JBER boundary. JBER personnel have periodically conducted annual stream walk surveys along North Fork Campbell Creek on JBER to determine timing and abundance of spawning salmon, including delineation of important spawning areas along the stream. Surveys started at the footbridge on Bulldog Trail and proceeded upstream for approximately 100 yards past the last observed salmon and downstream to the installation boundary.

Currently, stream walks on North Fork Campbell Creek are not conducted for human–wildlife safety concerns. ADF&G monitors the trend in salmon populations on North Fork Campbell Creek.

Landlocked Salmon

Landlocked Chinook and coho salmon are regularly stocked by ADF&G in many of the JBER lakes. Stocking records are archived and available to the public on ADF&G’s Sport Fish website (ADF&G 2025).

Trout, Char, and Dolly Varden

Rainbow trout are found in 12 JBER lakes, either as naturally occurring populations or stocked by the ADF&G Sport Fish program. Most stocked fish are believed to be caught during their first summer in the lakes, but those that survive beyond that can reach substantial size after several years. The Sixmile Lake system has a trout fishery; however, non-fertile triploid rainbows are stocked in Upper Sixmile Lake. Lake trout (*Salvelinus namaycush*) were stocked in Clunie Lake from 1999 to 2001, and ADF&G began stocking again in 2021. Arctic char (*Salvelinus alpinus*) are also stocked in many JBER lakes. A small population of rainbow trout and Dolly Varden are present in Ship Creek. Rainbow trout and Dolly Varden are also found in Sixmile Lake, Eagle River and its tributaries, Otter Lake and Creek, Campbell Creek, and Chester Creek.

Prior to joint-basing, both EAFB and FRA had fish hatcheries on Ship Creek that were operated through the joint efforts of ADF&G and both installations. These hatcheries produced fish for stocking lakes in the Anchorage Bowl area, including the 2 installations. The hatcheries were designed to use heated water from each installation’s power plant, but both power plants were decommissioned between 2002 and 2005. The new hatchery, the William Jack Hernandez Sport Fish Hatchery, which replaced the Elmendorf Hatchery, was operational in 2011. Subject to the terms of the lease agreement and JBER mission requirements, JBER will continue to lease the land at the hatchery site to ADF&G.

Other Fish and Macroinvertebrates

The three-spine stickleback is common in most JBER lakes and streams and is a major source of food for rainbow trout, as well as grebes (*Podiceps* spp.), loons (*Gavia* spp.), and other fish-eating birds. Slimy sculpin and nine-spine stickleback (*Pungitius pungitius*) also occur in JBER lakes and streams. Historically, Arctic grayling (*Thymallus arcticus*) fry were stocked in Sixmile Lake; however, they did not survive.

Surveys of the tidally influenced portions of Eagle River and its tributaries within ERF have documented all 5 species of Pacific salmon, rainbow trout, Dolly Varden, three-spine stickleback, slimy sculpin, starry flounder (*Platichthys stellatus*), nine-spine stickleback, Pacific staghorn sculpin (*Leptocottus armatus*), saffron cod (*Eleginus gracilis*), eulachon, snailfish (*Careproctus* spp.), longfin smelt (*Spirinchus thaleichthys*), walleye pollock (*Theragra chalcogramma*), snake prickpleback (*Lumpenus sagitta*), Pacific herring (*Clupea pallasii*), Bering cisco (*Coregonus laurettae*), polychaete worms (*Polychaeta* spp.), and sand shrimp (*Crangon* spp.).

2.3.3.2 Birds

Many nesting and migrant bird species have been identified throughout JBER, most of which are protected under the Migratory Bird Treaty Act (MBTA) and other federal and state regulations. Protected birds are further described in [Section 2.3.4.3](#), and their management is discussed in [Section 7.4.5](#).

Eagles

Bald Eagles (*Haliaeetus leucocephalus*) are year-round residents of JBER, with the highest numbers and visibility occurring between May and October. The eagles make heavy use of lakes, streams, and coastal

areas during the summer to feed on fish and the Ship Creek drainage in the winter to feed on ducks. Eagles concentrate around the Anchorage landfill, directly adjacent to JBER, in the winter. Annually, 15 to 17 pairs nest on or adjacent to JBER, and of the 47 nests identified in 2023, at least 18 were active. Of these active nests, only 33% were successful. Persistent eagle presence on the installation presents consistent challenges to the BASH program and mission activities, which creates the need for routine surveys and management to limit potential conflicts.

Golden Eagles (*Aquila chrysaetos*) are often sighted in the alpine and subalpine zones of JBER, although only a single inactive nest has been recorded in Snowhawk Valley (on 16 August 2021). [Figure 7-4](#) shows known Bald and Golden Eagle nest locations. Bald and Golden Eagles and their nests are federally protected under the Bald and Golden Eagle Protection Act (BGEPA; 16 USC § 668-668c), as well as state law.

Ospreys

Ospreys (*Pandion haliaetus*) are uncommon on JBER, but a pair regularly nests on the installation's communication towers near Lower Sixmile Lake.

Loons and Grebes

The Red-necked Grebe (*Podiceps grisegena*) is the most common grebe that nests on JBER lakes. The Horned Grebe (*Podiceps auritus*) is a species of special concern that migrates through the installation. Two species of loons, the Common Loon (*Gavia immer*) and Pacific Loon (*Gavia pacifica*), successfully nest on 6 lakes on the installation (Otter, Clunie, Green, Upper Sixmile, Lower Sixmile, and Oval lakes). Typically, 5 pairs of Common Loon and a pair of Pacific Loon use these lakes. The Red-throated Loon (*Gavia stellata*) is a species of special concern that migrates through the area.

Ducks

Mallards (*Anas platyrhynchos*) and Ring-necked Ducks (*Aythya collaris*) are common nesting species on JBER. Some mallards spend the winter on JBER in open water seeps, ponds, and streamlets associated with Ship Creek and the Upper/Lower Sixmile Lake culvert. Breeding populations of American Wigeon (*Mareca americana*), Pintail (*Anas acuta*), Barrow's Goldeneye (*Bucephala islandica*), and Green-winged Teal (*Anas carolinensis*) have also been recorded.

Geese and Swans

Canada Geese (*Branta canadensis*) were once common on JBER-E, particularly during the spring and fall migration seasons. Recently, fewer Canada Geese have been seen, and nesting pairs are rarely found, as a result of an aggressive BASH program ([Section 7.12](#)). Snow Geese (*Chen caerulescens*), Cackling Geese (*Branta hutchinsii*), and Lesser White-fronted Geese (*Anser erythropus*) are uncommon but seen occasionally. Trumpeter Swans (*Cygnus buccinator*) nest regularly at Otter Lake and Sixmile Lake. Tundra Swans (*Cygnus columbianus*) migrate through the area and occasionally stage on ERF, Otter Lake, and Upper and Lower Sixmile lakes.

Shorebirds

Shorebirds are abundant on JBER lakes, wetland complexes, and ERF. The most abundant species include Greater Yellowlegs (*Tringa melanoleuca*), Lesser Yellowlegs (*Tringa flavipes*), and Wilson's Snipe (*Gallinago delicata*). The Lesser Yellowlegs and Solitary Sandpipers (*Tringa solitaria*) are species of special concern that nest on JBER. Whimbrels (*Numenius phaeopus*) and Hudsonian Godwits (*Limosa haemastica*) are regional birds of conservation concern that nest in low numbers on JBER. Spotted

1869 Sandpipers (*Actitis macularia*) and Semi-palmated Plovers (*Charadrius semipalmatus*) are common.
 1870 Sandhill Cranes (*Grus canadensis*) nest on ERF and have been regularly seen in JBER bogs and fens.

1871 **Gulls and Terns**

1872 Gulls and terns include Mew Gulls (*Larus canus*), Herring Gulls (*Larus argentatus*), Bonaparte's Gulls
 1873 (*Larus philadelphia*), and Arctic Terns (*Sterna paradisaea*). The latter 3 species are common nesters on
 1874 JBER. Gulls are commonly found along the saltwater shoreline in the summer, as well as on the airfield
 1875 and golf courses. Herring Gulls frequently travel during summer nesting periods between the Municipal
 1876 landfill near Eagle River east of JBER to the mouth of Ship Creek or nesting areas in the industrial zone
 1877 along Ship Creek. That path takes them over the southern end of runway 16/34, making them a serious
 1878 BASH risk ([Section 7.12](#)).

1879 **Hawks and Falcons**

1880 Hawks nesting on JBER include the Northern Harrier (*Circus cyaneus*), Red-tailed Hawk (*Buteo*
 1881 *jamaicensis*), Sharp-shinned Hawk (*Accipiter striatus*), Merlin (*Falco columbarius*), and American
 1882 Goshawk (formerly, Northern Goshawk, *Astur atricapillus*). Rough-legged Hawks (*Buteo lagopus*) are
 1883 commonly seen during migration. Peregrine Falcons (*Falco peregrinus*) and Gyrfalcons (*Falco rusticolus*)
 1884 are infrequent migrants.

1885 **Owls**

1886 Owl surveys conducted on JBER typically detect Great Horned Owls (*Bubo virginianus*), Northern Saw-
 1887 whet Owls (*Aegolius acadicus*), Boreal Owls (*Aegolius funereus*), and Great Gray Owls (*Strix nebulosa*).
 1888 Short-eared Owls (*Asio flammeus*) are frequently observed during migration periods, especially near
 1889 airfields and drop zones.

1890 **Grouse and Ptarmigan**

1891 Spruce Grouse (*Canachites canadensis*) are common nesters and remain in good numbers, despite the heavy
 1892 mortality of mature spruce trees, an important winter food source for this species. Ruffed Grouse (*Bonasa*
 1893 *umbellus*) have been documented on JBER but not in substantial numbers. Willow Ptarmigan (*Lagopus*
 1894 *lagopus*) are residents of the alpine and subalpine on JBER and are winter visitors to lowland shrub habitat.
 1895 Rock Ptarmigan (*Lagopus mutus*) and White-tailed Ptarmigan (*Lagopus leucurus*) are residents of rocky
 1896 outcroppings in the alpine.

1897 **Passerines and Other Birds**

1898 Approximately 40 species of passerines and neotropical birds are common nesters on JBER. Common
 1899 nesting passerines in the installation's forest habitat include the Swainson's Thrush (*Catharus ustulatus*),
 1900 American Robin (*Turdus migratorius*), Yellow-rumped Warbler (*Dendroica coronata*), Dark-eyed Junco
 1901 (*Junco hyemalis*), Alder Flycatcher (*Empidonax alnorum*), and Ruby-crowned Kinglet (*Regulus*
 1902 *calendula*). In more open shrub and developed habitats, American Robins, Dark-eyed Juncos, Lincoln's
 1903 Sparrows (*Melospiza lincolni*), and Common Redpolls (*Carduelis flammea*) are the most common nesters.
 1904 Townsend's Warblers (*Dendroica townsendi*) are commonly heard on JBER's mountain slopes. The
 1905 Blackpoll Warbler (*Setophaga striata*), Olive-sided Flycatcher (*Contopus cooperi*), and Rusty Blackbird
 1906 (*Euphagus carolinus*) are species of special concern known to breed on JBER wetlands. Bird surveys
 1907 conducted in the Snowhawk and Chester Creek alpine training areas have identified Savannah Sparrows
 1908 (*Passerculus sandwichensis*), Wilson's Warblers (*Cardellina pusilla*), and Golden-crowned Sparrows
 1909 (*Zonotrichia atricapilla*) as the most common species near alpine wetlands (McDuffie and Johnson 2019).

1910 Winter residents on JBER include Common Ravens (*Corvus corax*), Steller's Jays (*Cyanocitta stelleri*),
 1911 Boreal (*Poecile hudsonicus*) and Black-capped Chickadees (*Poecile atricapillus*), Black-billed Magpies
 1912 (*Pica hudsonia*), Canada Jays (*Perisoreus canadensis*), Bohemian Waxwings (*Bombycilla garrulus*), and
 1913 Common Redpolls.

1914 2.3.3.3 Mammals

1915 Small Mammals

1916 Small mammals that have been found on JBER include the snowshoe hare (*Lepus americanus*), porcupine
 1917 (*Erethizon dorsatum*), collared pika (*Ochotona collaris*), northern redback vole (*Myodes rutilus*), meadow
 1918 vole (*Microtus pennsylvanicus*), tundra vole (*Microtus oeconomus*), singing vole (*Microtus miurus*),
 1919 meadow jumping mouse (*Zapus hudsonius*), house mouse (*Mus musculus*; nonnative), common shrew
 1920 (*Sorex cinereus*), tundra shrew (*Sorex tundrensis*), montane shrew (*Sorex monticolus*), pygmy shrew (*Sorex*
 1921 *hoyi*), northern water shrew (*Sorex palustris*), little brown bat (*Myotis lucifugus*), and northern flying
 1922 squirrel (*Glaucomys sabrinus*).

1923 Furbearers

1924 Furbearers found on JBER include beaver, river otter (*Lontra canadensis*), muskrat (*Ondatra zibethicus*),
 1925 ermine or short-tailed weasel (*Mustela erminea*), arctic ground squirrel (*Spermophilus parryi*), hoary
 1926 marmot (*Marmota caligata*), red squirrel (*Tamiasciurus hudsonicus*), red fox (*Vulpes vulpes*), coyote
 1927 (*Canis latrans*), gray wolf (*Canis lupus*), Canada lynx (*Lynx canadensis*), mink (*Mustela vison*), American
 1928 marten (*Martes americana*), and wolverine (*Gulo gulo*).

1929 Red fox are relatively common, including in cantonment areas. Beavers are found in most waterbodies on
 1930 the installation. Muskrats and river otter are occasionally sighted in the Sixmile Lake system, Otter Lake,
 1931 Hillberg Lake, Green Lake, Eagle River, and Ship Creek ponds. Although American marten and wolverines
 1932 are more common near the Chugach Mountains, they have been documented utilizing areas of the base all
 1933 the way to the coast.

1934 JBER previously supported 2 distinct wolf packs. The North Post pack primarily occupied the region north
 1935 of Eagle River, and the Ship Creek pack was concentrated in the southern portion of the installation. As of
 1936 2024, only the Ship Creek pack remains. Understanding wolf populations and their dynamics in the JBER
 1937 management area is important because the wolves from these packs were previously deemed a risk to public
 1938 safety ([Section 7.1.3](#)). Additionally, wolves serve an important role in maintaining a healthy ecosystem and
 1939 natural training environment for warfighter readiness. Although it is difficult to determine the total number
 1940 of wolves on JBER using traditional wildlife surveys, an ongoing collaborative project between ADF&G
 1941 and JBER is attempting to estimate wolf demographics (abundance, survival dispersal rates, etc.) and
 1942 movements throughout JBER and surrounding habitats (Saalfeld et al. 2023).

1943 Canada lynx are found throughout the JBER management area, with numbers peaking every 8 to 10 years.
 1944 Canada lynx populations have been well studied in other parts of the US and Canada; however, little is
 1945 known about lynx populations in urban areas and throughout Alaska. Currently, ADF&G and JBER
 1946 personnel are collaborating on a project to estimate home range, movement patterns, and habitat selection
 1947 of radio-collared Canada lynx on the installation and in surrounding habitats as lynx populations oscillate
 1948 over the 8- to 10-year cycle.

1949 Wolverines are also useful indicators of ecosystem health, although they have a relatively low survival rate
 1950 due to human harvesting and wolf predation. Wolverine are present across the JBER management area but
 1951 are rarely seen due to their elusive nature and expansive home ranges. Through an ongoing collaborative

project, ADF&G and JBER are attempting to estimate wolverine demographics, habitat selection, and movements on JBER and the surrounding habitats (Saalfeld 2023).

Bears

Game Management Unit (GMU) 14C has a healthy population of brown and black bears (ADF&G 2022). The number of black bears on JBER, which generally have smaller home ranges, does not fluctuate throughout the year as much as the numbers of other animals such as wolverines that have comparably larger home ranges. Brown bear numbers are highest during mid- to late summer, when salmon runs attract them from inland areas (Farley et al. 2008). Numbers of both bear species are likely lowest in the fall, prior to denning, when some bears move to higher elevations to feed on berries.

Moose

Moose are the largest member of the deer family and are highly visible on JBER. Because of their size and the frequency with which they wander through housing areas, moose are often the first wildlife species that newly arrived personnel see. The number of moose found on JBER varies seasonally, as does their spatial distribution across the installation. JBER is included in aerial surveys conducted by ADF&G. In 2023, a total of 883 moose were observed in the greater GMU 14C area, with the overall bull to cow and calf to cow ratios slightly lower than those found during the 2021 survey (Spivey 2021). JBER is included with the Upper Ship Creek Valley count, which showed a noticeable drop in the calf to cow ratio. This is most likely due to the deep snow during winter 2022, which likely increased winter mortality and the late-winter energetic demands on pregnant cows.

Dall Sheep

Dall sheep (*Ovis dalli*) occur throughout the alpine and mountainous terrain on JBER. Several surveys in Snowhawk Valley have recorded Dall sheep on the installation.

Marine Mammals

Various marine mammals are frequently observed within and around Eagle Bay and Knik Arm, including the Cook Inlet beluga whale (CIBW; *Delphinapterus leucas*), harbor seal (*Phoca vitulina*), and harbor porpoise (*Phocoena phocoena*). These species are all protected under the Marine Mammal Protection Act (MMPA), as amended (16 USC § 1361 et seq.) and are further described in [Section 2.3.4.2](#).

Cook Inlet Beluga Whales

CIBWs are most prevalent (as indicated through passive acoustic monitoring) in Eagle Bay, adjacent to JBER, during the spring (June) and fall to early winter (August to December) but are present for at least a portion of every month of the year. CIBWs have been sighted within ERF as far as 2.6 miles (river distance) up Eagle River (Goetz et al. 2023). The CIBW distinct population segment (DPS) is listed as endangered under the Endangered Species Act (ESA). Detailed descriptions of CIBW presence on JBER (Eagle River) and its waters are provided in the 673 ABW (2020a) marine mammal monitoring protocol and results report.

Harbor Seals

Harbor seals are also commonly seen in Eagle Bay during the summer and fall salmon runs and are occasionally observed within Eagle River, as far upstream as Bravo Bridge and (at high tide) within Otter Creek. No more than 4 harbor seals have been observed in the Eagle River/Eagle Bay at any given time. Detailed descriptions of harbor seal presence on JBER (Eagle River) and its waters are provided in the 673 ABW (2020a) marine mammal monitoring protocol and results report.

1992 Harbor Porpoises

1993 Harbor porpoises are occasionally sighted and frequently acoustically detected in both Eagle River (up to
1994 2.6 miles upriver) and Eagle Bay, Knik Arm. Harbor porpoise appear to be the most prevalent in Eagle Bay
1995 during the early spring (March) and fall to early winter (August to December). Although only individual
1996 harbor porpoises have been observed in this area, it is possible that others were missed due to their cryptic
1997 nature and the turbidity of the water. Harbor porpoises are known to travel in small groups of up to 10
1998 animals across their range (Leatherwood et al. 1982), but in Knik Arm, the reported group sizes are 1 to 5
1999 animals (Shelden et al. 2014). Like the beluga, they appear to be present in Eagle Bay for at least a portion
2000 of each month except February. Detailed descriptions of harbor porpoise presence on JBER (Eagle River)
2001 and its waters are provided in the 673 ABW (2020a) marine mammal monitoring protocol and results report.

2002 Other Marine Mammals

2003 Steller sea lions (*Eumetopias jubatus*), fin whales (*Balaenoptera physalus*), gray whales (*Eschrichtius*
2004 *robustus*), humpback whales (*Megaptera novaeangliae*), and killer whales (*Orcinus orca*) are uncommon
2005 in Upper Cook Inlet and may make extremely rare forays into Knik Arm.

2006 **2.3.3.4 Amphibians**

2007 The wood frog (*Rana sylvatica*) is the only amphibian species occurring on JBER. The wood frog inhabits
2008 a variety of habitats including mixed forests, open meadows, muskeg, tundra, and even landscaped spaces
2009 in urban and suburban areas (ADF&G 2015). Wood frogs are highly terrestrial but they are found in water
2010 during breeding and early development. Alaska Pacific University conducted breeding, productivity, and
2011 abnormality surveys in 56 waterbodies on the installation from 2013 to 2015 and in 2017. The surveys
2012 detected wood frogs in approximately two-thirds of all waterbodies sampled across JBER, and the wood
2013 frog distribution, productivity, and abnormality results are provided in the Alaska Pacific University report
2014 (Dial et al. 2015).

2015 **2.3.3.5 Invertebrates**

2016 Invertebrate abundance and diversity are considered indicators of ecosystem health, as they are particularly
2017 sensitive to physical, chemical, and biological conditions. The most common orders of freshwater
2018 invertebrates on JBER include Ephemeroptera, Odonata, Plecoptera, Trichoptera, and Cladocera. The most
2019 common orders of terrestrial invertebrates include Hymenoptera, Diptera, Odonata, Lepidoptera, and
2020 Arachnida. The results of invertebrate surveys on JBER can be found in [Table 7-1](#).

2021 **2.3.3.6 Weather and Natural Hazard Impacts on Fish and Wildlife**

2022 Many of the species on JBER are adapted to colder conditions and are sensitive to abrupt or prolonged
2023 periods of elevated temperatures. Furthermore, many species time their hibernation and migration based on
2024 temperature, and any changes may create a mismatch between these movements and the availability of
2025 prey. Phenological shifts may have a larger impact on migratory birds, including Swainson's Thrush,
2026 American Robin, Yellow-rumped Warbler, Alder Flycatcher, Ruby-Crowned Kinglet, and White-crowned
2027 Sparrows.

2028 The most prominent impacts of recent environmental trends have been seen within the tundra ecosystems,
2029 which are home to large populations of Arctic ground squirrels, hoary marmots, and tundra shrews. As
2030 habitat quality declines, JBER wildlife may also face increasing competition from generalist, nonnative
2031 species, including Rock Doves (syn., pigeons, *Columba livia*), European Starlings (*Sturnus vulgaris*), house
2032 mice, and feral cats (*Felis catus*). For example, the number of annual growing degree days influences the

carrying capacity of the lower-elevation areas, shifting the balance of generalists and native species that already inhabit those areas. The stress of changing environmental conditions may also increase disease outbreak in JBER wildlife.

Early onset of ice breakup and spring thaw directly influence the emergence/migrations of aquatic organisms. Aquatic species often time their migration routes to match the release of nutrients caused by snowmelt, and altered conditions can cause mismatches between emergence/migration and the availability of food. Periods of high precipitation totals can increase aquatic habitats on the installation and surrounding area, but erosion may simultaneously increase the presence of pollutants and sediments in these environments. Additionally, summer heat waves can warm aquatic systems past the thresholds to which the local cold-water organisms are adapted while increasing the frequency and intensity of algal blooms. Such conditions are especially harmful to cold water-adapted species like rainbow trout, three-spine stickleback, nine-spine stickleback, and sculpins. Because Pacific salmon do not eat after mating at the end of their migration, they may be less impacted by these risks.

2.3.4 Threatened and Endangered Species and Species of Concern

JBER and the surrounding areas provide habitat for a wide variety of federally and state-recognized T&E species and other species of concern. Per DAFMAN 32-7003, Section 3.38.2, “INRMPs should provide for the protection and conservation of state-listed protected species when practicable and consistent with the military mission.” While JBER has confirmed habitat for only one protected species, the presence of other protected and migratory species on and around the installation may result in the need for additional management considerations in the future. Protected species and other species of concern are listed in the subsections below, and the most prominent applicable regulations are listed in [Section 7.1.1](#). Birds on JBER are also protected under the MBTA, and eagles are granted additional protection under the BGEPA.

2.3.4.1 Species Protected by the Endangered Species Act

The National Marine Fisheries Service (NMFS; also known as National Oceanic and Atmospheric Administration [NOAA] Fisheries) has identified 7 T&E species that occur or are suspected to occur in the nearby Upper Cook Inlet Project Area (NMFS 2010, US Fish and Wildlife Service [USFWS] 2010a). These are described below. The CIBW is the only resident T&E species that has been confirmed on JBER property. In addition to its protection under the ESA, the CIBW is protected under the MMPA ([Section 2.3.4.2](#)). The Steller’s Eider (*Polysticta stelleri*) has been observed on the installation but is a transient species with no nesting activity observed.

Table 2-7. Threatened, endangered, and candidate species suspected or recorded in the Upper Cook Inlet Project Area of Joint Base Elmendorf-Richardson (JBER)

Common Name	Scientific Name	Geographic Population Segment	Endangered Species Act Status	Location Description and Assessed Presence
Beluga whale	<i>Delphinapterus leucas</i>	Cook Inlet (Distinct Population Segment)	Endangered	Occupies Cook Inlet waters and waters of North Gulf of Alaska (NMFS 2008); close proximity to JBER is highly likely
Chinook salmon*	<i>Oncorhynchus tshawytscha</i>	Lower Columbia River	Threatened	These stocks range throughout the North Pacific.

Table 2-7. Threatened, endangered, and candidate species suspected or recorded in the Upper Cook Inlet Project Area of Joint Base Elmendorf-Richardson (JBER)

Common Name	Scientific Name	Geographic Population Segment	Endangered Species Act Status	Location Description and Assessed Presence
		Puget Sound Snake River (spring/summer)	Threatened	However, the specific occurrence of listed salmonids within close proximity to JBER is highly unlikely (NMFS 2011a).
		Snake River (fall)	Threatened	
		Upper Columbia River (spring)	Endangered	
		Upper Willamette River	Threatened	
Fin whale*	<i>Balaenoptera physalus</i>	Alaska stock	Endangered	Northeast Pacific (NMFS 2016a); close proximity to JBER is highly unlikely
Humpback whale	<i>Megaptera novaeangliae</i>	Western North Pacific (Distinct Population Segment) ^a Mexico (Distinct Population Segment)	Endangered	Potential occurrence in Gulf of Alaska (Wade 2021); close proximity to JBER is highly unlikely
Steelhead*	<i>Oncorhynchus mykiss</i>	Lower Columbia River	Threatened	These stocks range throughout the North Pacific. However, the specific occurrence of listed salmonids within close proximity to JBER is highly unlikely (NMFS 2011a).
		Middle Columbia River	Threatened	
		Snake River Basin	Threatened	
		Upper Columbia River	Threatened	
		Upper Willamette River	Threatened	
Steller's eider	<i>Polysticta stelleri</i>	N/A	Threatened	Occupies areas along the west and southwestern coast of Alaska; close proximity to JBER is highly unlikely
Steller sea lion*	<i>Eumetopias jubatus</i>	Western Alaska (Distinct Population Segment)	Endangered	Includes sea lions born on rookeries west of Cape Suckling (144 W. Longitude) (Helker et al. 2017); close proximity to JBER is highly unlikely

*May move onto or within close proximity to JBER but occur so infrequently that projects are expected to have no effect on them (USFWS 2010a, NMFS 2010)

2065 **Cook Inlet Beluga Whale**

2066 The CIBW is a small (adult female length up to 11.6 feet; adult male length up to 13.6 feet) whale in the
 2067 family Monodontidae. Belugas are also known as “white whales” because of the white coloration of the
 2068 adults. The beluga whale is a northern-hemisphere species, ranging primarily over the Arctic Ocean and
 2069 some adjoining seas where it inhabits fjords, estuaries, and shallow water in Arctic and subarctic oceans.
 2070 NOAA Fisheries provides a detailed description of the CIBW’s biology in its recovery plan (NMFS 2016b).

2071 Five distinct stocks of beluga whales are currently recognized in Alaska: the Beaufort Sea, eastern Chukchi
 2072 Sea, eastern Bering Sea, Bristol Bay, and Cook Inlet stocks. The Cook Inlet population is the smallest in
 2073 number and is genetically and geographically isolated from the other stocks; this DPS of beluga whales
 2074 does not migrate outside the waters of Cook Inlet. Systematic surveys of beluga whales in Cook Inlet
 2075 documented a decline in abundance of nearly 50% between 1994 and 1998, from an estimate of 653 whales
 2076 to 347 whales, respectively. This decline was mostly attributed to unregulated subsistence harvest (through
 2077 1998); however, even with restrictions on harvest, the population declined by 0.4% per year from 1999 to
 2078 2016. Annual aerial surveys were conducted from 1994 to 2012 and biennial aerial surveys were conducted
 2079 from 2014 to 2022. The 2020 survey was postponed until 2021 due to COVID-19, leading to consecutive
 2080 surveys in 2021 and 2022 (Goetz et al. 2023). The 2024 survey was canceled due to mechanical problems
 2081 with the survey plane. The 2025 aerial survey was conducted in June 2025, and future biannual surveys
 2082 will occur in odd years. Over the most recent 10-year time period (2012 to 2022), the estimated trend in
 2083 abundance is approximately +0.2/year.

2084 After receiving several petitions to list the CIBW population under the ESA, NMFS completed a Status
 2085 Review in November 2006, affirming that the CIBW is a DPS and is in danger of extinction throughout its
 2086 range. NMFS proposed listing the CIBW as endangered (72 Federal Register [FR] 19854, 20 April 2007)
 2087 and the CIBW were listed as endangered (73 FR 62919, 22 October 2008), which took effect on 22
 2088 December 2008. On 2 December 2009, NMFS proposed critical habitat (74 FR 63080) for the CIBW DPS,
 2089 which became final (76 FR 20180) and took effect on 11 May 2011. Two areas were designated as critical
 2090 habitat, comprising 3,013 square miles of marine waters. Critical habitat within Eagle Bay does not include
 2091 the ERF or other JBER lands between Mean Higher High Water and Mean High Water, as NMFS
 2092 determined that the INRMP provides sufficient benefit to the CIBW in these areas (76 FR 20180). This
 2093 exclusion is not permanent, however, and can be reversed if the INRMP fails to provide sufficient benefit
 2094 to this endangered population.

2095 The CIBW is frequently observed on or near the installation throughout the summer and is known to travel
 2096 as far as 2.5 miles into the ERF to prey on salmon. Recent JBER efforts restored anadromy to Otter Creek,
 2097 allowing salmon to access spawning reaches in Otter Lake, resulting in an increase in potential CIBW prey.
 2098 Salmonid access to Otter Lake had previously been blocked due to the inefficient culvert design and a large
 2099 beaver dam. These issues were addressed once Otter Lake was confirmed to be clear of invasive northern
 2100 pike. [Figure 2-16](#) shows the CIBW critical habitat area in the vicinity of JBER, along with CIBW habitat
 2101 that has been removed as critical habitat, per the requirements outlined in DAFMAN 32-7003, Section 3.41.
 2102 Per ESA requirements, the CIBW recovery plan was finalized in 2017 (82 FR 1325), which addresses
 2103 potential threats and identifies goals, criteria for down-listing and delisting, and actions aimed at recovery
 2104 of the species. [Section 7.4.2](#) details the monitoring, conservation, and management actions that are planned
 2105 and implemented by the installation.



2106

2107 Figure 2-16. Map of Cook Inlet beluga whale critical habitat in the vicinity of Joint Base Elmendorf-
2108 Richardson

2109 Steller's Eider

2110 Eiders are diving sea ducks that primarily inhabit coastal marine areas while traveling inland to breed. The
2111 Steller's Eider is a colorful bird with unique, iridescent blue wing patches and white lining. While other
2112 eiders are known to travel as far southeast as Maine, the Steller's Eider range is limited to the Alaska coast
2113 and the east coast of Russia. Of the 3 distinct breeding populations of Steller's Eiders, only one primarily
2114 nests in Alaska, on the Yukon-Kuskokwim Delta and the Arctic Coastal Plain. During the winter, almost
2115 all Steller's Eiders can be found in the Aleutian Islands, Alaskan Peninsula, and western Gulf of Alaska,
2116 including Lower Cook Inlet.

2117 The Alaska-breeding population of Steller's Eiders was first recognized as federally threatened in 1997,
2118 and critical habitat was established in 2001 due to the rapidly declining breeding populations in the Yukon-
2119 Kuskokwim Delta. As the Steller's eider is a migrant species on JBER, the installation has not identified
2120 any nesting or long-term habitat. JBER T&E management would benefit from additional surveys to
2121 determine the extent of Steller's Eider presence on the installation and assess the need for additional
2122 management or conservation actions (ADF&G 2024).

2123 2.3.4.2 Species Protected by Marine Mammal Protection Act

2124 In addition to the endangered CIBW, marine mammals that have been documented near JBER are the killer
2125 whale, fin whale (endangered), gray whale, humpback whale (North Pacific DPS—endangered; Mexico
2126 DPS—threatened; and the Hawaii DPS—delisted, which is the most likely population be sighted in the area
2127 [Wade 2021]), Steller sea lion (western population—endangered), harbor seal, and harbor porpoise. Of
2128 these species, only the CIBW and harbor seal are commonly observed near JBER, and the harbor porpoise,
2129 although rarely observed visually, is frequently detected acoustically in Eagle Bay and Eagle River. Forays
2130 into Knik Arm by the other species (killer whales, fin whales, gray whales, humpback whales, and Steller
2131 sea lions) are considered extremely rare; thus, these species will not be discussed further in this document.
2132 [Table 2-8](#) provides an overview of these species and notes on observations of their presence in Knik Arm.
2133 An overview of the MMPA is provided in [Section 7.1.1](#).

2134

Table 2-8. Upper Cook Inlet species protected by the Marine Mammal Protection Act observed in Knik Arm

Common Name	Scientific Name	Occurrence in Knik Arm	Notes
Cook Inlet beluga whale	<i>Delphinapterus leucas</i>	Frequent	Belugas have been detected in Knik Arm year-round (JBER unpublished data, Shelden et al. 2018), but are most frequently detected in Eagle Bay in June and August to December.
Fin whale	<i>Balaenoptera physalus</i>	Rare/Unlikely	In June 2016, a male fin whale (62 feet long) live-stranded north of Eagle Bay, where it subsequently died (JBER and National Marine Fisheries Service [NMFS] unpublished data).
Gray whale	<i>Eschrichtius robustus</i>	Rare/Unlikely	In September 2017, a live gray whale was observed in Eagle Bay by a team from NMFS. The whale was not observed again after that day (M. Migura, NMFS, personal communication, 2017).

Table 2-8. Upper Cook Inlet species protected by the Marine Mammal Protection Act observed in Knik Arm

Common Name	Scientific Name	Occurrence in Knik Arm	Notes
Harbor porpoise	<i>Phocoena phocoena</i>	Frequent	Since 2012, multiple harbor porpoise detections (visual or acoustic) per year have occurred in Eagle Bay. Harbor porpoises have been detected acoustically in Eagle Bay in every month except for February (JBER unpublished data).
Harbor seal	<i>Phoca vitulina</i>	Frequent	Annually, from May to October, harbor seals have been observed in Eagle Bay, but they are most frequently observed in August and September (JBER unpublished data).
Humpback whale	<i>Megaptera novaeangliae</i>	Rare/Unlikely	In September 2017, a male humpback whale (approximately 25 to 30 feet long) was observed floating dead in Eagle Bay (JBER and NMFS, unpublished data). A necropsy was conducted but the cause, time, and place of death are unknown.
Killer whale	<i>Orcinus orca</i>	Rare	From 1975 to 2002, killer whales were occasionally observed in Knik Arm during surveys; however, they were relatively common in Lower Cook Inlet (Shelden et al. 2003). In June 2015, a possible killer whale was observed on 2 consecutive days travelling north up Knik Arm from the Port of Anchorage (B. Mahoney, NMFS, personal communication, 2015). On 15 September 2021, several researchers observed 2 killer whales patrolling Knik Arm near the Port of Anchorage. The whales were photographed and later identified as transients from the endangered AT1 population (V. Gill, NMFS, personal communication, 2021). On 27 September 2023, JBER biologists observed 2 killer whales in lower Knik Arm (near Cairn Point) in close proximity to a group of beluga whales. The beluga whales remained in shallow water with the killer whales nearby, in what was assumed to be deeper water. The biologists lost site of the killer whales and did not note any direct interaction with the beluga group (other than their close proximity).

Table 2-8. Upper Cook Inlet species protected by the Marine Mammal Protection Act observed in Knik Arm

Common Name	Scientific Name	Occurrence in Knik Arm	Notes
Steller sea lion	<i>Eumetopias jubatus</i>	Rare	In October 2009, a single Steller sea lion was observed transiting through Eagle Bay. In June 2011, a single Steller sea lion was observed just north of the Port of Alaska (JBER unpublished data). During the most recent Port of Alaska monitoring projects (2020 to 2022), a total of 18 Steller sea lions were observed (although some may have been re-sightings), with individuals detected intermittently between May and September (NMFS, unpublished data, 2021; 61 North [61N] Environmental 2021, 2022a, 2022b; Easley-Appleyard and Leonard 2022).

2135

2136 **Harbor Porpoise**

2137 Harbor porpoises are relatively small marine mammals that reach a maximum size of about 5.9 feet in
 2138 length and 198 pounds. They are a cryptic species, often travelling alone or in small groups and presenting
 2139 a low profile when surfacing (Leatherwood et al. 1982, Shelden et al. 2014). Harbor porpoises are found
 2140 primarily in coastal waters that are less than 300 feet deep (Hobbs and Waite 2010), where they feed on
 2141 cephalopods and relatively small (3.9 to 13.7 inches in length), non-spiny, schooling fish such as herring,
 2142 mackerel, and pollock (Gaskin et al. 1974, Leatherwood et al. 1982). Smith and Read (1992) reported that
 2143 harbor porpoise calves consume euphausiids in the Bay of Fundy, Canada. In Knik Arm, they likely feed
 2144 on saffron cod, pollock, longfin smelt, eulachon, and juvenile salmon. Given the findings of Smith and
 2145 Read (1992), harbor porpoise also likely feed on small shrimp (*Crangon* spp.). Harbor porpoise sightings
 2146 in the upper inlet peak during ice-free months when pelagic smelt are abundant (Shelden et al. 2014).

2147 In Alaska waters, 6 harbor porpoise stocks are currently recognized for management purposes: Southeast
 2148 Alaska (which includes Northern Southeast Alaska Inland Waters, Southern Southeast Alaska Inland
 2149 Waters, and Yakutat/Southeast Alaska Offshore Waters), Gulf of Alaska, and Bering Sea stocks (Young et
 2150 al. 2024). Porpoises found in Cook Inlet are included in the Gulf of Alaska stock, which is distributed from
 2151 Cape Suckling to Unimak Pass, and was estimated in 1998 at 31,046 animals (Young et al. 2024).
 2152 Abundance estimates for Cook Inlet harbor porpoise have ranged from 136 porpoises in 1991 (Dahlheim
 2153 et al. 2000) to 428 porpoises in 1993 (Aglar et al. 1995) to 249 porpoises (uncorrected) in 1998 (Hobbs and
 2154 Waite 2010). It is likely that all abundance estimates underrepresent the actual population for a variety of
 2155 reasons, including effort, survey area, and survey design (Shelden et al. 2014).

2156 Harbor porpoises are occasionally sighted and have been detected acoustically in both Eagle River and
 2157 Eagle Bay. Only single harbor porpoises have been observed in this area, but it is possible that animals
 2158 were missed. A detailed description of harbor porpoise presence on JBER (Eagle River) and waters adjacent
 2159 to JBER is provided in the 673 ABW (2020a) marine mammal monitoring protocol and results report.

2160 **Harbor Seal**

2161 Harbor seals are widely distributed in both the Atlantic and Pacific Oceans. This species is closely
 2162 associated with coastal waters, although it is sometimes found in rivers and lakes. Its range in Alaska

extends along the coast from British Columbia north to Kuskokwim Bay and west throughout the Aleutian Islands. Most harbor seals are associated closely with coastal waters, although occasional observations up to 50 miles offshore have been made. Harbor seals do not appear to make long migrations like some species of marine mammals. However, some long-distance movements of seals that were tagged in Alaska have been recorded, as have considerable local movements, which are generally associated with factors such as tides, weather, season, food availability, and reproduction (Young et al. 2024).

Although primarily aquatic, harbor seals also use terrestrial environments for rest, thermal regulation, social interaction, molting, predator avoidance, and to give birth. Seals are more likely to be hauled out during the pupping, breeding, and molting periods, and they haul out less frequently during late fall and winter (Boveng et al. 2012). Harbor seals prefer to haul out on tidally exposed habitats including reefs, offshore rocks and islets, mud and sand bars, sand and gravel beaches, and floating and shorefast ice (Pitcher and Calkins 1979, Bigg 1981). Montgomery et al. (2007) found that harbor seals in central and Lower Cook Inlet hauled out on sites with rocky substrate near deep water and available prey, while avoiding areas with high anthropogenic disturbance.

Harbor seals within Cook Inlet are managed by NMFS as part of the Cook Inlet/Shelikof stock, although little is known about these seals in Upper Cook Inlet. The NMFS abundance estimate (2019) for this stock was 28,411 seals, and the 8-year trend estimate for this stock was -111 in 2023 (Young et al. 2024). The summer distribution of harbor seals in Cook Inlet is primarily along coastal waters, whereas the overwintering areas include Lower Cook Inlet and the Gulf of Alaska (Boveng et al. 2007). The Cook Inlet/Shelikof stock is distributed from Anchorage to Lower Cook Inlet during summer and from Lower Cook Inlet through Shelikof Strait to Unimak Pass during winter (Boveng et al. 2012). Large numbers of seals concentrate at river mouths and embayments of Lower Cook Inlet, especially at Fox River, Kachemak Bay, and at several tidal rock islands in Kamishak Bay (Shelden et al. 2008, Boveng et al. 2012). Montgomery et al. (2007) recorded more than 200 harbor seal haul outs in Lower Cook Inlet.

Harbor seals are commonly observed at the mouth of Eagle River and occasionally observed in Eagle River, as far upstream as Bravo Bridge and (at high tide) Otter Creek. A detailed description of harbor seal use on JBER and waters adjacent to JBER is provided in the 673 ABW (2020a) marine mammal monitoring protocol and results report.

2.3.4.3 Protected Avian Species

In addition to the abovementioned ESA-protected Steller's Eider, JBER recognizes avian species of special concern. Many of these declining species commonly breed on and migrate through military lands in Alaska and warrant the greatest conservation need.

All avian species identified on JBER, except resident game species and nonnative species, are protected under the MBTA. [Table 2-9](#) presents a summary of avian species from the Birds of Conservation Concern list (USFWS 2024) and the Alaska Wildlife Action Plan (ADF&G 2015). These species are considered local breeders on JBER and/or within the Upper Cook Inlet ecoregion. The most prominent avian species that use habitat on JBER are further described in [Section 2.3.3.2](#). An overview of the MBTA and the management strategies for protected migratory birds are detailed in [Section 7.4](#).

Table 2-9. Avian species of special concern recognized for Joint Base Elmendorf-Richardson (JBER)

Common Name	Scientific Name	JBER Status	Designating Agencies
Alder Flycatcher	<i>Empidonax alnorum</i>	Breeding	Alaska Department of Fish and Game (ADF&G) ¹
Aleutian Tern	<i>Onychoprion aleuticus</i>	Migrant	US Fish and Wildlife Service (USFWS) ² , ADF&G ¹
American Golden Plover	<i>Pluvialis dominica</i>	Migrant	USFWS ² , ADF&G ¹
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Migrant	ADF&G ¹
American Pipit	<i>Anthus rubescens</i>	Breeding	ADF&G ¹
American Three-toed Woodpecker	<i>Picoides dorsalis</i>	Resident	ADF&G ¹
Arctic Peregrine Falcon	<i>Falco peregrinus tundrius</i>	Migrant	ADF&G ¹
Arctic Tern	<i>Sterna paradisaea</i>	Breeding	ADF&G ¹
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Resident	ADF&G ¹
Bank Swallow	<i>Riparia riparia</i>	Breeding	ADF&G ¹
Belted Kingfisher	<i>Megaceryle alcyon</i>	Breeding	ADF&G ¹
Black-backed Woodpecker	<i>Picoides arcticus</i>	Breeding	ADF&G ¹
Black-bellied Plover	<i>Pluvialis squatarola</i>	Migrant	ADF&G ¹
Black-capped Chickadee	<i>Poecile atricapillus</i>	Resident	ADF&G ¹
Black-legged Kittiwake	<i>Rissa tridactyla</i>	Breeding	ADF&G ¹
Black Turnstone	<i>Arenaria melanocephala</i>	Non-breeding	ADF&G ¹
Bohemian Waxwing	<i>Bombycilla garrulous</i>	Resident	ADF&G ¹
Boreal Chickadee	<i>Poecile hudsonicus</i>	Resident	ADF&G ¹
Boreal Owl	<i>Aegolius funereus</i>	Breeding	ADF&G ¹
Brown Creeper	<i>Certhia americana alascensis</i>	Resident	ADF&G ¹
Common Raven	<i>Corvus corax kamtschaticus</i>	Resident	ADF&G ¹
Common Redpoll	<i>Acanthis flammea</i>	Resident	ADF&G ¹
Dark-eyed Junco	<i>Junco hyemalis</i>	Breeding	ADF&G ¹
Dunlin	<i>Calidris alpine pacifica</i>	Breeding	ADF&G ¹
Dusky Canada Goose	<i>Branta canadensis occidentalis</i>	Breeding	ADF&G ¹
Fork-tailed Storm Petrel	<i>Oceanodroma furcata</i>	Migrant	ADF&G ¹
Fox Sparrow	<i>Passerella iliaca</i>	Breeding	ADF&G ¹
Glaucous-winged Gull	<i>Larus glaucescens</i>	Breeding	ADF&G ¹
Golden Eagle	<i>Aquila chrysaetos</i>	Breeding	ADF&G ¹
Golden-crowned Kinglet	<i>Regulus satrapa</i>	Breeding	ADF&G ¹
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	Breeding	ADF&G ¹
Gray Jay	<i>Perisoreus Canadensis</i>	Resident	ADF&G ¹
Great Gray Owl	<i>Strix nebulosi</i>	Breeding	ADF&G ¹
Greater White-fronted Goose	<i>Anser albifrons frontalis</i>	Migrant	ADF&G ¹

Table 2-9. Avian species of special concern recognized for Joint Base Elmendorf-Richardson (JBER)

Common Name	Scientific Name	JBER Status	Designating Agencies
Gyr Falcon	<i>Falco rusticolus</i>	Breeding	ADF&G ¹
Herring Gull	<i>Larus smithsonianus</i>	Breeding	ADF&G ¹
Horned Lark	<i>Eremophila alpestris arctica</i>	Breeding	ADF&G ¹
Hudsonian Godwit	<i>Limosa haemastica</i>	Migrant	USFWS ² , ADF&G ¹
Lapland Longspur	<i>Calcarius lapponicus alascensis</i>	Breeding	ADF&G ¹
Lesser Yellowlegs	<i>Tringa flavipes</i>	Breeding	USFWS ² , ADF&G ¹
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	Breeding	ADF&G ¹
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>	Migrant	ADF&G ¹
Long-tailed Duck	<i>Clangula hyemalis</i>	Breeding	ADF&G ¹
Marbled Godwit	<i>Limosa fedoa</i>	Non-breeding	ADF&G ¹
Mew Gull	<i>Larus canus brachyrhynchus</i>	Breeding	ADF&G ¹
Northern Harrier	<i>Circus cyaneus</i>	Breeding	ADF&G ¹
Northern Hawk Owl	<i>Surnia ulula</i>	Breeding	ADF&G ¹
Northern Shrike	<i>Lanius excubitor</i>	Breeding	ADF&G ¹
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Breeding	ADF&G ¹
Orange-crowned Warbler	<i>Oreothlypis celata</i>	Breeding	ADF&G ¹
Pacific Black Brant	<i>Branta bernicla nigricans</i>	Migrant	ADF&G ¹
Pacific Golden Plover	<i>Pluvialis fulva</i>	Migrant	ADF&G ¹
Pectoral Sandpiper	<i>Calidris melanotos</i>	Migrant	ADF&G ¹
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>	Migrant	ADF&G ¹
Pine Grosbeak	<i>Pinicola enucleator</i>	Resident	ADF&G ¹
Pine Siskin	<i>Spinus pinus</i>	Resident	ADF&G ¹
Red-necked Phalarope	<i>Phalaropus fulicarius</i>	Breeding	ADF&G ¹
Red-throated Loon	<i>Gavia stellata</i>	Breeding	ADF&G ¹
Red Knot	<i>Calidris canutus</i>	Non-breeding	USFWS ³ , ADF&G ¹
Rough-legged Hawk	<i>Buteo lagopus</i>	Breeding	ADF&G ¹
Ruby-crowned Kinglet	<i>Regulus calendula grinnelli</i>	Breeding	ADF&G ¹
Rusty Blackbird	<i>Euphagus carolinus</i>	Breeding	USFWS ² , ADF&G ¹
Sandhill Crane	<i>Grus canadensis</i>	Breeding	ADF&G ¹
Savannah Sparrow	<i>Passerculus sandwichensis</i>	Breeding	ADF&G ¹
Semipalmated Sandpiper	<i>Calidris pusilla</i>	Breeding	ADF&G ¹
Short-billed Dowitcher	<i>Limnodromus griseus</i>	Breeding	USFWS ² , ADF&G ¹
Short-eared Owl	<i>Asio flammeus flammeus</i>	Breeding	ADF&G ¹
Snow Bunting	<i>Plectrophenax nivalis nivalis</i>	Breeding	ADF&G ¹

Table 2-9. Avian species of special concern recognized for Joint Base Elmendorf-Richardson (JBER)

Common Name	Scientific Name	JBER Status	Designating Agencies
Solitary Sandpiper	<i>Tringa solitaria</i>	Breeding	USFWS ² , ADF&G ¹
Song Sparrow	<i>Melospiza melodia</i>	Breeding	ADF&G ¹
Spotted Sandpiper	<i>Actitis macularia</i>	Breeding	ADF&G ¹
Steller's Eider	<i>Polysticta stelleri</i>	Migrant	USFWS ³ , ADF&G ¹
Steller's Jay	<i>Cyanocitta stelleri</i>	Resident	ADF&G ¹
Surfbird	<i>Calidris virgata</i>	Breeding	ADF&G ¹
Townsend's Warbler	<i>Setophaga townsendi</i>	Breeding	ADF&G ¹
Tree Swallow	<i>Tachycineta bicolor</i>	Breeding	ADF&G ¹
Trumpeter Swan	<i>Cygnus buccinator</i>	Breeding	ADF&G ¹
Varied Thrush	<i>Ixoreus naevius</i>	Breeding	ADF&G ¹
Wandering Tattler	<i>Tringa incana</i>	Breeding	USFWS ² , ADF&G ¹
Western Sandpiper	<i>Calidris mauri</i>	Migrant	ADF&G ¹
Western Wood-pewee	<i>Contopus sordidulus</i>	Breeding	ADF&G ¹
Whimbrel	<i>Numenius phaeopus hudsonicus</i>	Migrant	ADF&G ¹
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	Breeding	ADF&G ¹
White-winged Crossbill	<i>Loxia leucoptera</i>	Resident	ADF&G ¹
White-winged Scoter	<i>Melanitta deglandi</i>	Breeding	ADF&G ¹
Wilson's Warbler	<i>Cardellina pusilla</i>	Breeding	ADF&G ¹

¹Species of Greatest Conservation Need²Bird of Conservation Concern³Endangered Species Act

2.3.4.4 Alaska Species of Greatest Conservation Need

ADF&G addresses the Species of Greatest Conservation Need (SGCN) for Alaska in the 2015 State Wildlife Action Plan. JBER works with ADF&G to assess which wildlife species JBER should consider prioritizing as installation SGCN. [Table 2-10](#) summarizes additional species found on JBER identified in the Alaska Wildlife Action Plan (ADF&G 2015) and their assessed importance to state and cultural stakeholders.

Table 2-10. Alaska Wildlife Action Plan's Species of Greatest Conservation Need recognized for Joint Base Elmendorf-Richardson

Common Name	Scientific Name	Stewardship Species	Sentinel Species	Culturally Important	Economically Important	Ecologically Important
Alaska blackfish	<i>Dallia pectoralis</i>	X		X	—	—
Arctic ground squirrel	<i>Urocitellus parryii</i>	—	—	—	—	X
Beluga (Cook Inlet Distinct Population Segment)	<i>Delphinapterus leucas</i>	X	—	X	—	X
Bering cisco	<i>Coregonus laurettae</i>	—	—	X	—	—
Chinook salmon	<i>Oncorhynchus tshawytscha</i>	X	—	X	X	—
Chum salmon	<i>Oncorhynchus keta</i>	—	—	X	X	—
Coho salmon	<i>Oncorhynchus kisutch</i>	X	—	X	X	—
Collared pika	<i>Ochotona collaris</i>	X	—	—	—	X
Common shrew	<i>Sorex cinereus</i>	X	—	—	—	—
Dolly Varden	<i>Salvelinus malma</i>	X	—	X	—	—
Dusky (montane) shrew	<i>Sorex monticolus</i>	—	X	—	—	—
Eulachon	<i>Thaleichthys pacificus</i>	—	—	X	—	X
Freshwater invertebrates	Ephemeroptera, Odonata, Plecoptera, Trichoptera, Cladocera	—	—	—	—	X
Harbor porpoise	<i>Phocoena phocoena</i>	—	—	—	—	X
Little brown bat	<i>Myotis lucifugus</i>	—	X	—	—	—
Longfin smelt	<i>Spirinchus thaleichthys</i>	—	—	X	—	X
Long-tailed vole	<i>Microtus longicaudus</i>	—	—	—	—	X
Meadow jumping mouse	<i>Zapus hudsonius</i>	—	—	—	—	X
Meadow vole	<i>Microtus pennsylvanicus</i>	—	—	—	—	X
Nine-spine stickleback	<i>Pungitius pungitius</i>	—	—	—	—	X
Northern flying squirrel	<i>Glaucomys sabrinus</i>	—	—	—	—	X
Northern pike	<i>Esox lucius</i>	—	—	X	—	X
Northern red-backed vole	<i>Myodes rutilus</i>	—	—	—	—	X

Table 2-10. Alaska Wildlife Action Plan's Species of Greatest Conservation Need recognized for Joint Base Elmendorf-Richardson

Common Name	Scientific Name	Stewardship Species	Sentinel Species	Culturally Important	Economically Important	Ecologically Important
Pacific herring	<i>Clupea pallasii</i>	—	—	X	—	X
Pink salmon	<i>Oncorhynchus gorbuscha</i>	—	—	X	X	X
Rainbow trout	<i>Oncorhynchus mykiss</i>	—	—	X	—	—
Red squirrel	<i>Tamiasciurus hudsonicus</i>	—	—	—	—	X
Saffron cod	<i>Eleginus gracilis</i>	—	—	X	—	—
Singing vole	<i>Microtus miurus</i>	X	—	—	—	X
Snowshoe hare	<i>Lepus americanus</i>	—	—	X	—	X
Sockeye salmon	<i>Oncorhynchus nerka</i>	X	—	X	X	X
Terrestrial invertebrates	Multiple (in Hymenoptera, Diptera, Odonata, Lepidoptera, Arachnida orders)	—	—	—	X	X
Tundra shrew	<i>Sorex tundrensis</i>	—	X	—	—	—
Tundra vole	<i>Microtus oeconomus</i>	X	—	—	—	X
Wood frog	<i>Lithobates sylvaticus</i>	—	X	—	—	—

Source: Alaska Department of Fish and Game 2015

2.3.4.5 Floral Species of Special Concern

Inventories on JBER have not identified listed or proposed T&E plant species. The University of Alaska's Alaska Center for Conservation Science maintains the state list of plant species of significance or species of conservation concern. Of those species, 3 may occur in wetlands and 2 may occur in upland habitats within the Alaska Range Transition, in which JBER is located (Table 2-11). While none of these species have been identified on JBER, the installation has potentially suitable habitat. If future surveys identify any of these species, they will be documented and protected.

Table 2-11. Floral species of special concern (Alaska)

Common Name	Scientific Name	Conservation Status*	Current Distribution	Alaska Distribution	Vegetation Type
Hudson Bay sedge	<i>Carex heleonastes</i>	G4, S3, BLM Watchlist	Brooks Range, Seward Peninsula, Tanana-Kuskokwim lowlands, Alaska Range, Cook Inlet Basin, etc.	Arctic Tundra, Bering tundra, Intermontane Boreal, Alaska Range Transition	Black spruce muskeg, bulrush-sedge wet meadow, Dryas
Lemmon's rockcress	<i>Arabis lemmonii</i>	S1S2, G5; BLM Watchlist	Alaska Range Transition, Coastal Rainforest	Alaska Range, Chugach-St. Elias Mts.	Mountain slopes, alpine saddles, crumbling cliffs, glacial moraine
Porsild's saxifrage	<i>Saxifraga nelsoniana</i>	S3, G4, BLM Watchlist	Alaska Range, Chugach-St. Elias Mts., boundary ranges, etc.	Bering taiga, Intermontane-Boreal, Alaska Range transition, Coastal Mtn. transition,	Rock outcrops, rocky seeps, streambanks
Sessile-leaved scurvygrass	<i>Cochlearia sessilifolia</i>	S2Q, G1G2Q; BLM Watchlist, US Forest Service Sensitive	Chugach- St. Elias Mts., Gulf of Alaska coast, Kodiak Isl.	Coastal rainforests; Estuarine	Fine gravel, mud, sand; below high tide
Triangle-lobe moonwort	<i>Botrychium ascendens</i>	S2S3 G3; BLM Sensitive	Aleutian Meadows, Alaska Range Transition, Coast Mountains Transition	Alaska Range, Peninsula, Gulf of Alaska Coast	Beaches, beach ridges, beach meadows, riparian meadows, mountain slopes

*State rank: S1=critically imperiled, S2=imperiled, S3=rare or uncommon, S4=not rare, S5=widespread and secure, S#S#=#range of potential status; Global rank: G1=critically imperiled, G2=imperiled, G3=rare or uncommon, G4=not rare, G5=widespread and secure, G#G#=#range of potential status, Q=questionable taxonomy

2.3.4.6 Weather and Natural Hazard Impacts on Threatened and Endangered Species

Periods of sustained increases in precipitation may increase aquatic habitat in some areas, but prolonged periods of high temperatures in aquatic habitats can decrease dissolved oxygen and create more favorable environments for algal blooms, especially in lentic systems. Shifting seasonality, especially during years with early spring onset, can combine with these other factors to reduce or alter prey abundance during times of the year that are critical for the welfare of the CIBW. Years with early snowmelt can alter invertebrate emergence and stress freshwater fish populations. If CIBW behavior changes during essential mission activities in the ERF, it could lead to additional regulatory burden or conflicts with the mission.

Years with abnormal temperature and precipitation patterns could also change vegetation community composition, altering prey and forage availability for species that inhabit JBER. While there are no year-round or nesting T&E species on the installation, reduction in habitat quality in the surrounding region could result in new protections for species that are already in decline. Changes in vegetation community composition may also alter the connectivity of wetland tributaries to anadromous waters, which could have an effect on fisheries and further stress prey populations and the CIBW. Consistent monitoring of at-risk species and environments will be essential to support adaptive management in a changing regulatory environment.

In 2016, a Strategic Environmental Research and Development Program-funded project began on JBER. The project was designed to identify key vulnerabilities in species that are sensitive to recent environmental trends. This project began with an analysis of the Alaskan douglasia (*Androsace alaskana*), which is an uncommon high-elevation plant species that is found across a specific elevational gradient in the Chugach Mountains in Southcentral Alaska. As a high-elevation, uncommon, sessile species, *A. alaskana* and similar species are vulnerable to recent environmental trends and thus may become conservation-reliant on JBER or other DoD lands in the future. Only 2 populations were historically documented, but several have been located during project-related reconnaissance between 2016 and 2018. The Strategic Environmental Research and Development Program project was ongoing from 2016 through 2017 but ended without resolution in 2018 due to logistical difficulties. JBER will continue to monitor the occurrence of *A. alaskana* and other uncommon species with known environmental sensitivities to continue documenting changes. Known occurrences of such species are catalogued in the natural resources Geodatabase under a contract with CEMML.

2.3.5 Wetlands and Floodplains

The National Wetlands Inventory (NWI; USFWS 2023) is managed by the USFWS, and maps are updated with consideration only to regulatory actions, including but not limited to Final Jurisdictional Determinations of the USACE. Where final jurisdictional determinations are lacking, the regulatory standard is the NWI.

Floodplain data are typically derived from the Federal Emergency Management Agency's Flood Insurance Rate Maps. In the region, these maps were most recently published on 25 September 2009. Military installations lie within a zone that the National Flood Insurance Program excludes from its mapping effort, as federal lands cannot make claims against the program. Floodplain boundaries depicted in the geospatial data on file for JBER's "floodplain" are not derived from a complete data source and they may be incomplete, inaccurate, or not shown at all, so caution must be used when referring to map resources for floodplains on JBER.

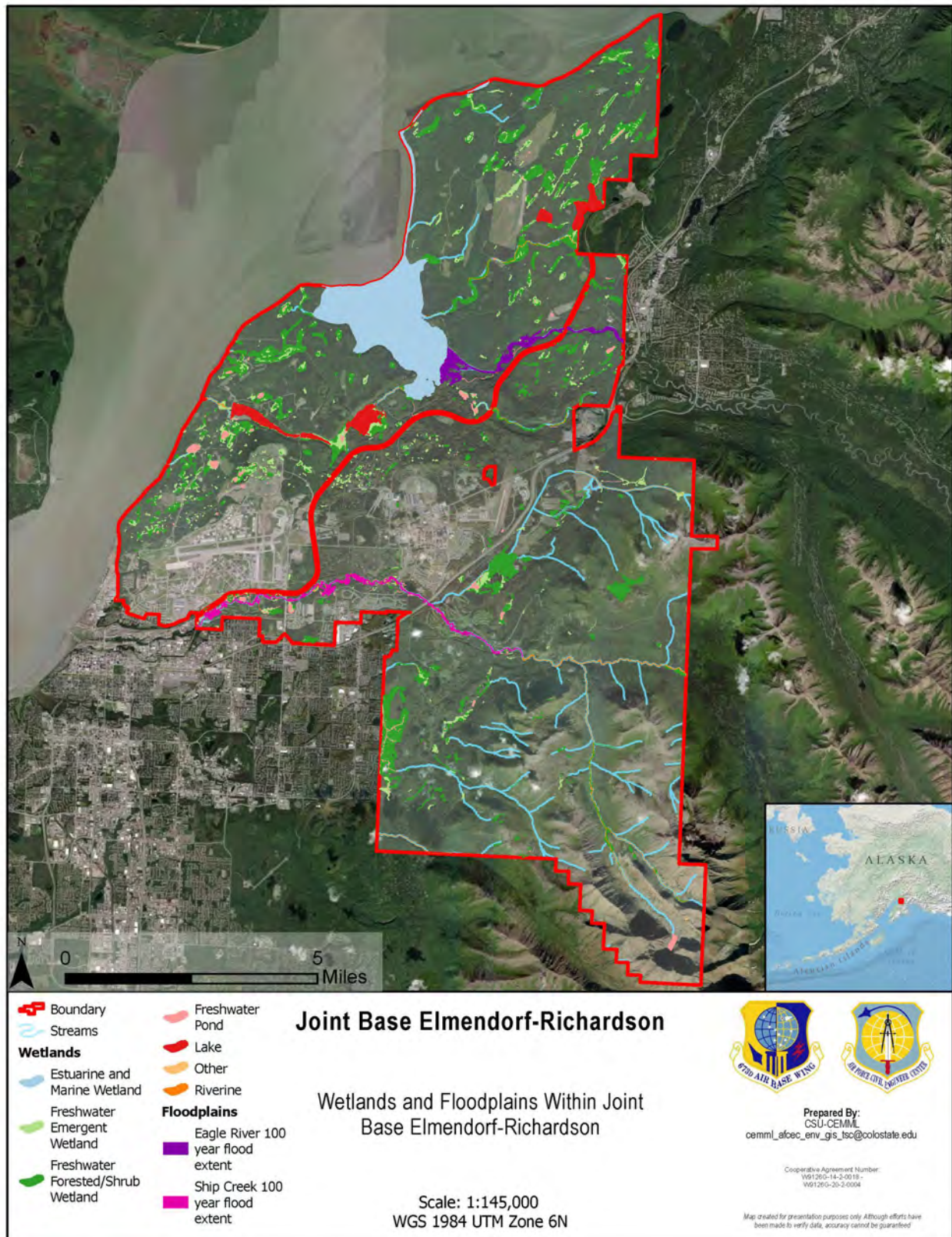
JBER's wetlands are diverse and widespread throughout the sloped, depressional, flat, riverine, and estuarine systems on base ([Table 2-12](#), [Figure 2-17](#)). These classifications describe the hydrogeomorphic

position of wetlands in the environment and reflect their placement and function within the watershed (Brinson 1993). These wetlands are further classified by their dominant vegetation, including aquatic, emergent, shrub-carr, and forested wetlands. JBER has 7,418.71 acres of wetlands, which account for approximately 10% of its land base. Wetland functions, including hydrologic function, habitat function, species function, and public value functions, are measured using a Wetland Functional Assessment methodology derived from the Anchorage Wetland Functional Assessment method. Floodplain functions are highly integrated with wetland functions, as many wetlands are directly associated with streams and lakes and, even when not directly connected via surface water, serve the same basic functions across the landscape as if they were. The JBER Wetland Functional Assessment has been completed and is updated as needed in coordination with the USACE.

Table 2-12. Joint Base Elmendorf-Richardson wetlands by type

Wetland Type	Total Acres	Percent of Total Wetland Area
Emergent	815.70	11.36
Estuarine and Marine	2303.23	32.09
Forested/Shrub	3222.08	44.89
Open Water	645.38	8.99
Riverine	191.11	2.66
Total	7,177.50	100.00

Source: USFWS 2023



2273

2274 Figure 2-17. Map of classified wetland types within Joint Base Elmendorf-Richardson

Wetlands are typically characterized based on parameters defined in the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region V 2.0* (USACE 2007). Wetlands are defined as “areas that are inundated or saturated by surface water or groundwater 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” (33 CFR Part 328.3[b]). Note that the “wetlands” definition does not include unvegetated areas such as streams and ponds. As described in USACE (1987, 2007), wetlands must possess the following 3 characteristics: (1) a vegetation community dominated by plant species that are typically adapted for life in saturated soils, (2) inundation or saturation of the soil during the growing season, and (3) soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions. Wetlands may constitute WOTUS, which include other waterbodies regulated by the USACE, including navigable waters, lakes, ponds, and streams, in addition to wetlands. Non-water and non-wetland areas are called uplands.

Wetland vegetation is described by species, relative to their affinity to wetlands, using an indicator status. An indicator status reflects the likelihood that a particular plant occurs in a wetland or upland. The 5 indicator statuses are (1) Obligate plants, which always occur in standing water or in saturated soils; (2) Facultative Wet plants, which nearly always occur in areas of prolonged flooding or require standing water or saturated soils but may, on rare occasions, occur in non-wetlands; (3) Facultative plants that occur in a variety of habitats, including wetland and mesic to xeric non-wetland habitats, but commonly occur in standing water or saturated soils; (4) Facultative Upland plants that typically occur in xeric or mesic non-wetland habitats but may frequently occur in standing water or saturated soils; and (5) Upland plants that rarely occur in water or saturated soils. USACE maintains a list of wetland plants and their assigned indicator statuses. A list of species designations, by state, can be found at <https://wetland-plants.usace.army.mil>. The hydrologic and soil characteristics specific to wetlands are also described in USACE (1987, 2007). The wetland descriptions below refer to the hydrology and hydric soil indicators detailed in these resources.

However, not all the wetlands on JBER have been specifically delineated, none of the data collected have been submitted to USACE for review, and a request for a Jurisdictional Determination on these wetlands has not been made. Wetlands shown on the maps provided are part of the JBER Wetland Inventory and are not considered field delineations of the wetland boundaries. Forested wetlands are generally difficult to identify because they are so heavily integrated. At the time of this INRMP update JBER has not accepted the 2022 Colorado State University floodplain mapping results due to identified gaps and incorrect data within forested wetlands. JBER has programmed field assessments to identify gaps and incorrect data and have requested an Air Force Civil Engineer Center (AFCEC) remodel using updated LiDAR and USGS Streamgage data. Any updates that are identified will be provided to NWI to reflect on the eDASH RAIT tool. These updates are necessary to properly manage wetlands near heavily used training areas, including the wetlands found at the end of the Malemute Drop Zone.

Impacts to wetlands, including discharge of fill, may be regulated by Section 404 of the CWA and Section 10 of the Rivers and Harbors Act. Wetlands are defined by measuring their hydric affinity of the vegetation, soil, and hydrologic properties according to USACE (1987, 2007). The USACE and the US Environmental Protection Agency (US EPA) regulate jurisdictional wetlands. Many wetlands on JBER are potentially jurisdictional and should be evaluated in consultation with USACE prior to incurring any impacts, including an evaluation of purpose and need, an assessment of practicable alternatives, and, if necessary, an assessment of compensatory or other mitigation requirements.

Wetland delineations and jurisdictional determinations are valid for up to 5 years. If impacts to a wetland are proposed for a site where no valid delineation exists, USACE may require a new delineation and jurisdictional determination. JBER completed an extensive wetland inventory in 2022 and 2023 in conjunction with the USFWS NWI team. This inventory is not equivalent to a wetland delineation or jurisdictional determination and may not be all-inclusive. The mapped polygons represent, with reasonable confidence, the general perimeter of the likely wetland resource and are valid for planning purposes only. Unmapped wetlands may still exist on JBER. Additionally, some areas mapped as wetlands may not meet all required criteria in the field and therefore would be considered upland and not regulated as a wetland. Only a field delineation and confirmation from USACE may be considered a definitive rule on the jurisdictionality of a wetland. Any new wetlands, challenged sites, or delineated boundaries are updated in the appropriate GIS layer in coordination with GeoBase.

The information below is intended to provide an ecological description of wetlands on JBER, specifically in the Elmendorf Moraine kettle area, ERF, and alpine areas of South Post. The details included were collected during field reconnaissance that occurred between 2013 and 2019.

Elmendorf Moraine Kettle Wetlands

The southern edge of the geological feature known as the Elmendorf Moraine and other associated ground moraine, an undulating, long series of ridges, runs east to west across JBER, roughly parallel to Knik Arm, and spans both sides of the Knik Arm, and up into the Matanuska Valley. This system of ridges marks the terminus of the last glacial advance in this area.

Many kettles on the moraine contain ponds and lakes, whereas others contain bog (peat) deposits. These types of depressions are typically surrounded by uplands and may have no distinguishable inlet or outlet and thus are fed either by groundwater or by surface water in the form of sheet flow. The water balance in the basin is achieved via groundwater recharge or basin overflow.

Within the Elmendorf Moraine, which stretches from the main cantonment area on JBER north, beyond the installation boundary, and from the foothills of the Chugach Mountain to the bluffs above Cook Inlet, there are more than 3,025 acres of depressional wetlands and waterways that lack a clear surface water connection to the Knik Arm of Cook Inlet, a tidal water. Wetland types include freshwater (palustrine) emergent, scrub-shrub, and forested wetlands ranging in size from 0.03 acres to over 30 acres, including small lakes or ponds. Spring Lake (9.6 acres), Hillberg Lake (10.9 acres), Triangle (3.8 acres), and Fish Lake (4.0 acres) are all present within the Elmendorf Moraine and lack clear surface water connections to Cook Inlet or its tributaries.

Most kettles are groundwater fed, have significant accumulations of peat, and have an abundance of sphagnum moss throughout the wetland area, whether emergent, scrub-shrub, or forested. Otherwise, dominant vegetation in these kettles varies by wetland class. Emergent wetlands are dominated by sedges and grasses, including Canada bluejoint grass, water sedge (*Carex aquatilis*), Lyngbye's sedge, beaked sedge (*Carex rostrata*), fowl bluegrass (*Poa palustris*), arctic bluegrass (*Poa arctica*), and purple marshlocks (*Comarum palustre*). Scrub-shrub wetlands may be dominated by dwarf shrubs such as mountain cranberry (syn., lingonberry, *Vaccinium vitis-idaea*), leatherleaf (*Chamaedaphne calyculata*), resin birch (*Betula glandulosa*), sweetgale, and marsh Labrador tea (*Ledum palustre*) or by tall shrubs such as green alder or tealeaf willow. In areas where shallow open water persists, vegetation such as northern water plantain (*Alisma triviale*), bur-reed (*Sparganium* sp.), purple marshlocks, and sedge species are common. Forested systems are dominated by resin birch (*B. papyrifera neoalaskana*) and black spruce, which persist in a stunted growth form in sphagnum-dominated bogs and on floating mats.

Hydrologically, the water table is typically high near the ground surface. Most kettles are at least shallowly inundated at their lowest point for most of the growing season. Floating mats have formed around the edges on most of the open waterbodies, most prominently in the Fish-Triangle Lake complex, where the 2 waterbodies are hydrologically connected below the surface of a dense floating mat. In smaller kettle ponds, floating mats may have formed over most of the surface area. Steep banks typically surround the kettle, where hydrologic features meeting wetland criteria are often clearly defined 12 to 16 inches above the edge terrain. Primary and secondary hydrologic characteristics, defined by USACE (1987, 2007), found in Elmendorf Moraine kettles include surface water, high water table, saturation, water marks, water-stained leaves, drainage patterns, geomorphic position, and microtopographic relief.

In the Elmendorf Moraine, undulating hills of Deception–Estelle–Kitchatna complexes are common (USDA NRCS 2024). These soils are comprised of silt, sandy silt, and silt loam over coarse gravel that are typically well drained. Most of the wetland complexes occurring in the low-lying areas between undulating Deception–Estelle–Kitchatna complexes are classified as having Salmatof Peat soils. Salmatof peat soils are very poorly drained and are typically comprised of 60 inches or more of organic peat over parent material (USDA NRCS 2024). A thick organic layer such as a Histosol, with at least 16 inches of an organic layer beginning near the soil surface or histic epipedon and 8 to 16 inches of organics in the upper portion of the soil profile, is common in kettles.

Functionally, depressional kettles retain and filter stormwater runoff and serve as wildlife habitat. Most of these kettles are also considered important components in groundwater recharge. Vegetated wetlands help remove pollutants, including chemicals and sediment from stormwater, and prevent release into rivers and streams. The value of this function depends on the amount of development around the depression. While there is not always direct connectivity between depressional kettles and larger open bodies of water such as lakes and streams, the capacity of kettles across the landscape can be important to overall hydrologic function within the watershed. The small size of many of these wetlands limits their overall impact, individually.

Due to the extreme variability of topography in the Elmendorf Moraine, the vegetative structure of kettle wetlands can be very diverse, creating higher-quality plant and wildlife habitat. Wetlands with vegetative floating mats, particularly around the edge of waterbodies populated by fish and tadpoles, serve as erosion buffers that protect the waterbody. Stocked and native fish including rainbow trout, char, landlocked salmon, and three-spine stickleback live and breed in lakes and ponds deeper than 6 feet. Systems with open water also provide bird nesting and feeding habitat. Although kettle ponds are small, they are important breeding habitat for a variety of waterfowl, wood frogs, waterbirds, and passerines. Forested, scrub-shrub, and emergent systems are important to many migratory song birds and boreal wetland birds. Lack of connectivity to anadromous streams or tidal waters limits the value of isolated depressions to anadromous fish or the CIBW.

The public value of wetlands in the Elmendorf Moraine is limited to those who are able to access these areas of the installation. Typically, only DoD identification card holders and their guests are eligible to access Elmendorf. Lakes with a stocked or native fish are frequently visited by Active-Duty personnel, DoD civilians, veterans, and their family members and guests. There are also several birding groups that frequently visit, including a few who contribute to the monitoring of resident and migrating birds in kettle lakes and ponds.

Because these systems occur as small, closed depressions, connectivity IAW the federal definition of a jurisdictional WOTUS requires consideration of both surface and subsurface connections (significant nexus) across the landscape. Traditional Navigable Waters are defined as “all waters which are currently

used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide (33 CFR 328.3(a)(1). WOTUS are defined in 40 CFR 120. There have been many challenges to the definition of Traditional Navigable Waters, requiring resolution by the US Supreme Court, resulting in refinement of what constitutes a jurisdictional wetland.

Eagle River Flats Wetlands

The ERF is comprised of estuarine emergent meadows, fringed by estuarine shrub-carr wetlands and palustrine forest. The ERF includes more than 95% of the total estuarine wetlands on JBER ([Figure 2-18](#)). Eagle River is the predominant waterbody flowing through the ERF; however, Otter Creek flows through the ERF until its confluence with Eagle River. Clunie Creek is also hydrologically connected to Eagle River through reemergence of an underground spring on the eastern edge of the ERF. Clunie Creek leaves Clunie Lake at the southern tip of the lake and proceeds southwest toward ERF. South of Artillery Road, however, the creek dissipates into the ground and loses all stream bed and bank morphology. It reemerges at a small pond at the edge of ERF.

Comprehensive sampling of wetlands in the ERF is not feasible due to unexploded ordnance hazards throughout the area. Access to ERF is controlled by the 11th ABN Range Control. To ensure safety, Range Control will grant access only for specific visits and generally requires visitors to be accompanied by EOD personnel. Four sample points were assessed by JBER Natural Resources in the estuarine emergent wetlands within ERF during the 2016 growing season. Other assessments of the presence, type, condition, and function of the ERF wetlands have been conducted using aerial imagery (particularly images taken in 2009, 2012, and 2015) and with the assistance of other remote sensing and GIS resources.

The general condition of the flats is saturated or inundated at variable depths, with tall, dense, herbaceous vegetation present throughout. Exposed mudflats are more prevalent in the zones most affected by the tidal flood and along the cut banks of Eagle River and Otter Creek. Additionally, microtopographical depressions approximately 6.6 to 19.7 feet across occur throughout the ERF where craters were left behind as a result of firing high explosive (HE) rounds into the impact area. Other microtopographical features include relict ditches and pond alteration resulting from the white phosphorus cleanup. Due to the potential hazard of unexploded ordnance, closer investigation of the vegetative assemblage between the impact depressions and other surrounding areas has not been made. Aerial imagery clearly shows variability in the hydrology throughout the ground surface, where craters may be inundated, whereas surrounding areas do not necessarily have open standing water.

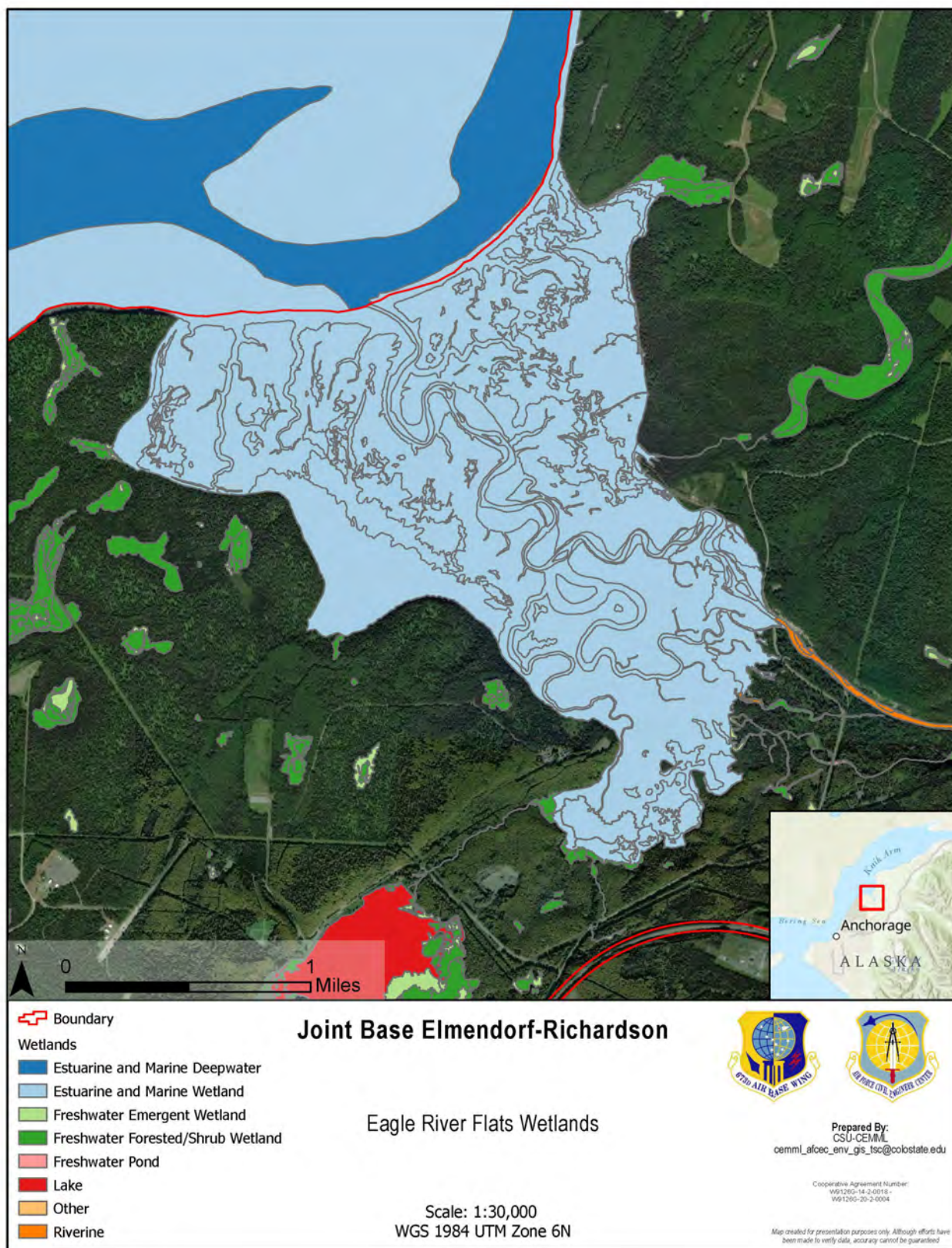
ERF is wholly comprised of wetlands, except on the outermost edges, where the topography increases sharply uphill. Adjacent uplands are described as closed mixed spruce–birch forest. Slopes are steep but well vegetated. Emergent wetlands are typically dominated by various sedges (Northwest Territory sedge [*Carex utriculata*], Lyngbye's sedge, mud sedge [*Carex limosa*], water sedge), dunegrass (*Leymus mollis*), arrowgrass, meadow barley (*Hordeum brachyantherum*), bulrush (*Bolboschoenus maritimus*), vetch (*Vicia americana*), cinquefoil (*Potentilla* sp.), and sea milkwort (*Lysimachia maritima*). Soils in these estuarine wetlands cannot be sampled due to risk of encountering unexploded ordnance, however, it can be inferred that the soils are predominantly comprised of frequently deposited silt, as is clearly visible at the ground surface in the slope profiles along the riverine troughs of Eagle River and other tributaries. There are some peat deposits mapped along the edges of the ERF, near forested hillslopes. Hydrologically, ERF wetlands are permanently saturated and often inundated, depending on tidal influx (daily) and seasonal factors, particularly spring breakup, when sediment and soils are frozen.

The ERF comprises 95% of the total estuarine wetlands on JBER and nearly 28% of all wetlands on JBER. Based on the relative and total size of these wetlands, the value of the ERF is high for both hydrologic

2450 integrity within the watershed, species diversity, and wildlife habitat. The ERF are also extremely valuable
 2451 for their capacity to aid in stormwater storage and removal and storage of sediments and other components
 2452 prior to discharge into Eagle Bay. Wetlands in the ERF are directly or indirectly provide healthy habitat for
 2453 spawning, rearing, and out-migration of anadromous salmon, on which the federally endangered CIBWs
 2454 are dependent. While anadromous fish are not known to spawn in the flats, these waterways serve as
 2455 corridors to upstream spawning areas. The estuary is also important waterbird nesting, feeding, and rearing
 2456 habitat and serves as an important migratory waterfowl and waterbird staging area. The public value of
 2457 ERF wetlands is extremely limited because of unexploded ordnance hazards that prohibit public access to
 2458 this area. There are some vantage points, such as from Bravo Bridge, from which the public can look out
 2459 over the flats.

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2462 Figure 2-18. Map of classified wetland types within the Eagle River Flats

2463 **Alpine Wetlands**

2464 The wetlands occurring in the Chugach Mountain region of JBER are diverse (Johnson et al. 2017; [Figure](#)
 2465 [2-17](#)). Wetlands in this area occur along rivers, streams, and lakes, at headwaters, in alpine swales
 2466 associated with melting snowbeds, and in other shallow depressions in valleys and saddles. Wetland areas
 2467 are smaller and form fewer large complexes than do wetlands in flatter, lower elevations. The
 2468 hydrogeomorphology of these various wetlands contribute to how water is stored and how it moves through
 2469 upper montane reaches of the watershed. Walker et al. (1997) describes alpine regions on JBER using the
 2470 following elevation classes: Subalpine (1,643 to 1,968 feet), Lower Alpine (1,971 to 3,116 feet), Middle
 2471 Alpine (3,120 to 5,085 feet), and Upper Alpine (above 5,085 feet). Wetlands may occur at any of these
 2472 elevations and may take on several different forms. There are approximately 57.2 acres of wetlands mapped
 2473 at elevations above 1,960 feet AMSL, inventoried by remote sensing throughout training areas 427, 428,
 2474 and 431 (excluding wetlands and open water in former training areas south of Tanaina Lake). Remote
 2475 sensing for wetlands in alpine areas can be difficult due to limited field data available to corroborate the
 2476 hydrology and vegetation indicators that may appear on infrared and other high-resolution aerial imagery.

2477 Closed Tall Willow Scrub and Alder Scrub Swamps fall into the “Scrub-Shrub” wetland type and have
 2478 been observed throughout low-gradient stream reaches in the Chester and Snowhawk valleys, including
 2479 Geronimo Drop Zone and along the stream channel for both North and South forks of Snowhawk Creek,
 2480 as well as after their confluence. These areas were dominated by various willow and alder species (including
 2481 Barclay’s willow, feltleaf willow [*Salix alaxensis*], diamondleaf willow, and green alder). Scrub is
 2482 distinguished by height. Tall scrub includes shrubs from 5 to 9.8 feet in height. These scrub-dominated
 2483 wetlands extend well above the tall shrub zone in Snowhawk Valley.

2484 Research conducted by Alaska Pacific University (Dial et al. 2015) indicates that changing climatic
 2485 conditions may be driving the presence of typically taller willow and alder species at elevations at which
 2486 they have not previously been abundant. There are approximately 25 acres of scrub dominated riverine
 2487 wetlands currently mapped in the Snowhawk Valley. Field observations in 2016 suggest that the total area
 2488 is much larger, particularly along low-gradient stream reaches; therefore, the total area of these wetlands is
 2489 unknown.

2490 Alpine Depressions and Swales typically fall into the “Scrub-Shrub” wetland type but are comprised of
 2491 dwarf shrubs that do not exceed 8 inches in height. Common dominants include Alaska bellheather
 2492 (*Harrimanella stelleriana*), crowberry, Canada bluejoint grass, Altai fescue (*Festuca altaica*), Mertens’
 2493 rush (*Juncus mertensianus*), smallawned sedge (*Carex microchaeta*), woodrush species (*Luzula* spp.), and
 2494 lutkea. The abundance or absence of mosses versus lichens are common indicators of moisture at a given
 2495 site, regardless of whether hydric conditions are fully met.

2496 Wet Sedge-Herb Meadow Tundra, which fall into the “Emergent” wetland type, occur commonly in
 2497 headwater reaches of the North and South forks of Snowhawk Creek, as well as in depressional swales.
 2498 These areas are dominated by various sedges, bluejoint, burnet, alpine mountainsorrel (*Oxyria digyna*),
 2499 Mertens’ rush, cottongrass species (*Eriophorum* sp.), and arctic sweet coltsfoot (*Petasites frigidus*).
 2500 Shallow drainages move slowly in the upper valley and saturation is relatively broad across the headwater
 2501 channels. The soils contain a low abundance of organic material, comprised mostly of coarse gravel overlain
 2502 by fine gravel. Headwaters are clear and very low in silt. Slow melting snowbeds are present in the North
 2503 fork valley but are less abundant in the South fork of Snowhawk Creek. In 2019, 673 CES/CEIEC biologists
 2504 and 673 CES, Installation Support GeoBase investigated the connectivity between the South fork
 2505 headwaters of Snowhawk Creek and Tanaina Lake. The ordinary high water mark and thalweg of the stream

were surveyed in the field and the perennial, ephemeral, and non-stream reaches of the mapped watercourse were remapped ([Section 2.2.4](#)).

Alpine wetland functions primarily benefit the hydrologic integrity of the watershed downstream. Wetlands occurring in drainages on steep slopes and that are relatively small limit the total capacity for these wetlands to store stormwater runoff. However, the presence of dense vegetation, especially on low-gradient valley bottoms, allows for improvement of water quality and reduction in flow velocity as snowmelt and stormwater make their way toward Chester, Snowhawk, or Ship creeks, all anadromous streams that discharge into the Knik Arm of Cook Inlet. Stream sampling in 2015 to 2016 in Chester Creek headwaters and in 2015, 2018, and 2019 in Snowhawk Creek indicated that the water quality in these headwaters is clear and cold, with some fine sediments, and has high dissolved oxygen and low conductivity (Schoofs and Zonneville 2016, Johnson et al. 2022). The cumulative area and volume of these wetlands are minor compared to the total extent of wetlands throughout the rest of the watershed; however, they do hold snowmelt, surface water, and groundwater in place. Collection is often long enough for ground frost to thaw where it can recharge groundwater through highly permeable soils or slowly be released through dense, low vegetation that holds sediments in place. Depressional wetlands, including shallow swales, can serve to regulate hydrological processes by minimizing the total volume and velocity of water input to higher-order creeks, stabilizing aquatic systems throughout the watershed and improving the quality of fish habitat downstream.

These waters are too shallow and often lie above significant elevational gradients to serve as fish habitat; however, there is a possibility of aquatic invertebrates occupying these upper reaches, providing food to birds and contributing to nutrient transport downstream. Fish were not observed in the upper headwaters of Snowhawk or Chester creeks; however, Dolly Varden and coho salmon were found in middle reaches, below the subalpine zone (Schoofs and Zonneville 2016). These wetlands filter sediments from runoff as water flows toward associated waters, providing valuable protection to water quality downstream, where anadromous salmonids spawn and rear. Forested habitat along the Chugach Mountains also serve as resting and foraging habitat for migratory songbirds (ADF&G 2015), as well as nesting and rearing habitat for boreal birds that depend on wetlands for food.

Climatic factors may be particularly influential to wetland functions in higher-elevation headwaters in the future, as higher elevations have been found to experience more intensive changes in temperature and precipitation. This may result in an added impact on the quality of hydrologic processes in the upper headwaters of local watersheds.

Problematic Alpine Depressions and Swales

Wetlands currently shown in the NWI within the Snowhawk Creek drainage are typical of mapped wetlands in the Chugach Mountains, which are limited primarily to riverine scrub-shrub wetlands associated with the seeps and drainages associated with Snowhawk Creek. Depression and swale landforms that may meet wetland criteria but are not mapped occur in association with snowbeds, on benches or plateaus, or at the bottom of broad U-shaped valleys. The USDA NRCS and USACE identified these specific types of landforms in the early 2000s as having potential to meet the definition of a “wetland” but most likely under problematic circumstances.

USACE (2007) identifies specific “test” criteria for evaluating such landforms. Additionally, USACE defined specific soil and hydrology protocols for use in certain situations where soils may lack wetland indicators. These problematic protocols were used to evaluate the field conditions of 9 mapped wetlands and 20 “depressions and swales” in 2018 to 2019, in conjunction with the Alpine Training Support project. Preliminary findings indicated that many of the depressions and swales, clearly associated with late-melting

2550 snow-beds, met wetland criteria IAW the “test” criteria for such landforms. An argument can be made in
 2551 several other situations where other problematic situations may apply, even if the specific criteria for swales
 2552 was not met.

2553 Wetland investigations and delineations were conducted in 2013 to 2015 along the proposed route through
 2554 Training Area 425 up the hillside, north of Chester Creek, and then around the south side of Rufus Ridge.
 2555 In this area, wetlands were found associated with drainage tributaries of Chester Creek. Other shallow
 2556 drainages with wetland features are likely along relatively shallow gradients but lie in heavily forested
 2557 areas, which are very difficult to map using only aerial resources. Some of the investigated mapped wetland
 2558 areas failed to meet hydrology and soil indicators, despite having wetland vegetation and geomorphology.
 2559 For these reasons, among others, the wetland inventory is typically valuable for planning purposes only and
 2560 should not replace the need for a field delineation. Additional efforts to better understand alpine wetlands
 2561 began in 2015 with a preliminary summary of wetland characterizations included in Johnson et al. (2017),
 2562 preceding an intensive study of alpine wetlands in 2018 to 2019.

2563 Wetlands associated with drainages and streams typically showed clear indicators of hydrology, including
 2564 saturation or inundation within the upper 12 inches of the soil. This was typical with riparian wetlands even
 2565 in areas where soil depth is very shallow over large rocks. Here, water could be observed running toward
 2566 the streams, under the wetland surface. Drainage patterns near drainages and streams were also clear
 2567 indicators of wetland hydrology, even in intermittent reaches that dried up later in the growing season.

2568 In depressions and swales, however, hydrology indicators were less prevalent. Early in the season, snow
 2569 and ice in the shallow soil layers served as a restrictive layer, holding water at the surface of concave basins
 2570 during snow and even after the snow in the basin has melted. This occurs for a period of time when alpine
 2571 dwarf shrubs are prolifically growing, even under snow cover, as they are adapted specifically to
 2572 maximizing productivity during a very short growing season (Korner 2003). Additional meltwater often
 2573 feeds these basins well into the growing season until the soils thaw and water quickly drains out. Observing
 2574 saturation or inundation in these situations may be difficult if site visits occur well into to the growing
 2575 season.

2576 Commonly observed soil features failed to meet the specific required criteria, as significant accumulation
 2577 of organic material or mottling was typically lacking. Alpine soils are typically poorly developed, due in
 2578 part to the limited productivity of small, predominantly evergreen dwarf shrubs and the limited microbial
 2579 activity to break down organics and accumulate them in the soil (Korner 2003). Iron reduction is the result
 2580 of microbial and physical processes, both of which can be inhibited in cold, acidic soils. The hue of alpine
 2581 soils was typically in the 7.5- to 10-year range, with moderately low chroma and value (such as 3/2). Soil
 2582 profiles are typically very shallow over large rocks and gravel.

2583 The USACE identifies limited organic accumulation and poorly developed soils as issues that may mask
 2584 wetland criteria at a site. A chemical dye (alpha, alpha dipyridyl) test may be necessary to determine if
 2585 reduced conditions exist in areas where other hydric soil indicators are absent. The soil must, however, be
 2586 naturally saturated at the time of testing.

2587 Geomorphic position and microtopographic relief were among the most common secondary indicators of
 2588 hydrology present in depressions and swales. The landform must have a conducive shape to accumulating
 2589 water for any of the problematic conditions to be reasonably applied. Hummocking, a feature derived from
 2590 a plant response to frequent flooding and not to be confused with frost boiling, was frequently observed
 2591 around headwaters. Vegetation matting, soil cracking, and sediment lines were also observed on occasion
 2592 in drained basins. Consistent among nearly all of the depressions and swales observed was the presence of
 2593 persistent snowbeds, either by direct observation or visible on aerial imagery through May and even well

into June. The presence of snowbeds this far into the growing season indicates a persistent source of water into the basin. Areas prone to late-season thawing may be most able to maintain hydric conditions long enough to exhibit wetland characteristics, even in problematic situations.

2.3.6 Other Natural Resource Information

Old-Growth Forests

Old-growth forests on JBER provide excellent wildlife and military training areas unlike those found elsewhere in the country. Maintaining such forests benefits many species of wildlife and provides for a sustainable level of biodiversity, ecosystem functionality, and watershed protection. Multiple stand age classes provide habitat for flora and fauna that may be sensitive to disturbed environments, and support military training by providing variety in structure that simulate realistic scenarios.

Carbon Storage

In 2017 to 2018, a total forest carbon inventory for JBER was quantified across all major forested types using LIDAR-assisted models combined with field sampling (Dial et al. 2018). The majority of organic carbon was found to be stored in soil and living trees. Shifts in vegetation composition driven by insect outbreaks, novel fire regimes, or increased temperatures have the potential to alter nutrient cycling rates and degrade the ecosystem services provided by JBER's forests. Additionally, Dial et al. (2015, 2018) identified the frequent conversion of forest to shrubland and subsequent succession of shrublands and low-lying habitats along palustrine edges to forest lands. These changes in land cover can significantly influence the natural resources that support JBER's mission and habitats.

EOD Creek Natural Area

The munitions and EOD areas to the south and ERF marsh to the east effectively isolate the EOD Creek area, which is composed of approximately 1,200 acres. Only one road enters the area, and it is not suitable for large vehicles. Currently, only authorized personnel, such as work parties and munitions personnel, are allowed in this area. The only known isolated occurrence of low-elevation mountain hemlock on JBER is found in this unit. The 1982 natural resources inventory (Rothe et al. 1983) reported that this area "presently supports a unique, 200- to 250-year-old, old-growth mixed forest which is probably the least disturbed piece of forest land left in the Anchorage area. It is perhaps the last vestige of this vegetation type which covered much of the Anchorage area prior to arrival and subsequent disturbance by white men."

In addition to the unique nature of the forest community, the EOD Creek Natural Area has numerous wetlands and EOD and Sixmile creeks, which constitute the southern boundary. The area is an important travel corridor for black bears, brown bears, and wolves in summer, and is close to wolf denning and rendezvous areas on JBER. Black and brown bears and Bald Eagles heavily use JBER's anadromous streams and saltwater shoreline.

Ship Creek Riparian Zone

Ship Creek and its riparian habitat run through both undeveloped and developed lands on JBER. Ship Creek is of high management priority because it is an anadromous stream and because of its importance in maintaining drinking water quality. It is also a travel corridor for many small and large animals, connecting northern sections of JBER to the Upper Ship Creek drainage. This area is heavily used by wildlife (bears, wolves, moose, lynx, etc.) and is close to wolf denning and rendezvous areas on JBER. Use by moose may be limited by the dimensions of the underpass, which could discourage or exclude large bulls from passing through. Recreational facilities include Cottonwood Park, Eaglegen Fitness Park, and Moose Run Golf

Course. Current management concerns include water quality, soil and bank erosion in the golf course area, protection of wildlife habitat areas, and invasive plant introductions and spread. European bird cherry has been surveyed and treated along portions of the Ship Creek corridor. Reed canary grass has also been documented in Eagleglen.

Sixmile Lake System

The Sixmile Lake system is another biological and recreational resource on JBER. It is an anadromous system supporting spawning and rearing habitat for 4 of the 5 salmon species. A salmon spawning area that is part of the Watchable Wildlife Program is located at the outlet of Lower Sixmile Lake. It is a biologically productive system and is managed as a recreational sport fishery. It is also home to little brown bats, otters, muskrat, beavers, swans, loons, grebes, and numerous other types of wildlife. Bald Eagles and Osprey are regularly seen here. Recreation lodges and chalets dot the shores of Lower Sixmile Lake, with canoeing and kayaking being popular activities during summer. Ice fishing and snowmachining on the ice are popular in winter.

Current management concerns include fuel leakage and spills from floatplanes, introduction of invasive species, impacts on nesting waterbirds by boaters, influences of an abundant beaver population on trees and structures, and an unknown level of summer salmon poaching. Erosion concerns include recreational users accessing the shoreline for fishing. Invasive species management is also a matter of concern, particularly at Lower Sixmile Lake. There is a stand of orange hawkweed (*Hieracium aurantiacum*) near the floatplane base that has received ongoing treatment since 2015. In 2020, invasive northern pike were identified and confirmed in Lower Sixmile Lake. Early detection and rapid response efforts successfully eradicated the invasive species in 2022 to 2023. The risk for introduction of *Elodea* spp. in floatplane waters is high. In 2023, elodea was confirmed to be established in portions of Lower Sixmile Lake, and a 3-year treatment project began in July 2024.

Green Lake/Moonshine Creek System

Historically, Green Lake existed at a lower level than present-day levels. In the 1970s, a dam was added to increase its size, which inhibited transitional fish to Moonshine Creek. Moonshine Creek may have been anadromous before the 1964 earthquake, but the connection no longer exists. Moonshine Creek is a small, shallow creek that has an approximately 50-foot section where the creek is subterranean. At the Green Lake outlet, the creek is mostly covered in floating and emergent plants, with only an intermittent defined channel for the first few hundred feet. Only three-spine stickleback have been documented in Moonshine Creek (Schoofs and Zonneville 2016).

Alpine Areas

Alpine areas are important components to the overall ecology of Alaska. Alpine ecosystems are very sensitive to disturbance, susceptible to damage, and slow to recover. The alpine tundra consists of dwarf shrubs with mosses and lichens dominating. JBER's alpine training areas are classified as having medium to high erosion risk (Jorgenson et al. 2004). JBER alpine training areas are used for light military training activities.

A report on alpine biodiversity was completed by Walker et al. (1997). They found 3 general alpine areas: a high-elevation zone above 5,100 feet with little vegetation; a middle alpine zone from 5,100 to 3,100 to 2,300 feet (depending on aspect) that is strongly affected by the combination of topography, wind, and snow; and a transitional, low alpine zone from 3,100 to 2,300 feet to the open spruce forests at lower elevations. The low alpine zone supports scattered trees mixed with forb meadows and shrub lands. Focal

species that occur in alpine habitats include collared pika, Golden Eagle, and Dall sheep (Johnson et al. 2017). Wetland systems unique to alpine and headwater regions are described in [Section 2.3.5](#).

Eagle River Flats

ERF and its associated tidal wetlands are important for both military training and natural resources conservation. The glacially fed Eagle River flows through the flats before discharging into Eagle Bay of Knik Arm in Upper Cook Inlet. ERF has been used since the 1940s as an impact area. Because ERF is off-limits, no development has occurred, preserving much of the ecosystem.

Racine and Brouillette (1995) have characterized ERF into 7 major physiographic zones and 15 vegetation classes, representing 67 species of vascular plants. Physiographic zones include Coastal (littoral coastline of ERF along Eagle Bay), Riverine (Eagle River and banks), Mudflat/Tidal Gully (silt-covered mudflats directly bordering Eagle River and along the coast), Interior Lowland (well vegetated, low embayment occupying southern 30% of ERF), Sedge Meadow (narrow band of continuous sedge meadow between mudflats along river and pond/marsh), Pond/Marsh (area of lower elevation along the middle and outer edges of ERF, characterized by permanently inundated ponds and associated marshes), and Border (abrupt upland border of ERF).

A complex interaction of physical forces acts on ERF, including those exerted by a high tidal range, glaciofluvial influences from Eagle River, sedimentation from turbid waters of Knik Arm and Eagle River, and the subarctic coastal climate of south-central Alaska (Lawson et al. 1996). Anthropogenic influences on ERF include military training, both historical (Army artillery impact area since 1949) and current (winter firing of artillery into flats), as well as activities associated with remediation of white phosphorus residues.

The combination of these forces and influences presents a complex and dynamic environment to organisms living within and around ERF. Despite this challenging physical environment, this area supports a variety of birds (approximately 68 species), mammals, fish, and approximately 30 species of benthic macro invertebrates, and it is a staging area for spring and fall migrations of thousands of waterfowl (Racine et al. 1993).

In 1980, unusually high numbers of waterfowl carcasses were observed on the flats. Concern over these mysterious deaths led to the 1987 formation of an interagency task force charged with finding the cause of the mortality and recommending options for remediation (CH2M Hill 1997). Investigations conducted in subsequent years identified exposure to white phosphorus particles deposited in ERF sediments following detonation of smoke-producing artillery ammunition as the cause of the increased waterfowl mortality (Racine et al. 1992). The primary route of exposure for dabbling ducks and swans was thought to be ingestion of the dense, water-insoluble particles while feeding in contaminated shallow ponds. In 1990, the Army stopped use of white phosphorus rounds during training in wetlands nationwide as a result of these findings.

In 1994, FRA was placed on the US EPA's National Priorities List under CERCLA (as amended by the Superfund Amendments and Reauthorization Act of 1986), and ERF was given the identifier "Operable Unit C". Operable Unit C includes ERF and an associated gravel pad where historical destruction of military ordinance was conducted (Open Burn/Open Demolition Pad). A comprehensive remedial investigation completed in 1996 concluded that the primary chemical of concern in the unit was white phosphorus and recommended that remedial action concentrate on hot ponds and be driven by waterfowl mortality (CH2M Hill 1997).

The resulting Record of Decision (ROD) for Operable Unit C (accepted by the US EPA and Army in 1998) outlined short-term and long-term waterfowl mortality objectives and identified the chosen remedial treatment as the temporary draining of pond water in white phosphorus-contaminated ponds (hot ponds) to allow sediment drying and consequent white phosphorus sublimation and oxidation. Remedial action began in spring 1999 and resulted in the successful remediation of all previously identified hot ponds (over 56 acres) with exception of a few, more recently discovered pools that were treated in 2006. Estimated bird mortality on ERF decreased to below the required remediation levels during that time period. Bird mortalities are no longer being observed on ERF. White phosphorus particles are persistent in saturated, low oxygen sediment like that found in ERF (Racine et al. 1992) and may be resuspended and potentially transported by tidal activity. Although trace amounts of white phosphorus have been detected in tidal gully sediments (but not water), all sediment and water samples from Eagle River and Knik Arm have been free of white phosphorus (CH2M Hill 1997, Bigl et al. 2011). All the Remedial Action Objectives from the ROD have been met and maintained well beyond the 20-year requirement stipulated in the 1998 ROD. Ongoing maintenance of gravel caps and fill areas will continue in the unlikely event that firing activities inadvertently disturb the capped areas. Outside of these areas, white phosphorus may still be present in sediments below the depth of oxidization, although if present, it likely occurs in a non-uniform distribution in ERF.

In 2010, the Air Force and Army conducted environmental impact analysis for the resumption of year-round firing and expansion of the impact area to meet training and qualification requirements for Combined Arms Live Fire Exercise. A draft Environmental Impact Statement (EIS) was published in April 2025. A Final ROD is anticipated in early 2026. Under the proposed action, the Air Force will modify winter firing restrictions at the ERF Impact Area, reinstate all-season indirect live-fire training and qualification, add 155-millimeter artillery to the authorized weapon systems at JBER, and expand the ERF Impact Area into 585 acres of adjacent upland. The maximum number of rounds fired into the ERF Impact Area is expected to increase from current levels. Protective measures to avoid or reduce impacts to CIBW and other resources will be implemented as part of the action and will be detailed in the Final EIS, ROD, and subsequent Mitigation and Monitoring Plan.

2.4 Mission and Natural Resources

2.4.1 Natural Resource Constraints to Mission and Mission Planning

Inherent physical and biotic components of the JBER landscape may present training constraints. Most limitations involve wetlands and floodplains protected by EOs, federal and state laws, and Army and DAF policies, but there are also limitations resulting from species at risk, MBTA, vegetation clearing guidelines, MMPA, ESA regulations (Public Law [PL] 95-632, 16 USC § 1531 et seq.), National Bald Eagle Management Guidelines (USFWS 2007), special interest areas, outdoor recreation, cultural resources, Superfund cleanup, and regulatory and legal requirements of individual agreements or National Environmental Policy Act (NEPA)-related mitigation. JBER has been successful in deconflicting potential constraints by conducting advanced planning and maintaining an open dialogue between mission planners, natural resources staff, and outside regulatory agencies.

Bird and Wildlife Aircraft Strike Hazard

The 3d Wing Safety Office (3 WG/SE) BASH program is codified in the 3d Wing Instruction (3 WGI) 91-212, *Bird and Wildlife Aircraft Strike Hazard Program* (3 September 2025), and is used in conjunction with DAFMAN 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Program*, to manage and minimize BASH risks. Species of BASH concern within the aerial dome include large birds (e.g., ducks, geese, raptors, cranes, swans, gulls, Common Ravens) and densely flocking birds (e.g., Bohemian

Waxwings, European Starlings). Mammals that pose an airfield risk include moose, bears, canids, voles, and lemmings that attract raptors to the airfield, and beavers that create attractive waterfowl habitat. Grasshoppers and caterpillars also create a BASH risk by attracting gulls, corvids, and other passerines to the airfield. Anthropogenic effects, such as food waste and dumpster management, also contribute to BASH risk. [Section 7.12](#) provides information on JBER BASH management.

Wildlife Risks to Human Safety and Health

Wildlife conflict issues are common on JBER. Wildlife can be found in close proximity to large numbers of people, facilities, and developments. Human–wildlife conflicts are likely to increase as development continues and remaining pockets of vegetation are cleared. Species that pose risks to personnel safety and equipment losses (e.g., moose, black and brown bear, wolves) are a primary concern to the JBER mission. These species can cause human injury, death, or vehicle collisions. Additional species that pose a human/pet health risk or risk to facility integrity are beavers, swallows, and small canids (both wild and feral). The management of wildlife conflict issues is further described in [Section 7.1](#).

“Living with Wildlife in Anchorage” Memorandum of Understanding

Recognizing the unique nature of human–wildlife conflicts in the Anchorage area, the ADF&G initiated a planning program for the Anchorage area in 1996 called *Living with Wildlife in Anchorage*. Two of the stated goals of this program were to “minimize opportunities for conflicts between wildlife and people” and “foster a sense of stewardship for wildlife and their habitats among the public, non-governmental organizations, and local governmental agencies.”

When EAFB and FRA were separate entities, they were members of this planning group and signatories to the 2000 *Memorandum of Understanding Regarding a Comprehensive Wildlife Management Plan, Living with Wildlife in Anchorage: A Cooperative Planning Effort for Anchorage, Alaska* (FWS70181-9-K235). Other key signatories included ADF&G, the Municipality of Anchorage, USFWS, and other land and natural resource management agencies. To ensure that the agencies were in agreement on managing human and bear conflicts, the US Army Garrison Alaska, USAF, EAFB, ADFG, and USDA signed AK-MOA-54, *Bear/human conflict response*.

Tribes connected to the installation were not consulting parties on these agreements but have a vested interest in habitat and wildlife management. As described in [Section 7.4.1](#), coordination and cooperation with Tribes on the management of wildlife will continue to be a priority for the JBER Natural Resources program.

2.4.2 Land Use

The main installation of JBER is comprised of 73,041 acres of land. Land use distribution is divided into 2 general terms: human-modified (approximately 14,000 acres) and unimproved grounds (approximately 59,000 acres) (673 CES GeoBase 2019).

Human-Modified Land

Human-modified lands include areas occupied by buildings and other permanent structures, as well as maintained lawns and landscape plantings. Specific areas on JBER include the cantonment areas, parade grounds, drill fields, athletic areas, golf courses, cemeteries, and housing areas. The main facilities on JBER are the airfields, which are each made up of 2 runways with associated taxiways and parking aprons. JBER cantonment areas have various services and administration buildings, dormitories and housing for military personnel, industrial and recreation facilities, medical and dental facilities, churches, schools, libraries,

2803 crafts shop, newspaper, theater, golf courses, the Base Exchange, and Commissary. The joint military mall,
 2804 installation hospital, Veterans Administration hospital, and privatized family housing units expanded into
 2805 previously forested ecosystems in the cantonment area.

2806 Outside of the cantonment areas, JBER human-modified lands include open fields around the flight line,
 2807 munitions areas, antenna fields, a munitions storage area, an EOD range, small arms ranges, large ranges,
 2808 artillery and mortar firing points, landing zones, drop zones, Mad Bull (Combat Engineer) Training Center,
 2809 and various communication facilities. The US Army Alaska Range and Training Land Program
 2810 Development Plan outline the range development requirements for Army training lands on JBER. The
 2811 INRMP does not conflict with the range development plan; rather, it complements the siting of new range
 2812 facilities by providing information that minimizes impact to natural resources.

2813 Major ranges on JBER include the following:

- 2814 • Mad Bull Training Center
- 2815 • EOD
- 2816 • Munitions Storage Area
- 2817 • Mahon Range
- 2818 • Fieldfire Range
- 2819 • Statler-Newton Small Arms Range
- 2820 • Oates-McGee Range
- 2821 • Grezelka Range
- 2822 • Zero Range
- 2823 • Record Range
- 2824 • Pendeau Range
- 2825 • Grenade Range
- 2826 • Shoot House Range
- 2827 • Off-Duty Range
- 2828 • 40-millimeter Range
- 2829 • Davis Range Complex
- 2830 • Biathlon Range
- 2831 • Aerial Target Range
- 2832 • Demolition Range
- 2833 • McLaughlin Range Complex
- 2834 • Infantry Platoon Battle Course
- 2835 • ERF Impact Area

2836 These ranges include 2 demolition ranges (Demo II and Demo III, listed as a single range) that are similar
 2837 to non-dudged impact areas. They also include 9 mortar firing points (listed as a single range) and 9 artillery
 2838 firing points (listed as a single range), all of which are located throughout the northern training area. The
 2839 list of ranges includes a skeet and trap range that is used primarily for recreation.

2840 Other notable range facilities on JBER in this category include the following:

- 2841 • Malamute Drop Zone
- 2842 • Bowling Alley, Geronimo, and Neibar Drop Zones
- 2843 • Landing Zones (about 25) for helicopter assaults
- 2844 • The Squad Obstacle Training Course

Unimproved Grounds

Unimproved grounds are coastal, riverine, open water, lowland, upland, subalpine, and alpine areas in which natural vegetation is allowed to grow unimpeded by maintenance activities. JBER's unimproved grounds are comprised of maneuver areas and impact areas. The ERF Impact Area is used for mortar and artillery firing from approximately 27 active firing points, which include 9 mortar firing points and 18 artillery firing points.

Military Land Uses

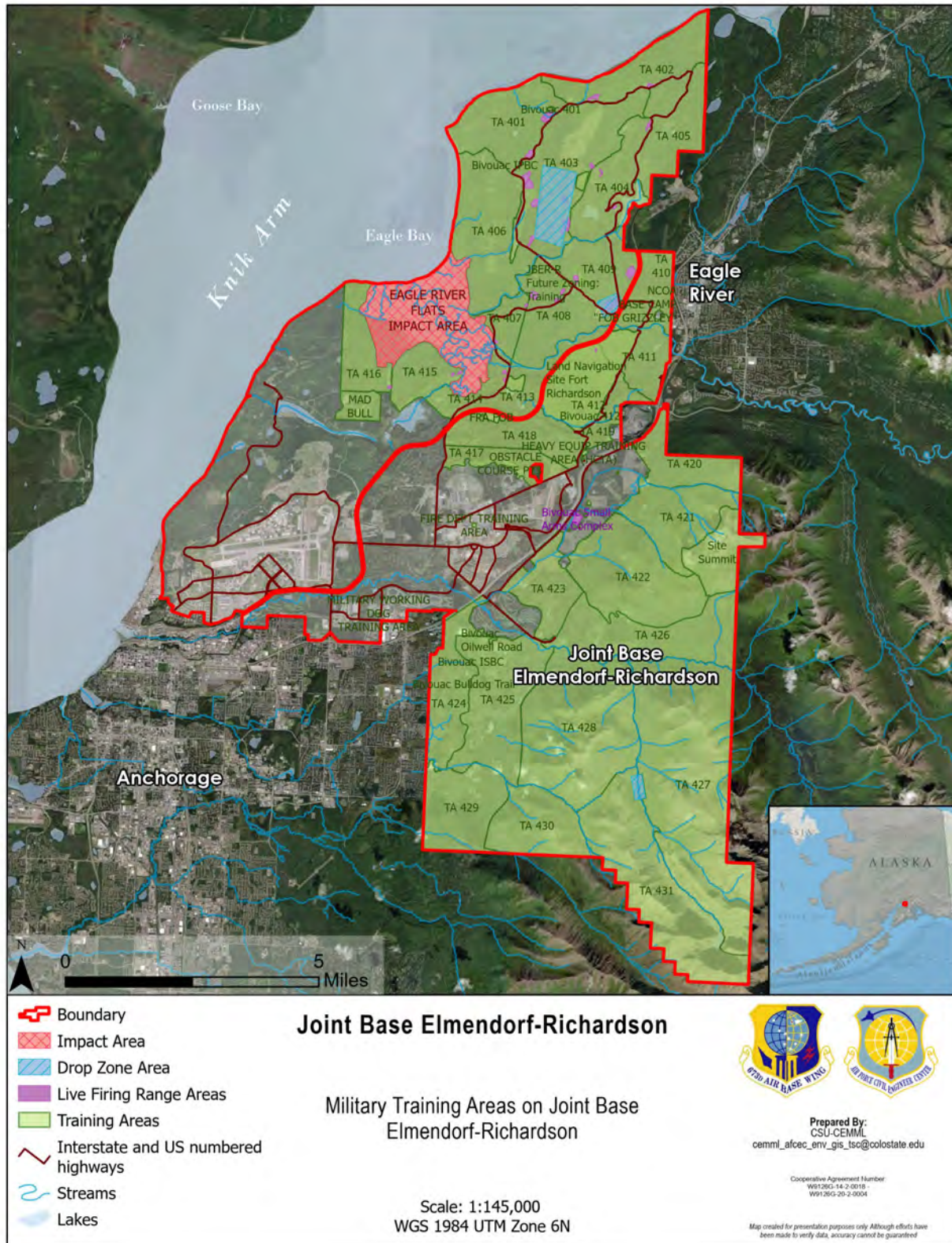
Military land use follows the categories discussed above. Training areas can be separated into 2 broad categories: maneuver training and weapons training. Maneuver training is conducted primarily in training areas or the unimproved grounds on JBER. A training area is space for ground and air combat forces to practice movements and tactics as specified in the unit's Army Training and Evaluation Program. Different unit types may work in support of one another (combined arms), or the unit may operate on its own to practice a specific set of Army Training and Evaluation Program tasks. Bivouac sites, base camps, drop zones, artillery and mortar firing points, and other miscellaneous training areas are included in these areas. Each training area is managed and scheduled by Range Control. Weapons training also have land-based requirements and occur primarily on firing ranges. Munitions from firing ranges land in surface danger zones or impact areas. Descriptions for military land use on JBER are provided in [Table 2-13](#).

Table 2-13. Joint Base Elmendorf-Richardson military land use descriptions

Primary Military Land Use Category	Secondary Military Land Use Category	Description
Cantonment Area	N/A	Area where most buildings are located, including those for office use, indoor training, and housing.
Recreation Area	N/A	Areas where recreation is the primary land use (e.g., Otter Lake Recreation Area, camping areas, installation golf courses).
Ammunition Storage	N/A	Off-limits areas where ammunition is stored; they are typically fenced off and not compatible with other land uses.
Training Area Facilities and Weapons Training	Firing Ranges	Semi-permanent or permanent facilities for weapons firing, demolition, assault courses, or other specific training, usually with associated buildings or berms. These include firing ranges, assault courses, and urban assault areas. Firing ranges are controlled and restricted for firing live ammunition from direct fire or line-of-sight weapons systems at targets within a controlled area. Typically, a range has left and right boundaries, which extend from the firing line forward to just past the last target array. Training ranges are normally reserved and equipped for practice and qualification in weapons delivery and/or shooting at targets. Furthermore, training ranges constitute a functional complex that normally includes a Range Control tower with associated firing points, lanes or pits, a cleared or graded area, target system emplacements, and a firing flag and flagpole, in addition to equipment-in-place, such as target control systems, target systems, targets, and fixed public address system components. A range could include an area for back blast safety zones, which can have a secondary use as non-duded impact area or maneuver area.
	Airstrips	Airstrips and assault strips are semi-permanent or permanent facilities for aircraft landing and taking off that are not paved or part of an urban area.
	Drop Zones	Drop zones or landing zones are cleared areas used for dropping troops and equipment that are maintained by mowing and hydro axing. These areas should have vegetation but are highly disturbed. Military activities include airborne assault, air assault in support of combined arms, aeromedical evacuation, and landing zones for rotary wing aircraft.
Maneuver Training Areas	Maneuver Areas	Open to semi-open areas where vehicles can move without running into obstacles such as trees, range buildings, streams, wetlands, and lakes. Military activities that occur in these areas include offensive operations, tactical movement, movement to contact, relocating a unit to a new site, defending an assigned area, relocating/establishing new area of operations, trail construction, mobility and counter mobility operations, and reducing or constructing obstacles with equipment.

Table 2-13. Joint Base Elmendorf-Richardson military land use descriptions

Primary Military Land Use Category	Secondary Military Land Use Category	Description
	Impact Areas	Areas within and above an operational range used to contain fired or launched military munitions. Impact areas may be delineated by operational range use. For example, the delineation of an indirect-fire weapon system impact area accounts for probable error in military munitions range and deflection. The delineation of a direct-fire weapon system impact area accounts for the total surface danger zone from the firing point or position downrange to impact. Other examples include: • Dedicated impact area, duded—An impact area with permanently delineated boundaries normally used to contain non-sensitive, high-explosive, military munitions. • High-hazard impact area—A permanently designated impact area used to contain sensitive, high-explosive military munitions, normally delineated within a dedicated impact area where access is restricted due to unexploded ordnance hazards (22 AR 385–63/MCO 3570.1C, 30 January 2012). • Impact area, non-duded—An impact area with designated boundaries used to contain non-explosive military munitions. These areas are primarily composed of small arms range safety fans and are available for maneuver when not used for military munitions training. • Impact area, temporarily-duded—An impact area primarily used to contain non-explosive military munitions that may be temporarily used to contain non-sensitive, high-explosive, military munitions. Area should be capable of being cleared for maneuver.
	Bivouac Areas	Semi-open to semi-closed areas where units stop or camp for a period of time. Activities include assembly area, combat service support, unit security, and defense operations.
	Foot Use Areas	Areas that show little or no impacts from military use. Units are on foot and conduct movement to contact and land navigation.
Maneuver Training Areas <i>(continued)</i>	Firing Points	Localized areas from which either artillery or mortars are fired; often open areas with high vegetation disturbance. Firing points are sometimes also designated by survey markers.
	Road Corridors	Road corridors are defined as semi-permanent or permanent access ways including ditches and the open rights-of-way on each side of the road.
	Rights-of-Way	Rights-of-way are any areas used for utility or pipelines (electric, gas, or communication). Areas bordering either side of roads are not considered a separate rights-of-way.
	Excavations	Excavations are gravel pits, military engineer training areas, or similar areas that show signs of manual or mechanical digging.



2864

2865 Figure 2-19. Map of military training areas within Joint Base Elmendorf-Richardson

Outgrants

About 4,045 acres of JBER are outgranted. These areas include but are not limited to material sites (weigh station, gravel pits, landfill overflow), the Glenn Highway, a pipeline, utility easements other than utility privatization (water, electrical, cable, gas, and communications), schools, banks, a credit union, fish hatcheries, parks, the Federal Aviation Administration, and the Alaska Army National Guard area (Camp Carroll, Camp Denali, and Bryant Army Airfield). In addition, about 960 acres of JBER are used for private-sector financed housing under a 50-year lease.

Utilities for installation purposes are owned by Doyon Utilities under a Utilities Privatization contract. Doyon Utilities has an easement, but the exact number of acres affected has not been calculated as the unit of measure is in linear feet.

Integrated Training Area Management

The Army relies on land to achieve its training and testing objectives and maintain force readiness. Force readiness depends on high-quality realistic training. The use of these lands for training and testing purposes can cause damage that can potentially reduce the quality of training. ITAM serves the overall needs of the Army by overcoming the apparent conflict between force readiness and stewardship.

The Army's ITAM program is a core program of the Sustainable Range Program and is responsible for maintaining the outdoor classroom to help the Army to meet its training requirements. ITAM provides the capability to manage training lands by integrating mission requirements with environmental requirements and sound land management practices. ITAM establishes a systematic framework for decision-making and management by integrating elements of operational, environmental, master planning, and other programs that identify and assess land use alternatives. ITAM includes the following components:

- Training Requirements Integration—Provides trainers and range managers with technical information to balance training needs with land constraints
- Land Rehabilitation and Maintenance (LRAM)—Improves and enhances training capacity through repair, maintenance, and reconfiguration of training land
- Range and Training Land Assessment—Collects data to determine training land conditions, identifies areas needing repair or reconfiguration, and supports range operations and modernization planning
- Sustainable Range Awareness—Educates trainers and range managers on how to reduce impacts on training land
- GIS—Provides standard mapping and spatial analysis capabilities for ITAM, range operations, and modernization

ITAM is an Army-funded and operated program that is implemented on JBER-R. ITAM program administration is coordinated with this INRMP for all planned land use actions that alter the current land use condition (e.g., erosion control, trail or firing point development). Since ITAM affects and can improve JBER natural resources, it is important that the Natural Resources and ITAM personnel coordinate efforts on the lands that they jointly manage. Meetings and coordination occur between the ITAM and range staff as issues arise throughout the year. Coordination occurs on a monthly and as-needed basis between ITAM staff and the JBER Forester throughout the winter.

Informal meetings and coordination efforts will occur throughout summer months to help maximize efforts between LRAM, Wildland Support Module (WSM), and Forestry work crews. Spring coordination occurs, as applicable, to combine seasonal ITAM field crew training with JBER staff training (e.g., moose and bear

safety training, Red Cross first aid training). In addition, communication with JBER contractors working on various projects (e.g., wetland delineation and cultural resource surveys) is coordinated weekly throughout the field season. Additional coordination with the Natural Resources Manager (NRM) occurs as issues arise.

2.4.3 Current Major Mission Impacts on Natural Resources

Mission-Related Impacts

New installation-level developments can individually or cumulatively impact natural resources. Habitat losses, fragmentation, and wildlife movement corridor restrictions via expansion of the North/South runway, creation of a trail into alpine training lands, and development of advanced training ranges and facilities have recently been initiated or are expected to occur in the foreseeable future. The JBER IDP (673 ABW 2015) describes additional future land conversion projects. NEPA documents on military construction address these natural resources concerns. Mission-related impacts can also positively impact natural resources. For example, the recent land use conversion of Eagleleglen Golf Course to Eagleleglen Fitness Park has increased wildlife habitat and restored movement corridor connectivity.

The challenge of properly mitigating or compensating for lost habitat and corridor disruption has increased with diminishing habitats that are available or capable of meeting modification requirements. Identifying and maintaining adequate travel corridors is challenging. Habitat loss or fragmentation presents an ever-increasing human–wildlife conflict safety risk.

Future planned developments will support overall JBER mission accomplishment. However, unless such development is constructed directly on existing hardstands or urban landscaped areas (replacing existing development), these projects inevitably affect natural ecosystem functionality in a cumulative fashion.

JBER natural resources staff works closely with planners, using the NEPA process, to minimize ecological impacts to the highest degree practicable consistent with the military mission. The staff must also manage for multipurpose resource use if possible, maintain a public recreational access program, and most importantly, ensure no net loss in the installation's ability to support its military training program. Forethought on project siting decisions is often the best way to minimize impacts to ecosystem functionality.

The current DAF Indo-Pacific Command tempo has a major impact on JBER, which has been identified as a critical intermediate location for the deployment and materials necessary for posturing. Much of the development that has occurred on JBER in recent years includes redevelopment of existing developed areas, including demolition projects to make way for new projects including the Joint Integrated Test and Training Center, a C-17 simulator, a helicopter training simulator, multiple substations, a new aircraft fuel system, and a water treatment plant. Other pending projects will require expansion that exceeds the currently developed area, particularly to the north of the Elmendorf airfield.

Land-Based Training

Past Impacts

JBER lands were withdrawn during or since World War II. Military use has changed the landscape through construction and weapons and maneuver training. While military use has altered these habitats from their original condition (pre-World War II), the withdrawal of land for military use has had a long-term positive effect on natural resources, as these areas would have likely been enveloped by the expansion of Anchorage and other communities in the area. Most of the land outside of the cantonment areas and airfields remains

2949 undeveloped and is affected only by training impacts. Proactive natural resources programs since the early
2950 1970s have mitigated impacts from military training and have resulted in positive impacts on natural
2951 resources.

2952 Present Impacts

2953 Maneuver training impacts to soils, vegetation, and wetlands occur primarily from driving vehicles (on and
2954 off roads). Localized impacts can occur in bivouacs, base camps, and assembly areas from digging,
2955 vegetation damage, spills, and trash. These activities also create a minor potential for hazardous material
2956 spills or fire starts. Some training activities can cause erosion, road degradation, creation of new trails, and
2957 long-term habitat change.

2958 Direct fire weapons training occurs primarily on firing ranges; indirect fire weapons training occurs on
2959 mortar or artillery firing points. Munitions from firing ranges land in surface danger zones or impact areas.
2960 A live-fire operation is defined as a training event that uses service (or real) ammunition as opposed to
2961 blank ammunition. A direct fire operation occurs when ammunition is delivered on target by sighting
2962 directly on the target using the weapon system's sighting equipment. During a direct live-fire event, Soldiers
2963 maintain an unimpeded direct line-of-sight between their location and the targets, while shooting real bullets
2964 at those targets. Indirect fire means that weapons are fired up in the air at a trajectory. Soldiers do not
2965 maintain an unimpeded direct line-of-sight between their location and targets, but rather track munitions
2966 through a forward observer or other technological means.

2967 Live-fire ranges are maintained and targets replaced on a regular basis to provide realistic training. While
2968 some impacts occur on range berms and target locations, most impacts on the environment occur in impact
2969 areas. Impacts to soils, water, and vegetation from live-fire weapons training include cratering, target scrap,
2970 munitions residues, and the potential for unexploded ordnance and fire starts.

2971 Training to doctrinal standards under realistic combat conditions will affect the environment. Providing
2972 premiere and realistic training opportunities requires training lands to be in good environmental condition.
2973 The Army ITAM program serves the overall needs of the Army by overcoming the apparent conflict
2974 between force readiness and environmental stewardship. The ITAM program essentially acts as an ongoing
2975 mitigation program for Army maneuver training activities on JBER-R. It is the formal strategy for focusing
2976 on sustained use of training lands, and it provides the Army with the sound planning and execution
2977 mandatory to protect JBER land as an essential training asset. The integration of stewardship principles into
2978 training land and natural resource management practices ensures that JBER's lands remain viable to support
2979 future training and mission requirements.

2980 There are also positive effects of the military mission on natural resources. The land-based military mission
2981 fosters relatively healthy, stable ecosystems. While infantry-related exercises may cause localized damage,
2982 they seldom threaten ecosystems or biodiversity. The DAF's and Army's commitment to natural resources
2983 management, including minimizing and mitigating military mission damage, is also beneficial for natural
2984 resources and the people who use them.

2985 Another positive effect of the military mission is that some of the land within a military installation is often
2986 protected from encroachment and remains in a relatively pristine state compared to similar land off the
2987 military installation. For areas on JBER that are not subject to intensive military use (i.e., infantry-related
2988 exercises), military use ensures habitat and ecosystem protection by protecting the land from urban
2989 development and minimizing encroachment.

Natural resources management emphasizes the accomplishment of multiple objectives for both natural resources management and military training, rather than conflicts with the mission. Habitat enhancement areas (especially those for species such as moose or grouse that depend on primary successional vegetation) are often used as bivouac areas for training. Surveys of training lands to identify special interest areas and highly susceptible and easily degradable lands is a continual goal of the INRMP and an ITAM function through the Range and Training Land Assessment program. Conversely, training exercises can be used as a tool to accomplish natural resource management objectives.

Extensive studies conducted in the Snowhawk and Chester creek alpine training areas on JBER have identified progressive encroachment of tall, woody vegetation in areas that were previously dominated by alpine tundra vegetation, on which training depends. While anthropogenic effects on alpine areas have been identified (new footpaths, small training facilities, etc.), these studies have determined that the training activities have not resulted in significant degradation or change to the environment. Instead, these studies have attributed the changing vegetation and any large amounts of soil disturbance to natural processes and wildlife. There is a moderate potential for training activities to result in the introduction of invasive species, which can have a significant effect on alpine areas over time (Johnson et al. 2022).

Environmental Contamination

CERCLA, also known as Superfund, regulates the cleanup of hazardous substance sites and imposes liability for cleanup on the responsible parties. Sites owned or used by federal agencies are subject to this statute. Responsibilities governed by this statute include the management of hazardous substances, reporting releases of hazardous substances, and cleaning up environmental contamination. Roles, responsibilities, and best management practices (BMPs) regarding solid waste are detailed in the 2023 Integrated Solid Waste Management Plan (673 ABW 2023b).

The Defense Environmental Restoration Program is a DoD program designed to identify and remediate past environmental contamination on its installations. Procedures for handling, storing, and disposing of hazardous waste prior to the mid-1970s resulted in contamination of the environment, although the procedures were standard at the time. The Defense Environmental Restoration Program process evaluates past disposal sites, controls migration of contaminants, controls potential hazards to human health and the environment, and conducts environmental restoration activities. Preliminary assessments are followed by site inspections, remedial investigations, and feasibility studies.

In 1990, EAFB was placed on the US EPA's National Priorities List. JBER-E has 6 Superfund operational unit sites resulting from past waste management practices or accidental releases. These operable units are comprised of smaller parcels that are grouped based on geographical proximity and similar contamination types, contaminated media (soil and/or groundwater), and/or remedial approaches. Each operable unit has an ROD signed by the US EPA, Alaska Department of Environmental Conservation (ADEC), and the DAF, requiring remedial actions until specific goals are met.

JBER-R has 5 Superfund operational unit sites. In 1994, Fort Richardson was placed on the US EPA's National Priorities List (under Superfund), and ERF was designated as a Superfund site due to unoxidized white phosphorus from smoke-producing ammunition. The ROD stipulated Remedial Action Objectives (extensive drainage of ponds within ERF) for the site to allow oxidation of white phosphorus, a 50% reduction in waterfowl mortality from the 1996 baseline within 5 years, and reduction of mortality to 1% of the total waterfowl population within 20 years. The reduction in waterfowl mortality has been achieved within the limits of statistical analysis. ERF will remain a Superfund site for the foreseeable future ([Section 2.3.6](#)). The remaining 4 Superfund sites have little effect on natural resources.

Other Impacts

Public Access

Public access is allowed IAW the Sikes Act and is subject to safety requirements and military security. Significant events, most notably the terrorist attack on 11 September 2001, have forced installations to tighten security requirements. For the foreseeable future, public access to JBER will be closely controlled and in some areas highly restricted ([Section 7.2](#)).

Fish Passage Initiatives

Ship Creek had been identified through a local environmental awareness group, along with state and federal resource agencies, as a candidate system for dam removal/modification to enhance fish passage and return the system to an ecosystem complete with the nutrients added by anadromous fish (salmon). This goal is shared by the Native Village of Eklutna in hopes of reestablishing potential subsistence sources for salmon. Removing or improving fish passage past the dam, above the hatchery, would increase the length of anadromous stream on JBER land, increase spawning and productivity for salmon, increase marine-derived nutrients to stream vegetation, provide additional resources for wildlife, and potentially increase opportunities for fishing and salmon viewing. However, removal/modification may have the potential to significantly increase human–wildlife interactions and mission risks (BASH) if not carefully evaluated. In the 2009 lease agreement, EAFB and ADF&G agreed that in providing land for the expansion of the ADF&G fish hatchery, the DAF would not remove the dam or allow salmon escapement above the existing fish ladder and dam at the hatchery.

In 2014, JBER obtained the necessary permits to remove the low head dam located at JBER-R fish hatchery. The 773d Civil Engineer Squadron (773 CES) roads and grounds crew removed the dam on 14 January 2015.

JBER and ADF&G initiated the Otter Lake/Creek restoration project in 2010 ([Section 2.3.3.1](#)). The project was designed to remove all pike with rotenone, remove fish passage obstacles, enhance spawning habitat, and reintroduce salmon into the system. MWH Global, Inc. (2015a) collected baseline data in 2011 to 2013. The rotenone application occurred from 6 to 9 October 2015. In spring 2016, nets were set underneath the ice on Otter Lake and eDNA samples taken once the ice melted to verify that the treatment worked. Neither the nets nor the eDNA identified presence of pike. Adult coho salmon were observed in 2015 in Otter Lake and Otter creek upstream from Otter Lake Road. In 2017, the stream channel from the lake outlet was modified and an Otter Lake Road culvert was replaced. These stream modifications created favorable spawning habitat and enabled anadromous fish passage into the lake. The project was successfully completed in fall 2017.

2.4.4 Potential Future Mission Impacts on Natural Resources

Future impacts to natural resources as a result of mission changes that are not covered under current planning documents will be addressed by separate NEPA documentation. Natural resource management on JBER is not optional. In addition to the Sikes Act requirement of natural resource management on all military (including withdrawn) lands, natural resource management and effects are typically thoroughly analyzed for all internally and externally prepared NEPA documents.

Noise Impacts on Beluga Whales and Other Marine Mammals

Military mission-generated noise becomes a natural resources issue when it has the potential to affect a listed species, such as the endangered CIBW, or its designated critical habitat. Sound waves (i.e., noise)

propagate through land and water and can cause auditory fatigue, auditory masking, auditory injury, and behavioral changes to individual marine mammals, with similar effects on their prey.

Auditory masking occurs if the noise from an activity interferes with an animal's ability to detect, understand, or recognize biologically relevant sounds. Biologically relevant sounds for the beluga whale likely include calls from other belugas (e.g., those between cows and calves), self-generated echolocation click trains, and calls and click trains from predators (e.g., killer whales). The frequency, received level, and duty cycle for the potential masking noise and the signal of interest determine the potential degree of auditory masking. Detections of signals under varying masking conditions have been determined for active echolocation and passive listening tasks in toothed whales (Johnson 1971, Au and Pawloski 1989, Erbe 2000). These studies provide baseline information from which the probability of masking can be estimated.

If marine mammals detect anthropogenic noise, a behavioral or physiological stress response could occur. Animals that alter their natural behaviors (e.g., feeding, breeding, and sheltering) may incur a biologically significant cost from such responses. However, costs that result from brief interruptions to transiting or migrating are likely to be less important. A physiological stress response is characterized by a release of hormones (Reeder and Kramer 2005) or other stress-related chemicals.

For CIBW, reactions to military disturbances (e.g., detonations, low jet overflights) could include behaviors such as increased alertness, displacement, and cessation of echolocation. These behaviors may reduce foraging opportunities. Models indicate that intermittent losses of foraging opportunities during the summer and fall would have little effect on CIBW fitness if prey were abundant but would adversely affect fitness if prey were reduced (McHuron et al. 2023). Thus, the biological consequence of intermittent anthropogenic military disturbances on CIBW depends on whether prey remain abundant during the summer and fall. Declines in high-quality prey within Cook Inlet have been observed for Chinook in southcentral Alaska (Jones et al. 2020). Combined with lost foraging opportunities (e.g., from behavioral reactions to noise), such declines could lead to declines in individual beluga fitness and potential adverse consequences to the population as a whole.

Auditory fatigue, or temporary threshold shift (TTS), may result from overstimulation of the delicate hair cells and tissues within the auditory system. The result of TTS is a temporary increase in the hearing threshold (i.e., reduced hearing sensitivity), which eventually returns to normal. Reduced hearing sensitivity that does not return to normal after a relatively long period of time post-exposure (usually in the order of weeks) is considered auditory injury or permanent threshold shift (PTS) (Southall et al. 2007). PTS could result in reduced fitness and even death of individual belugas.

NMFS recently released new acoustic criteria for assessing the onset of TTS and PTS as a potential result of a given anthropogenic noise. This guidance divides marine mammals into functional groups based on their shared hearing physiology: Low-frequency cetaceans (LF), Mid-frequency cetaceans (MF), High-frequency cetaceans (HF), Phocid pinnipeds underwater (PW), and Otariid pinnipeds underwater (OW). The CIBW is in the MF group, the harbor porpoise is in the HF group, and the harbor seal is in the PW group. For impulsive noises, NMFS uses dual criteria to assess threshold onset: peak sound pressure level (SPL), which is unweighted, and weighted cumulative sound exposure level (SEL_{cum}), accumulated over a maximum of 24 hours. The SEL_{cum} criteria must also be adjusted using an auditory weighting function specific to each functional group. These functions encompass current knowledge of marine mammal hearing and susceptibility to noise-induced damage and are designed to adjust a measured or estimated sound exposure level (SEL) to account for the frequency content of the noise.

These new criteria are considerably more complicated to employ than the previous acoustic thresholds used by NMFS. In recognition of this, the new technical guidance offers multiple alternate methods to analyze

the potential for an action to result in the onset of TTS or PTS. However, given the complexity of the sound field presented in the ERF and the importance of getting the most realistic measurements for the analysis, JBER decided to obtain site-specific data within ERF.

A joint team from the DAF, Army, Navy, National Marine Mammal Foundation, Colorado State University, and Alaska Sea Life Center conducted underwater acoustic measurements of explosive detonations (ordnance and C-4 equivalents) placed within ground impact areas of ERF on 18 and 19 July 2018 at multiple concurrent locations in Eagle River and Eagle Bay. The detonations were conducted under an informal consultation with NMFS under Section 7(a)(2) of the ESA (NMFS PCTS # AKR-2018-9779). Measurements were obtained for 60-millimeter HE mortars (0.9 lb. net explosive weight), 105-millimeter HE rounds (8.4 lb. net explosive weight) and C-4 equivalents, and 155-millimeter HE rounds (15.7 lb. net explosive weight). The distances from the detonations and the measurement sites during this test were between 525 feet and 3,248 feet in Eagle River and between 3,281 feet and 7,218 feet in Eagle Bay.

Peak SPLs, unweighted SELs, and weighted SELs (per marine mammal hearing group) were provided in a report for each detonation and measurement location, and the values measured for all detonations during the test were below the thresholds for the onset of TTS and PTS for all hearing groups measured (mid-frequency, high-frequency, pinniped) (US Navy 2019).

Subsequent to these in-situ explosives tests, an environmental consulting company (JASCO Applied Sciences) was contracted to assess the potential impacts to marine mammals and fish as a result of detonations of military HE munitions within the ERF Impact Area. JASCO conducted numerical modeling of the potential waterborne and airborne sound propagation resulting from a combination of munitions as proposed in the ongoing Proposed Mortar and Artillery Training area environmental impact analysis.

Proposed Mortar and Artillery Training

The Army currently fires indirect weapons systems (i.e., artillery and mortars) into the ERF Impact Area from November through March if there is sufficient ice cover to protect the underlying sediment (5 inches of ice cover for 120-millimeter HE mortars and 105-millimeter HE Howitzer rounds, and 2 inches of ice for 60-millimeter and 81-millimeter HE mortars). Pursuant to Section 7 of the ESA, NMFS concurred with JBER that firing HE rounds into the ERF during frozen months may affect but is not likely to adversely affect the CIBW or adversely modify its critical habitat. This determination was predicated on mitigation measures offered by JBER during the consultation process ([Section 7.4.2](#)).

The Army identified a need to expand home-station live-fire training in the ERF into non-winter months to ensure adequate training and qualification of units without the need to deploy them to Fort Wainwright. In a draft EIS, the US Army Garrison, Fort Richardson, considered an alternative that, if implemented, would reinstate year-round, live-fire training in the ERF Impact Area (US Army Alaska 2010a). After careful study, the Army determined that the resumption of year-round, live-firing at the ERF Impact Area had the potential to adversely affect CIBWs because the noise associated with HE munitions training may result in behavioral take of marine mammals.

The DAF conducted substantial noise modelling and analysis of the potential impact to marine mammals before working with the Army to develop a range of measures that minimize these risks. A Biological Assessment was submitted to NMFS in October 2024. Upon review, NMFS determined that the action, combined with the extensive measures proposed to mitigate the risk of effect, was not likely to adversely affect marine mammals. A Letter of Concurrence without authorization of Incidental Take was received from NMFS in July 2025.

Ongoing Military Activities

JBER and NMFS conducted 2 separate informal consultations on the potential effects of military fighter aircraft overflights of Knik Arm. In both cases (the addition of 7 F-22 aircraft and the proposed relocation of 21 F-16 aircraft to JBER), NMFS concurred with JBER's determination that overflights by F-22s and F-16s may affect but were not likely to adversely affect the CIBW and that these overflights would not result in adverse modification to designated CIBW critical habitat. Included in the F-16 consultation was an analysis of the effects on the CIBW from overflights of other aircraft already operating from JBER, including F-22, C-17, C-130, E-3A, and transient aircraft (transient F-15E, C-130, C-17, B-737, KC-135R, and C-5A). The potential effects from these aircraft operations, in addition to the F-16s, were included in JBER's final "may affect but not likely to adversely affect" determination.

Both the Army and DAF train using HEs that are detonated on JBER land. The ERF Impact Area has been used for weapons (e.g., artillery and mortar) training since the 1940s and sustained heavy year-round use until February 1990, when the Army voluntarily implemented a temporary firing suspension. In December 1991, live-fire weapons training within ERF Impact Area was resumed, restricted to winter months only when specified ice conditions are met. The forthcoming ROD (expected in early 2026) to be completed by the DAF on behalf of the Army will modify winter firing restrictions at the ERF Impact Area, reinstate all-season indirect live-fire training and qualification, add 155-millimeter artillery to the authorized weapon systems at JBER, and expand the Impact Area into 585 acres of adjacent upland. Protective measures, standard SOPs and BMPs, and mitigation will be implemented to avoid or reduce impacts to CIBWs and other resources as part of the action.

Additionally, JBER conducts explosive ordnance training such as EOD and demolition training. The DAF and Army have training areas for live fire training with conventional and improvised explosives. A recent study conducted by JBER and the Navy found that a 74-pound net explosive weight charge of buried C4 detonated at an explosive ordnance range on JBER (Demo III, located approximately 2,625 feet from Knik Arm) resulted in a maximum SPL of 139 decibels referenced to 1 micropascal root mean square in Eagle Bay (Henderson et al. 2012). A later study found that a 151-pound net explosive weight charge buried on the same range (Demo III) resulted in a maximum SPL of 145 decibels referenced to 1 micropascal root mean square in Eagle Bay (Henderson et al. 2013). Based partially on these results, NMFS, under informal consultation with JBER, agreed with JBER's determination that explosive ordnance activities on the base may affect but were not likely to adversely affect the CIBW and that they were not likely to adversely modify its critical habitat.

Mission Sustainment

Encroachment is defined in Air Force Instruction (AFI) 90-2001 (31 July 2019) as "any deliberate action by any governmental or non-governmental entity or individual that does, or is likely to inhibit, curtail, or impede current or future military activities within the installation complex and/or mission footprint; or any deliberate military activity that is, or is likely to be incompatible with a community's use of its resources." AFI 90-2001 groups mission sustainment hazard categories into 7 broad categories: airspace; land and sea; spectrum; water; energy; climate and weather; and natural and cultural resources. Encroachment is also a focus of the Army Sustainable Range Program described in Army Regulation 350-19 (30 Aug 2005), which defines range encroachment as "external influences threatening or constraining range and operating area activities required for force readiness and weapons research, development, testing, and evaluation." It includes, but is not limited to, endangered species and critical habitat, unexploded ordnance and munitions, electronic frequency spectrum, maritime, airspace restrictions, air quality, airborne noise, and urban growth.

Current or potential encroachment challenges from within all 7 DAF categories and many Army examples exist within and around the installation and the JBER installation complex/mission footprint.

Mission-sustainment challenges identified by the JBER Installation Mission Sustainment Team include proposals by non-military entities to acquire JBER lands; incompatible land use in areas adjacent to the installation; effects of the planned development north of the installation; lack of knowledge among community stakeholders of the military mission, leading to unreasonable expectations; and conflicts with unauthorized recreators in military training areas, specifically associated with the use of the South Post Training Areas. Modern military systems tend to require larger standoff distances and safety buffers than legacy systems, resulting in new constraints in military areas that were previously adequate. Mission impacts are also aggravated by the limited land and airspace within the Anchorage Bowl, the largest urban center in the state, and the Matanuska-Susitna Borough, the population of which is expected to continually increase.

DAF and Army encroachment management guidance emphasizes the need for communication and collaboration with external stakeholders to avoid, manage, and minimize mission impacts resulting from encroachment challenges. This may take the form of engagement with individual stakeholders, participation in local and regional bodies and planning exercises, or partnerships to create buffer areas outside of installation boundaries. The DoD's Readiness and Environmental Protection Integration Program partners with non-DoD stakeholders to conserve land across the nation to benefit the DoD mission, local communities, and natural resources. The DoD's Office of Economic Adjustment administers the Compatible Use Program, which provides assistance to state and local governments to ensure mission compatibility. Encroachment is managed and mitigated using the JBER Installation Complex Encroachment Management Action Plan (JBER 2012).

Port of Alaska

The Port of Alaska serves 85% of the population of Alaska by providing about 50% of all consumer goods for the state, including military fuel, materials, and supplies. The Port of Alaska's current infrastructure is past its economic and design life and needs replacement. The port is in the process of modernizing the facility, known as the Port of Alaska Modernization Program. The goals of the project include:

- Enable safe, reliable, and cost-effective port operation
- Improve resiliency to enable facilities to survive extreme seismic events and Cook Inlet's harsh marine environment with minimal operation disruption for at least 75 years
- Update facilities to improve operational efficiency and sustainably accommodate modern shipping operations (e.g., support larger, deeper draft vessels)
- Optimize facilities to accommodate changing statewide economic and market needs (e.g., petroleum product shipments are increasing significantly faster than general cargo growth due to Flint Hills refinery closure in 2014)
- Optimize project scope, schedule, and budget to deliver practical, timely and cost-effective port modernization program

The project is anticipated to last from 2020 to 2027 and will be phased/managed to enable continuous port and tenant operations.

The BO for the project considered direct, indirect, and cumulative effects on the CIBW. The proposed action is expected to result in direct and indirect impacts to these whales. It is estimated 34 whales may be taken annually by harassment during the term of the MMPA authorization (i.e., construction period). This harassment is not likely to result in injury or death. After construction, some whales would be exposed to

increased noise due to operation of the port. This exposure is unlikely to cause injury or mortality, although individual whales may alter their behavior for a brief period of time. An accounting of the probable level of removals associated with other anthropogenic actions and a projection of cumulative impacts to this population does not suggest current trends in this population would be altered.

NMFS excluded the waters near the Port of Alaska from the CIBW Critical Habitat designation in its 2011 final rule, stating that “given that the DoD has stated the Port of Alaska is critical to military operations in and deploying out of the State of Alaska, any delays in military movements through the Port of Alaska could reduce the ability of the military to ensure national security.”

Risks Associated with Weather and Natural Hazards

Major changes in temperature, warming of rivers, and extensive melting of permafrost have been clearly documented in Alaska and Canada over the last 20 years. The widespread melting of permafrost is a major concern in northern portions of Alaska where continuous and discontinuous permafrost are present. The loss of permafrost can impact the stability and developmental capacity of infrastructure at JBER and alter wildlife habitat on base. Further discussion of natural hazards, risks, vulnerabilities, and adaptation strategies are in [Section 7.16](#).

3261 **3.0 ENVIRONMENTAL MANAGEMENT SYSTEM**

3262 The DAF environmental program adheres to the Environmental Management System (EMS) framework
 3263 and its Plan, Do, Check, Act cycle for ensuring mission success. EO 13834, *Efficient Federal Operations*;
 3264 DoDI 4715.17, *Environmental Management Systems*; DAF Instruction (DAFI) 32-7001, *Environmental*
 3265 *Management*; and International Organization for Standardization 14001 standard, *Environmental*
 3266 *Management Systems—Requirements with guidance for use*, provide guidance on how environmental
 3267 programs should be established, implemented, and maintained to operate under the EMS framework.

3268 The Natural Resources program employs EMS-based processes to achieve compliance with all legal
 3269 obligations and current policy drivers, effectively manage associated risks, and instill a culture of continual
 3270 improvement. The INRMP serves as an administrative operational control that defines compliance-related
 3271 activities and processes.

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3272 **4.0 GENERAL ROLES AND RESPONSIBILITIES**

3273 General roles and responsibilities that are necessary to implement and support the Natural Resources
 3274 program are listed in the table below. Specific natural resources management-related roles and
 3275 responsibilities are described in appropriate sections of this plan.

3276

Table 4-1. General roles and responsibilities at Joint Base Elmendorf-Richardson (JBER)

Office/Organization/Job Title*	Installation Role/Responsibility Description
Installation Commander	The 673d Air Base Wing (673 ABW) is the host unit at JBER, with responsibilities to maintain daily operation and furnish services and support to JBER military personnel, supported and tenant organizations, civilian staff, family members, and the surrounding community. The 673 ABW Commander bears ultimate approval authority for this Integrated Natural Resources Management Plan (INRMP).
Air Force Civil Engineer Center (AFCEC) Natural Resources Subject Matter Expert	AFCEC Environmental Operations Division Pacific Region (AFCEC/CZOP) provides installation support for the JBER natural and cultural resource program and is considered the Alaska natural and cultural resource Subject Matter Expert.
Installation Natural Resources Manager	The 673d Civil Engineer Group provides most of the natural resources direction for JBER. Organizations within this group that are involved with natural resources management are detailed below. Annual INRMP reviews, updates, and changes are approved by the 673 CES Commander.
Installation Tribal Liaison Officer, Community Partnership Office (673 ABW/CP)	The 673 ABW/CP engages with the public, local municipal government, and Alaska Native entities on issues affecting the community. It serves as the Point of Contact for public inquiries and concerns about activity on JBER. The 673 ABW/CP is involved in natural resource public awareness and works with the 673 CES to communicate with the public and Tribes about policy changes, mission requirements, and National Environmental Policy Act (NEPA) analysis.
Installation Security Forces	The 673d Security Forces will work with 673 CES Conservation Law Enforcement Officers in establishing and defining operational support and reporting procedures.

Table 4-1. General roles and responsibilities at Joint Base Elmendorf-Richardson (JBER)

Office/Organization/Job Title*	Installation Role/Responsibility Description
Installation Unit Environmental Coordinators (Department of the Air Force Instruction 32-7001)	The Environmental Management System (EMS) vision is for an effective framework to meet DAF environmental obligations. Organizational or squadron commanders appoint primary and alternate Unit Environmental Coordinators (UECs). UECs participate in and help determine the adequacy and effectiveness of the installation EMS. The installation UEC serves as the EMS conduit between the installation's environmental function and their unit, attends appropriate working group meetings as requested, advises the work area supervisor on any EMS and environmental policies, manages and monitors the EMS requirements for the unit, provides any information required for installation environmental and sustainability performance measures, participates and supports EMS and compliance assessments, and assists with developing corrective actions to address identified findings.
Installation Wildland Fire Program Coordinator	The Wildland Fire Program Coordinator is delegated by the Installation Commander. 673 CES/CEF is currently delegated as the JBER WFPC.
Pest Manager	The 773d Civil Engineer Squadron Pest Management section (773 CES/CEOIE) is responsible for control and management for pest management activities on JBER, with exception of pest issues within privatized housing units.
Range Operating Agency	The 11th Airborne Division (Arctic) provides operational management and support for the JBER training lands.
CLEOs	The 673 CES provides conservation law enforcement support and minimizing wildlife conflicts or concerns within the cantonment and training areas. CLEOs are also responsible for issuing US District Court Violation notices for fish and game violations committed by both civilians and Title 10 personnel who commit fish and game violations. CLEOs will provide fish and wildlife violation notice information annually to the state.
NEPA	The 673 CES provides NEPA support for the base and the applicable tenants in accordance with (IAW) the <i>DoD Implementation of the NEPA</i> (30 June 2025).

Table 4-1. General roles and responsibilities at Joint Base Elmendorf-Richardson (JBER)

Office/Organization/Job Title*	Installation Role/Responsibility Description
National Oceanic and Atmospheric Administration (NOAA) Fisheries (National Marine Fisheries Service [NMFS])	IAW Department of Defense Instruction (DoDI) 4715.03, NMFS is a signatory cooperator and partner in the implementation of this plan due to the presence of Cook Inlet beluga whales (CIBWs), harbor porpoises, and harbor seals on or adjacent to JBER. NMFS provides scientific expertise and legal authority for marine mammals, marine endangered species, and Essential Fish Habitat identified in the Magnuson-Stevens Fishery Conservation and Management Act. NMFS is the lead agency for issues regarding harbor porpoises, harbor seals, and the CIBW (Section 7.4.2) and is a key partner in implementation of this plan.
United States Department of Agriculture, Forest Service	JBER, the US Forest Service, and the Alaska Division of Forestry (AKDOF) have a Memorandum of Agreement (MOA) regarding wildland fire response on JBER. This MOA (JBER-MOA-216) was finalized on 22 March 2015.
United States Fish and Wildlife Service (USFWS)	IAW the Sikes Act, the USFWS is a signatory cooperator and partner in the implementation of this plan. USFWS has been working collaboratively with JBER on a conservation effort to survey wetland boreal bird presence, abundance and distribution, and freshwater salmon productivity. Coordination with USFWS in regard to Bird/Wildlife Aircraft Strike Hazard (BASH) is maintained throughout the planning process. Migratory bird and Bald Eagle permits are acquired by JBER from the USFWS.
673d Air Base Wing Deputy Commander	The Environmental Safety and Occupational Health Council is typically chaired by the Deputy Air Base Wing Commander if so delegated by the Air Base Wing Commander. The Environmental Safety and Occupational Health Council frequently addresses INRMP issues.

Table 4-1. General roles and responsibilities at Joint Base Elmendorf-Richardson (JBER)

Office/Organization/Job Title*	Installation Role/Responsibility Description
673d Air Base Wing Judge Advocate's Office (673 ABW/JA)	673 ABW/JA provides legal support to commanders and the installation engineering and technical staff on all environmental programs and compliance and liability issues, including natural resource issues. 673 ABW/JA attorneys appointed as Special Assistant US Attorneys (SAUSAs) assist with the prosecution of JBER natural resource cases involving civilian offenders in federal magistrate court. Regarding violations of state fish and wildlife laws and regulations by personnel in Active-Duty status, 673 ABW/JA will notify the state's SAUSA and provide a copy of the violation notice, probable cause statement, and any other relevant matters so that the SAUSA will have the necessary information to pursue disposition of such cases in federal magistrate court. The US Attorney's office will provide backup when state attorneys are not available. Regarding felony-level cases involving fish and game violations, as well as serious misdemeanor fish and game cases that JBER has a particular interest in handling, 673 ABW/JA will consult with the state in determining the most appropriate prosecutorial entity for handling the case.
673d Air Base Wing Public Affairs	673 ABW Public Affairs is required, upon request, to provide JBER personnel, dependents, and the general public, information on hazards of wildlife and bird activity and measures to minimize them. The Public Affairs Office also provides the public with information concerning JBER activities dealing with natural resources or the outdoor recreation program. The Public Affairs Office is also involved in natural resource public awareness programs.
673d Civil Engineer Squadron (673 CES)	The 673 CES Natural Resources office manages natural resources on JBER, including forestry, fish and wildlife, outdoor recreation, and land management. The 673 CES Natural Resources office is responsible for documenting all INRMP actions taken or planned. 673 CES Installation Management is primarily responsible for coordinating JBER-wide planning and associated NEPA analysis and coordination for all activities. The 673 CES is also responsible for maintaining the JBER GeoBase, but the Natural Resources office is responsible for producing clean and current data for entry into the system.
673d Logistics Readiness Group	The 673d Logistics Readiness Group Commander is part of the Bird Hazard Working Group. The 673d Logistics Readiness Group provides vehicles and equipment to support the bird dispersal efforts when necessary.

Table 4-1. General roles and responsibilities at Joint Base Elmendorf-Richardson (JBER)

Office/Organization/Job Title*	Installation Role/Responsibility Description
3d Wing Deputy Commander	The 3d Wing Deputy Commander chairs the Bird Hazard Working Group as mandated by 3d Wing Instruction (3 WGI) 91-212, <i>Bird/Wildlife Aircraft Strike Hazard program</i> . The commander also has approval authority for recommendations of the Bird Hazard Working Group.
3d Wing Safety/BASH Officer	The 3d Wing Safety Office (3 WG/SE) has primary responsibility in regard to 3 WGI 91-212 or the BASH program. The 3 WG/SE works with newly arrived personnel, making sure that all are briefed on the JBER BASH program and that squadron safety officers have an established briefing on bird hazards and know report procedures. The 3 WG/SE BASH Officer schedules Bird Hazard Working Group meetings, takes minutes and attendance at these meetings, and maintains the minutes for at least 3 years.
3d Wing Operations Group	The 3d Wing Operations Group and its entities are involved in the BASH program. They perform the day-to-day coordination, monitoring, briefing, and reporting of hazardous bird activities to maintain the safety of those flying in and out of JBER.
Installation Cultural Resource Manager	673d Civil Engineer Group provides most of the cultural resources direction for JBER, is an integral part of the NEPA process, and reviews and updates the JBER Integrated Cultural Resources Management Plan.
United States Environmental Protection Agency (US EPA)	The US EPA is involved in various federal programs related to natural resources management, particularly the wetland permitting process, delegated nationally to the US Army Corps of Engineers (USACE). The US EPA will be involved in remedial actions to rehabilitate contaminated areas and is involved with air and water regulations.
United States Department of Agriculture, Animal Plant Health Inspection Services–Wildlife Services (USDA–APHIS–WS)	USDA–APHIS–WS has national expertise in developing actions and strategies for BASH programs. USDA–APHIS–WS is under contract with 3d Wing to provide 24/7 BASH activities between 1 April and 31 October and daylight-work-week coverage during winter. USDA–APHIS–WS activities involve removing birds within the Bird Exclusion Zones and Waterfowl Exclusion Zones and other wildlife within the airfield fence. Bryant Army Airfield also finalized an airfield BASH Plan in 2015.
USDA, Natural Resources Conservation Service	This agency provides technical assistance in identification and conservation of soils.

Table 4-1. General roles and responsibilities at Joint Base Elmendorf-Richardson (JBER)

Office/Organization/Job Title*	Installation Role/Responsibility Description
Alaska Department of Fish and Game (ADF&G)	IAW the Sikes Act, ADF&G is a signatory cooperator and partner in the implementation of this INRMP. It is also the primary state agency for fish and wildlife management in Alaska, including JBER. JBER is part of the Anchorage Management Area for fisheries and within Game Management Unit 14C. JBER cooperates with ADF&G in the state's management of fish and wildlife populations on JBER, including but not limited to fish stocking, moose and bear management, wildlife conflict, and BASH management. The ADF&G Habitat Section is responsible for issuing permits for activities that may impact anadromous fish waterways, including stream diversion, stream bank disturbance, stream bank restoration, erosion control, gravel extraction from waterways, culvert and bridge construction, water withdrawal, and recreational mining. Removing beaver dams also requires a permit from the Habitat Division when machinery is used. ADF&G has developed a number of species management plans. The plans can be accessed on the ADF&G website. JBER management activities, as delineated in this INRMP, are consistent with these plans. However, special circumstances or requirements of military readiness may occasionally require deviations. In this event, coordination between ADF&G and JBER will address any management concerns. JBER and ADF&G frequently discuss projects of mutual interest.
Alaska State Troopers	CLEOs coordinate with the Alaska State Troopers in situations that involve dispatching animals, in cases that require prosecution by the state, and in cases involving resources that move off of the installation.
Alaska Department of Law	The Alaska Department of Law will appoint SAUSA(s) to handle violations of state fish and wildlife laws and regulations by personnel in active-duty status and will pursue disposition of such cases in federal magistrate court.

Table 4-1. General roles and responsibilities at Joint Base Elmendorf-Richardson (JBER)

Office/Organization/Job Title*	Installation Role/Responsibility Description
United States Bureau of Land Management (BLM)	Approximately 65,262 acres (89%) of land currently used by JBER is on long-term withdrawal from public domain lands originally assigned to the BLM (Figure 2-3). Provisions for management of these lands are generally specified in public laws, public land orders, executive orders (EOs), and other enabling documents. Whenever the military uses withdrawn public land, it incurs legal and moral responsibilities for the stewardship of the land and its resources. Residual responsibility for JBER withdrawn lands remains with BLM, which retains interest in the stewardship of the transferred parcel, even though the land is under DoD's long-term management.
Alaska Department of Natural Resources	Division of Forestry—AKDOF is responsible for fire suppression on all lands, regardless of ownership, in the southern half of Alaska. JBER has established an MOA with the AKDOF for wildland fire prevention, suppression, and training. JBER falls into the Coastal Zone Management Unit. AKDOF is a cooperating agency in management programs that deal with prescribed fire and wildfire suppression, forest pest management, general forest management, and forest inventories. Division of Parks and Outdoor Recreation—The Division of Parks and Outdoor Recreation may be involved with JBER on issues of public access on adjacent Chugach State Park and ways the JBER recreation plan affects tourism within the Anchorage area. Additional coordination with Chugach State Park, Morale Welfare Recreation, and Range Control is anticipated concerning recreational trail development. State Historic Preservation Officer (SHPO)—JBER coordinates all undertakings with the SHPO for compliance with the National Historic Preservation Act. The SHPO also serves as a repository of cultural resource information. Plant Materials Center—The Plant Materials Center has the skills to assist or advise JBER on habitat enhancement, rehabilitation, or maintenance. The Plant Materials Center grows seedlings from seeds collected on JBER and other nursery stocks for revegetation projects.
Alaska Department of Environmental Conservation (ADEC)	ADEC is the state's primary agency for regulation of contaminated areas, water quality, and wetlands. JBER coordinates with ADEC on these issues. ADEC also guides and provides assistance with spills IAW the JBER Spill Plan and disposal of solid or hazardous waste.

Table 4-1. General roles and responsibilities at Joint Base Elmendorf-Richardson (JBER)

Office/Organization/Job Title*	Installation Role/Responsibility Description
Tribal Governments	The United States has a unique legal relationship with Tribal governments as set forth in the US Constitution, treaties, statutes, EOs, and court decisions. The United States recognizes Tribes as domestic dependent nations under its protection. EO 13175 and the American Indian and Alaska Native Policy (DoD 1998), supplemented by DoDI 4710.02, <i>DoD Interactions with Federally Recognized Tribes</i> (24 September 2018), and Department of Air Force Instruction 90-2002 (18 March 2025), <i>Interactions with Federally Recognized Tribes</i> , require regular and meaningful consultation and collaboration with Indian Tribal governments. JBER provides a process that permits elected officials and other representatives of Alaska Native Tribal governments to provide meaningful and timely input on actions or policies that might be of Tribal interest, such as those that affect sacred sites or traditional cultural properties.
11th Airborne Division (11 ABN)	11 ABN's mission is to deploy combat-ready forces to support joint military operations worldwide and serve as the Joint Force Land Component Command to support Joint Task Force Alaska. Other missions of US Army Alaska are the defense of Alaska and coordination of Army National Guard and Reserve activities in the state.
United States Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory	US Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory provide cooperative support in water quality, hydrology, vegetative, permafrost and range studies related to munitions and noise.
USACE, Alaska District	The USACE is responsible for issuing wetland permits IAW Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. The agency also provides contract service to the natural/cultural resources program, as its staffing allows.
United States Geological Survey	The US Geological Survey is an independent fact-finding federal agency that collects, monitors, analyzes, and provides scientific understanding about natural resources conditions, issues, and problems. The US Geological Survey will support the development of JBER's geographic information system (673 CES GeoBase). This federal agency is a good source for remotely-sensed imagery, as well as terrain, hydrology, and vegetation data. Wildlife expertise is also available from the Alaska Science Center, specifically related to bird survey advice and coordination.

Table 4-1. General roles and responsibilities at Joint Base Elmendorf-Richardson (JBER)

Office/Organization/Job Title*	Installation Role/Responsibility Description
Municipality of Anchorage	The outdoor recreation program and fish and wildlife management in general are of interest to the Municipality of Anchorage. Additionally, JBER must coordinate with Anchorage for air quality permits for any planned prescribed burns on JBER. The Anchorage Historical Commission represents the Municipality for consultation under the National Historic Preservation Act and is a Certified Local Government.
Universities	JBER partners with universities for natural resources management expertise through USACE cooperative agreements. Experts from universities have provided specialized knowledge needed to effectively manage natural resources on JBER lands.
Contractors	Private contractors are important to all facets of military installation management. JBER uses contractors for many programs associated with natural resources, such as NEPA documentation, natural and cultural resources surveys, implementation of the BASH program, and INRMP preparation.

*Listing is not in order of hierarchical responsibility.

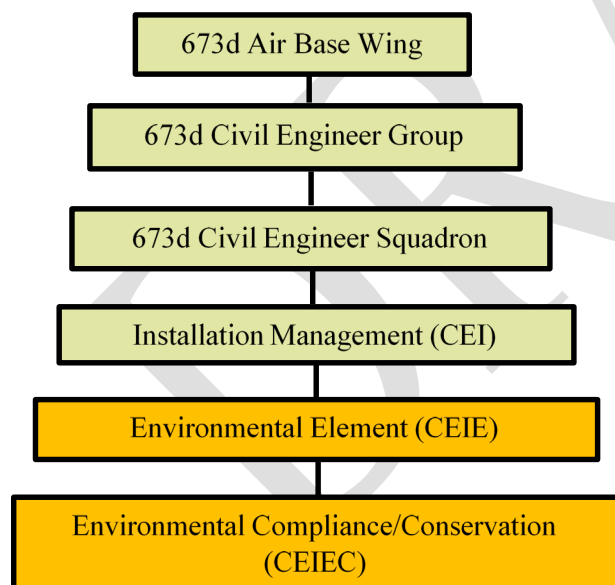


Figure 4-1. Organizational chart of the 673d Air Base Wing, emphasizing the Environmental Element

5.0 TRAINING

DAF installation NRMs and other natural resources support personnel require specific education, training, and work experience to adequately perform their jobs. Section 107 of the Sikes Act requires that professionally trained personnel perform the tasks necessary to update and carry out certain actions required within this INRMP. Specific training and certification may be necessary to maintain a level of competence in relevant areas as installation needs change, or to fulfill a permitting requirement.

Installation Supplement

- NRMs at Category I installations must take the DoD Natural Resources Compliance course that is endorsed by the DoD Interservice Environmental Education Review Board and offered for all DoD Components by the Naval Civil Engineer Corps Officers School. See <https://www.denix.osd.mil/cecos/conservation/nrc/> for course schedules and registration information. Other applicable environmental management courses are offered by the Air Force Institute of Technology (<http://www.afit.edu>), the National Conservation Training Center managed by the USFWS (<http://www.training.fws.gov>), and the BLM Training Center (<https://www.blm.gov/learn/national-training-center>).
- Natural resource management personnel shall be encouraged to attain professional registration, certification, or licensing for their related fields, and they may be allowed to attend appropriate national, regional, and state conferences and training courses.
- All individuals who will be enforcing fish, wildlife, and natural resources laws on DAF lands must receive specialized, professional training on the enforcement of fish, wildlife, and natural resources in compliance with the Sikes Act. This training may be obtained by successfully completing the Land Management Police Training course at the Federal Law Enforcement Training Center (<http://www.fletc.gov/>).
- Individuals participating in the capture and handling of sick, injured, or nuisance wildlife should receive appropriate training, to include training that is mandatory to attain any required permits.
- Personnel supporting the BASH program should receive flight line drivers training, training in identification of bird species occurring on airfields, and specialized training in the use of firearms and pyrotechnics as appropriate for their expected level of involvement.
- The DoD supported publication, *Conserving Biodiversity on Military Lands—A Handbook for Natural Resources Managers* (Leslie et al. 1996), provides guidance, case studies, and other information regarding the management of natural resources on DoD installations.

Natural resources management training is provided to ensure that installation personnel, contractors, and visitors are aware of their role in the program and the importance of their participation to its success. Training records are maintained IAW the Recordkeeping and Reporting section of this plan. Below are key natural resources management-related training requirements and programs.

State and National Conferences and Meetings

The Natural Resources office usually sends at least 2 representatives to the North American Wildlife Conference and joint meetings of the National Military Fish and Wildlife Association. Individuals also occasionally attend the Society of American Foresters meeting, annual Wildlife Society meeting, Alaska Marine Science Symposium, Alaska Forum on the Environment, Joint Service Environmental Management conference, and various specialized training sessions related to ecosystem management and biodiversity. A JBER representative occasionally attends the national annual BASH conference. Maximum use is made of locally available training.

3323 **Conservation Law Enforcement Officers**

3324 Full-time Conservation Law Enforcement personnel must meet basic training requirements to remain in
3325 compliance with DAFMAN 32-7003. The preferred training avenue is the Federal Law Enforcement
3326 Training Center's Land Management Training Program. Ancillary training is attended and ongoing
3327 following graduation from this program.

3328 **Military Conservation Agents**

3329 Level 1 Military Conservation Agents (MCAs) receive 8 hours of orientation and training and are then
3330 assigned to Level 2 or 3 trainers for field training. Field training includes a minimum of 40 hours of on-the-
3331 job training, attendance of a 60-hour class, and completion of a 4-hour shotgun course. After a 6-month
3332 probationary period, most Level 1 MCAs are scheduled to attend Level 2 MCA training. Initial training for
3333 Level 2 agents totals 110 hours, and annual refresher training is required.

3334 Training is conducted by Conservation Law Enforcement Officers (CLEOs) and state and federal partners
3335 as available (e.g. NMFS, ADF&G, Alaska State Troopers, and similar). Training topics include state and
3336 federal fish and wildlife laws, natural and cultural resources laws, field safety, weapons qualification,
3337 wildlife response and hazing, and enforcement of 673 ABW installation policies. For Level 2 agents to
3338 acquire Level 3 status, 36 additional hours of field training patrol, incident command courses 100 and 200,
3339 and all-terrain vehicle and snowmachine certification courses must be completed. Level 3 agents receive
3340 additional training in wildlife response procedures, and incident command courses 700 and 800. All
3341 qualified MCAs must successfully complete an annual quality control practical to maintain qualification.

6.0 RECORDKEEPING AND REPORTING

6.1 Recordkeeping

The installation maintains required records IAW DAFI 33-363, *Records Management and Information Governance Program*, and disposes of records IAW the Air Force Records Management System records disposition schedule. Numerous types of records must be maintained to support implementation of the Natural Resources program. Specific records are identified in applicable sections of this plan, in the Natural Resources Playbook, and in referenced documents.

6.2 Reporting

The installation NRM is responsible for responding to natural resources-related data calls and reporting requirements. The NRM and supporting AFCEC Natural Resources Media Manager and Subject Matter Specialist should refer to the Environmental Reporting Playbook for guidance on execution of data gathering, quality control/quality assurance, and report development.

An annual summary of fish and game violations will be sent to the Alaska State Troopers and the ADF&G Anchorage Area Biologists for Wildlife and Sport Fish by 31 January of the following year.

6.3 Publications

The generation and wide distribution of sound scientific studies conducted on JBER is strongly encouraged by the DAF for the dissemination of significant scientific and technical findings, IAW DAFI 61-201 (30 November 2020), *Management of Scientific and Technical Information (STINFO)*, and DoDI 3200.12 (17 December 2018), *DoD Scientific and Technical Information Program (STIP)*. Additionally, the DAF encourages its scientific and technical personnel to publish research results in recognized scientific and technical journals. Journal publication is important to the Air Force's Research and Development program, and therefore, publications that are produced, funded, and/or sponsored by the DAF should direct relevant credit to the DAF. DAFI 61-201 describes the policies and procedures for processing, distributing, and publishing STINFO that is generated in-house or by contract, subcontract, or grant. This policy applies, by definition, to textual, graphic, numeric, multimedia, and digital data; technical reports; scientific and technical conference papers and presentations; theses and dissertations; scientific and technical computer software; journal articles; workshop reports; program documents; and other forms or formats of technical data that are intended for dissemination to the public (DAFI 61-201; DoDI 3200.12).

Publications must be determined by the DAF as appropriate for public release and demarcated using the appropriate Distribution Statement (DoDI 5230.24, *Distribution Statements on DoD Technical Information* [10 January 2023]). Distribution Statement "A" ("Approved for public release: distribution unlimited") is typically the most appropriate for basic or applied research that is not classified or Controlled Unclassified Information.

Contracted work that is based on a scope of work generated by the DAF or including work facilitated by DAF and/or DAF staff may consider crediting the program manager or staff as coauthor(s) as appropriate.

Contracted materials or publications proposed by cooperative partners or contractors outside the DAF must have the article reviewed and approved by the DAF sponsor according to DAF information-release policies and procedures. All materials, in their final form proposed for publication must be approved by JBER Public Affairs.

The following statements may be included in each publication:

- 3382
- 3383
- 3384
- 3385
- 3386
- 3387
- “This report is published in the interest of scientific and technical information exchange and does not constitute approval or disapproval of its ideas or findings.”
 - “Opinions, interpretations, conclusions, and recommendations are those of the author and are not necessarily endorsed by the United States Air Force.”
 - “This research was sponsored by (name of sponsoring organization), Department of the Air Force grant or contract number (insert contract number here).”

DRAFT

7.0 NATURAL RESOURCES PROGRAM MANAGEMENT

This section describes the current status of the installation's natural resources management program and program areas of interest. Current management practices, including common day-to-day management practices and ongoing special initiatives, are described for each applicable program area used to manage existing resources. Program elements in this outline that do not exist on the installation are identified as not applicable and include a justification, as necessary.

Installation Supplement—Natural Resources Program Management

Policy and Background

Ecosystem management philosophy, policy, and background are discussed in [Section 1.2](#). JBER has identified 7 major procedures or components that are integral to the successful execution of the ecosystem management program:

- Inventory and monitoring of biological resources
- Selecting priority species for management
- Habitat-based approach to management
- Habitat preference information for management-priority species
- Evaluating conflicts in land use issues
- Specification of the land use mosaic
- Regional management efforts

Prior to implementing an INRMP-identified project, JBER will ensure the NEPA process is implemented IAW 90 FR 27857, *DoD Implementation of the NEPA*. A more detailed description of the NEPA is provided in [Section 9.0](#).

Partnerships

The DAF carries out its Sikes Act obligations by partnering with interested agencies, including the BLM, USFWS, NMFS, and ADF&G. All agencies have a policy to use an ecosystem management approach to land management. Cooperative relations among the military services and other land management agencies foster regional approaches to addressing stewardship issues that provide benefits beyond what could be separately achieved by each agency.

This INRMP cannot be implemented by JBER alone. IAW land withdrawal legislation and the ecosystem management philosophy, JBER actively maintains partnerships with various agencies to manage its natural resources. Major partners in the implementation of this plan are USFWS, NMFS, and ADF&G. Other partners in this effort include the Alaska Department of Natural Resources (ADNR), BLM and other federal and state agencies, Alaska Native entities, universities, contractors, and private citizens.

Partnerships are usually formalized as cooperative or support agreements, MOAs, or memoranda of understanding (MOUs). While several formal agreements have been enacted at the DoD or DAF level, installations are encouraged to enter into agreements with state and federal agencies to coordinate and improve management of natural resources on the installations (DoD, USFWS, and International Association of State Wildlife Agencies 2013).

IAW the Sikes Act, the INRMP describes how fish and wildlife resources on JBER lands will be cooperatively managed. This includes the recognition “that states in general possess broad trustee and police powers over fish and wildlife within their borders, including—absent a clear expression of Congressional

intent to the contrary—fish and wildlife on federal lands within their borders.” Where Congress has given federal agencies certain conservation responsibilities, such as for migratory birds or species listed as T&E under the ESA, the states, in most cases, have cooperative management responsibilities (DoD, USFWS, and International Association of State Wildlife Agencies 2013). The INRMP provides planning, development, maintenance, and coordination of wildlife, fish, and game conservation. The INRMP provides for fish and wildlife habitat improvements or modifications; wildlife considerations in all range rehabilitation; control of off-road vehicle (ORV) traffic; use and protection of fish and wildlife resources, to include both consumptive and non-consumptive use and natural resources law enforcement requirements; and designated responsibilities for control and disposal of feral animals.

[Appendix K](#) includes a Cooperative Agreement between the Alaska District of the USACE and the BLM that defines responsibilities for authorizing use (rights-of-way, leases, licenses, permits) by others of public lands in Alaska withdrawn for the Department of the Army and the DAF.

JBER Monitoring-Priority Species

As a more scientifically-based alternative to single-species management, ecosystem management emphasizes multiple species management, in which a variety of habitats, species viability, species interactions, community structure, mutualistic relationships, edge effects, and connectivity are all considered. With a broader ecosystem approach to management, both the spatial and ecological scales of management efforts are greatly expanded so that management is conducted for many species, including species of concern, over much larger geographic regions. Ecosystem management also recognizes that humans have been and will continue to be part of the landscape, and it endeavors to integrate human and non-human uses of the land. Importantly, ecosystem management seeks to place management actions within a larger landscape context, specifically recognizing that the effects of actions at a local scale, for example, can have larger ramifications at a landscape scale.

While multiple species management is the goal of the ecosystem approach, sometimes single species may take priority. In these cases, all efforts will be made to incorporate the needs of multiple species into any required management actions. [Table 7-1](#) lists JBER monitoring-priority species.

Species fall into several categories under multiple species management, including keystone or key species, featured species, species with legal constraints, and management-indicator species. Important considerations of species priority also include selection of species that can be monitored with the labor and funding likely to be available and the degree to which management and habitat can be controlled.

Keystone or key species play a disproportionately large role in ecosystem structure. Their significant ecosystem role may be due to their importance to the feeding structure or because they provide a critical process in the system, provide necessary interactions, or generally have a significant impact on the ecosystem.

Managed species, unlike key species, are chosen based on human values instead of ecosystem values. These species may or may not be key or indicator species. These likely have socioeconomic importance as locally harvested species.

Species with legal constraints have been listed as T&E species, are otherwise protected by the USFWS or NMFS, and/or are designated as SGCN by ADF&G. Additionally, this group could contain species that are of concern from an installation, regional, or state perspective (for organizations such as USFWS, BLM, US Forest Service, and Audubon), as summarized in the 2015 Alaska State Wildlife Action Plan.

Indicator species are species that managers use to track ecosystem health or status or that have specific management programs. These species may or may not be key or managed species and may include invasive species.

Many species within JBER and the surrounding area are culturally significant and have been addressed in previous priority species studies. This includes not only species of interest for recreational hunting and sport fishing, but also subsistence species that have been used historically or are still being used today. [Section 7.2.4](#) and [7.14](#) include more information on the importance of these species, the ways they are managed, and the regulatory drivers behind their management.

Table 7-1. Potential Joint Base Elmendorf-Richardson monitoring-priority species

Species	Ecotypes Represented	Species Category ¹
Mammals		
Little brown bat	Human-modified, Upland, Lowland	M, L, I
Gray wolf	All but Human-modified	M, K
Lynx	Upland, Lowland, Subalpine	K
Wolverine	Alpine, Subalpine, Upland	M
Harbor seal	Coastal	L
Harbor porpoise	Coastal	K, L
Black bear	Upland, Lowland, Subalpine	M
Brown bear	All but Human-modified	M, K
Cook Inlet beluga whale	Coastal	L, I
Moose	All but Pavement	M
Dall sheep	Alpine	M
Beaver	Lowland, Riverine	K, M
Microtines	All but Pavement	I, L
Collared pika	Alpine	I, L
Snowshoe hare	Upland, Lowland, Subalpine, Riverine	K, M, I, L
Birds		
See Table 2-9		
Amphibians		
Wood frog	Lowland, Upland	I, L
Fish		
Northern pike	Lowland, Riverine	K, I
Coho salmon	Lowland, Riverine	K, M, I, L
Sockeye salmon	Lowland, Riverine	K, M, I, L
Chinook salmon	Lowland, Riverine	K, M, I, L
Pink salmon	Lowland, Riverine	K, M, I, L
Chum salmon	Lowland, Riverine	K, M, I, L
Rainbow trout	Lowland, Riverine	M

Table 7-1. Potential Joint Base Elmendorf-Richardson monitoring-priority species

Species	Ecotypes Represented	Species Category ¹
Dolly Varden	Lowland, Riverine	K, L
Insects		
Spruce beetle (<i>Dendroctonus rufipennis</i>)	Upland, Subalpine	K, M
Freshwater invertebrates (Orders: Ephemeroptera, Odonata, Plecoptera, Trichoptera, Cladocera)	Lowland, Riverine	I
Terrestrial invertebrates (Orders: Hymenoptera, Diptera, Odonata, Lepidoptera, Arachnida)	All	I
Plants		
Alaska dwarf primrose (<i>Douglasia alaskana</i>)	Alpine	I
Alpine sweetvetch (<i>Hedysarum alpinum</i>)	Alpine	M, C
Beach pea (<i>Lathyrus japonicus</i>)	Lowland, Riverine	M, C
Bird vetch (<i>Vicia cracca</i>)	Upland, Human-modified	I ³
Bog cranberry (<i>Vaccinium oxycoccos</i>)	Subalpine, Wetland	M, C
Canada thistle (<i>Cirsium arvense</i>)	Upland, Modified	I ^{2, 3}
Canadian waterweed/Elodea (<i>Elodea canadensis</i>)	Aquatic	I ³
Chocolate lily (<i>Fritillaria camschatcensis</i>)	Subalpine	M, C
Cloudberry (<i>Rubus chamaemorus</i>)	Alpine	M, C
European bird cherry (<i>Prunus padus</i>)	Lowland, Riverine	I ³
Mountain hemlock (<i>Tsuga mertensiana</i>)	Subalpine	M, C
Orange hawkweed (<i>Hieracium aurantiacum</i>)	Upland, Human-modified	I ^{2, 3}
Paper birch (<i>Betula papyrifera</i>)	Upland	K, M
Reed canary grass (<i>Phalaris arundinacea</i>)	Human-modified, Lowland, Riverine	I ³
White spruce (<i>Picea glauca</i>)	Upland	M
White sweetclover (sweetclover, <i>Melilotus officinalis</i>)	Upland, Human-modified	I ³

¹Species Categories: I=Indicator species; K=Keystone or key species; L=Species with legal constraints; M=Managed species; C=Culturally Significant Plants

²Prohibited-Noxious

³Exotic/Invasive

7.1 Fish and Wildlife Management

Applicability Statement

This section applies to all DAF installations that maintain an INRMP. The installation is required to implement this element.

Program Overview/Current Management Practices

7.1.1 Policy and Background

The fish and wildlife management program provides for the regulation and conservation of game and nongame populations and their habitats. JBER management practices are consistent with accepted scientific principles and comply with the ESA and all other applicable laws and regulations ([Appendix A](#)). Management goals are consistent with the integrated Natural Resources program. Emphasis is placed on

3489 maintenance and restoration of favorable habitat to the production of native fish and wildlife. Suitable lands
3490 and waters for fish and wildlife conservation are managed to sustain those resources.

3491 Both game and nongame species are considered when planning natural resource management activities.
3492 The Natural Resources program on JBER has traditionally been based on multiple-use management
3493 philosophies. However, military training has always been and continues to be the primary land use.

3494 Maintaining functional ecosystems is the primary goal of the JBER Natural Resources program. “Realistic
3495 training lands” are often quoted as essential needs by military trainers; on JBER, this translates to functional
3496 ecosystems that provide a realistic subarctic training environment and can be sustained indefinitely.

3497 Fish and wildlife management actions fall into 2 categories: population management and habitat
3498 management. Fish and wildlife population management is accomplished through actions that directly affect
3499 wildlife species. Setting population goals and managing harvests are the primary actions used in population
3500 management. Habitat management, on the other hand, indirectly affects wildlife populations by
3501 manipulating their habitat. JBER cooperates with ADF&G in the state’s management of fish and wildlife
3502 populations on JBER, and management objectives are outlined in this INRMP.

3503 Inventory and monitoring programs are critical components of ecosystem management. They lie at the heart
3504 of adaptive management, providing much of the information or feedback that is used to make decisions
3505 about and modify management practices. There are a number of different types of monitoring, including
3506 baseline, trend, and effectiveness monitoring. Management-focused population inventory and monitoring
3507 efforts benefit from clearly articulating the management goals and the information that is most useful in
3508 reaching those goals.

3509 Baseline monitoring is an initial inventory of resources to establish a reference point that future monitoring
3510 can be compared to. Trend monitoring, in general, can be thought of as periodic checks of a resource or
3511 community, which are then compared to baseline data to determine trends. Effectiveness monitoring
3512 provides direct feedback about specific management actions, issues, or programs.

3513 Fish and wildlife management at JBER supports and is supported by the following programs, which are
3514 further discussed in the referenced INRMP sections:

- 3515 • Inventory and Monitoring Programs ([Section 7.0](#))
- 3516 • Policies, Programs, and Methods Used to Control Feral Animals ([Section 7.1](#) and [Section 7.11](#))
- 3517 • Wildlife Pest Problems and Techniques Used for Wildlife Control ([Section 7.1](#) and [Section 7.11](#))
- 3518 • Migratory Bird Management ([Section 7.1](#) and [Section 7.4](#))
- 3519 • Hunting and Fishing Program Organization and Management ([Section 7.1](#) and [Section 7.2](#))
- 3520 • Permitted Access for Hunting, Fishing and Wildlife Related Outdoor Recreation ([Section 7.2](#))
- 3521 • Demand for Hunting, Fishing and Non-Consumptive Resource Uses ([Section 7.2](#))
- 3522 • Hunting and Fishing Policy, Regulations and Fee structure ([Section 7.2](#))
- 3523 • Natural Resources Law Enforcement ([Section 7.3](#))
- 3524 • Watchable Wildlife Areas ([Section 7.2](#) and [Section 7.15](#))
- 3525 • Wildlife Education and Interpretive Programs ([Section 7.15](#))

3526 **Cultural Resource Requirements and Tribal Coordination**

3527 As described in [Section 1.2.1](#), the impacts of any ground-altering activities must be reviewed to determine
3528 if the NHPA Section 106 consultation process is required to avoid impacts to cultural resources. This
3529 includes the terrestrial and aquatic habitat management practices that are described in the following

subsections. Consultation and coordination with Tribal stakeholders provides opportunities to support JBER's natural and cultural resource programs and expand access to cultural resources for all stakeholders involved. Archaeological data collected by JBER and Alaskan Tribes can also be used to inform biological and ecosystem studies, which improves the base's ability to manage wildlife and wildlife habitats. JBER will continue coordinating management activities with Tribal stakeholders to improve the conditions of and access to wildlife habitat on the installation.

7.1.2 Fisheries Management

The primary objectives of fisheries management on JBER are to sustain, maintain, and enhance the aquatic ecological integrity for ensuring sustainable use and environments required for realistic military training and recreational use. Streams and lakes on JBER are managed for a variety of purposes, including military training, recreational fishing, and protection of ecosystem health, sustainability, and productivity. Management related to CIBW, other T&E species, and species of concern is discussed in [Section 7.4](#).

Non-Anadromous Fisheries—Sport Fisheries

The main non-anadromous fisheries (or sport fisheries) management efforts on JBER are in collaboration with the ADF&G Division of Sport Fish to protect and improve the sport fishery resources for sport anglers. The core functions include monitoring to support management decisions for sustained yield and angler satisfaction; and protecting, enhancing, or restoring fish habitats for the benefits of fish and sport anglers.

Lakes and ponds occurring on JBER are discussed in [Section 2.2.4](#). These lakes vary in size between 2 and 124 acres ([Table 2-5](#)). JBER has 11 ADF&G stocked lakes: Upper and Lower Sixmile, Spring, Hillberg, Fish, Triangle, Green, Otter, Clunie, Thompson, Waldon, and Gwen lakes. Recreational sport fishing is discussed in [Section 7.2.3](#).

Most of the lakes on JBER are relatively shallow, with the exception of Clunie, Fish, and Triangle lakes, which reach depths of over 25 feet. A survey of the recreational and stocked lakes on JBER is currently being conducted. The lake surveys will provide information to support JBER Natural Resources program and ADF&G management decisions, including evaluating current stocking strategies. The primary goal of this project is to document and monitor biotic and select abiotic factors that could impact fish species in JBER lakes. The survey may extend to lakes that are not currently managed on JBER that have limited or no existing information (e.g., Dishno Pond, Cochise Lake). Additionally, fishing surveys from the recreational access systems used on JBER, iSportsman (prior to August 2023) and RecAccess, are compiled annually.

Anadromous Fisheries

The process by which critical habitat designations were made for CIBW determined that persistence of the belugas' primary prey species is essential to their conservation. Primary prey species for CIBW include 4 salmon species present on JBER: Chinook, sockeye, chum, and coho. JBER has 8 creeks and 2 lake systems identified within the ADF&G Anadromous Waters Catalog, which are discussed in [Section 2.3.3](#). All 5 species of Pacific salmon, coastal pelagic species, groundfish species, and highly migratory fish species are regulated and managed under the Magnuson-Stevens Fishery Conservation and Management Act of 1976 and essential fish habitat, as amended through 1996, and the Anadromous Fish Act (Alaska Statute 16.05.871–16.05.901). Critical Habitat for the CIBW, designated in 2011, does not include waters on JBER, so long as management of CIBW and their prey are included in the INRMP. JBER monitors the salmon runs and freshwater productivity on base in support of CIBW recovery, and doing so helps ensure that Critical Habitat is not designated on JBER land. Current monitoring efforts include adult salmon

escapement monitoring in Eagle River, Sixmile system, and Otter system. Salmon smolt out-migration is monitored at the outlet of Sixmile Lake. Additional information on fisheries management efforts for the CIBW is provided in [Section 7.4.2](#).

JBER and the USFWS partnered in 2018 to better understand salmon populations on JBER, focusing initially on the Sixmile drainage and the drivers of productivity in coho and sockeye salmon populations. Additional salmon runs occur in the Otter Creek drainage, which has been monitored using a video weir (VAKI Riverwatcher) since 2020. This partnership will eventually also look at the Otter Lake drainage productivity of coho and sockeye salmon.

However, Eagle River is currently of higher interest. CIBWs are most prevalent (as indicated through passive acoustic monitoring) in Eagle Bay adjacent to JBER during the spring (June) and fall-early winter (August to December) but are present for at least a portion of every month of the year. CIBWs have been sighted within ERF as far as 2.6 miles (river distance) up Eagle River. Eagle River has been monitored using a sonar weir system since 2012. Initially, a fish wheel was used in conjunction with the sonars, but it was decommissioned in 2016 because the data acquired from its operation lacked the resolution necessary to adequately classify species composition.

Monitoring Eagle River utilizing the sonars is essential to understanding salmon productivity, including annual variability and changes in future salmon populations within the system, and to continue building monitoring indices for use in evaluating trends/status of these populations. CIBWs are often present in Eagle Bay and Eagle River for a large portion of the year, and it is hypothesized that their presence is due to prey and forage fish presence. Therefore, it is important to update and reevaluate the run timing and speciation of the salmon species and identify the presence of other potential prey species utilizing Eagle River. There is recent evidence to suggest that the abundance of salmon (especially Chinook and coho) in certain Upper Cook Inlet drainages directly affects the reproductive success of CIBW (Norman et al. 2019). Lack of high-quality prey, in combination with anthropogenic disturbance, may lead to reductions in individual CIBW fitness with potential adverse consequences to the population as a whole (McHuron et al. 2023). Gaining a deeper understanding of potential CIBW prey ecology is an essential step in evaluating potential impacts to the CIBW.

Fish Habitat Improvement

Fish habitat improvements focus on addressing the limiting factors in specific systems. Fish habitat improvements also focus on shoreline restoration/protection efforts and invasive species eradication (if identified). Habitat improvement projects for areas that are degraded due to human impacts are prioritized. These improvement projects may enhance salmon productivity on JBER. Stream and lake habitat surveys were conducted during the 2015 to 2017 field seasons. These surveys focused on stream and lake water and habitat quality for fish. These surveys identified potential locations needing habitat improvement. Any shoreline protection and restoration efforts occur in areas with high potential for cultural resources and are likely to require consultation under the NHPA.

Salmon appear to be fully utilizing all existing spawning redds in Upper and Lower Sixmile lakes. Late-arriving salmon have been observed to rework spawning redds used by earlier-arriving salmon. This results in the destruction of the previous eggs, reducing the number of salmon fry produced by the run. Over-spawning by returning salmon may cause periodic reductions in the number of fish in future salmon runs. Most spawning takes place in Upper Sixmile Lake and a small portion of Lower Sixmile Lake near the culvert. Sixmile and Otter lakes are also annually stocked with rainbow trout by ADF&G for recreational sport fishing. In collaboration with USFWS, JBER is using existing data to identify data gaps and drivers of productivity declines in coho and sockeye salmon in the Sixmile and Otter Lake/Creek drainages. This

will also include data collection to fill the data gaps and potential habitat enhancement. The initial study will focus on the Sixmile Lake System and then shift to the Otter Lake drainage in the future.

Fisheries/Aquatic System Conflict Issues

Invasive Species

Northern pike are native to interior Alaska but are not native to Southcentral Alaska. During the later half of the 20th century, pike were introduced from interior Alaska to a few lakes in the Susitna River drainage of Cook Inlet. Flooding during the 1980s promptly dispersed the pike population throughout the drainage, and suspected human introductions added to their distribution spread. Invasive northern pike are voracious predators of salmonids, sometimes limiting their population size and presence, and can have devastating effects on ecosystems that have not adapted to pike presence. Native forage fish, stocked rainbow trout, and visiting wildlife (waterfowl, small mammals, etc.) are likely to suffer negative impacts from northern pike.

Northern pike are believed to have been illegally introduced into Otter Lake sometime in the mid-1990s and were successfully removed through rotenone treatment in 2015. In fall 2020, invasive northern pike were confirmed in Lower Sixmile Lake. With support of ADF&G, 673 CES/CEIEC implemented suppression efforts to remove the pike from the lake to prevent the population from expanding. No pike were caught during the spring and fall 2022 netting efforts and in the final confirmation netting in spring 2023 (Dunker et al. 2022). The 673 CES/CEIEC is developing a long-term monitoring plan with ADF&G and USFWS to monitor for northern pike and eventually include other invasive species (e.g., zebra mussel) for all lakes ([Section 7.11.3](#)).

7.1.3 Wildlife Management

Wildlife management on JBER consists of population monitoring, game management, conservation actions, and wildlife habitat restoration and improvement. Monitoring priorities for the JBER Natural Resources program must consider the cost and practicality of monitoring methods and whether the monitored species will be directly affected by proposed management activities. Priority species for JBER monitoring are listed in [Table 7-1](#). The population and management status for priority species and species groups is further described in the subsections below. Summaries on the presence of these species are included in [Section 2.3.3](#).

Monitoring of some priority species will require that habitat preferences be determined and added as spatially explicit data in the GIS. The resulting data will then require incorporation into ecotype (habitat) classes, as Jorgenson et al. (2002) did for FRA. A map with key habitats highlighted can then be developed for all JBER priority species and used for management and land-use recommendations.

Hunting and fishing are forms of outdoor recreation that help JBER and ADF&G maintain species population goals. Hunting and fishing are conducted under ADF&G regulations to ensure that populations can be supported by available habitat and meet recreational demand. JBER manages hunting and fishing in terms of areas available, dates within the ADF&G seasons, safety requirements, permit and reporting requirements, and evolving program needs to avoid conflicts with the military mission and provide safe, high-quality recreational experiences ([Section 7.2.3](#)).

Terrestrial Mammals

Bats

Little brown bats are the only known species of bat on JBER. Maternity roosts are monitored annually. In 2012, bat boxes were constructed to provide alternate habitat in response to human–wildlife conflict since

bats were roosting in facilities near Lower Sixmile Lake. In August 2022, the bat box structure was confirmed to house 97 bats. In July 2023, the structure housed 210 bats and was confirmed to be a maternity roost. In 2018, 3 maternity roosts were discovered in structures on JBER-E; however, in 2019, the roof of one of the structures was sealed, and no bats were observed emerging in following years. In 2023, 3 additional maternity roosts were discovered; however, one of the structures is slated to be demolished to fulfill safety requirements. Demolition or sealing of structures that are known to house maternity roosts is not initiated until after the bats have dispersed for the season. Where mitigation is practicable, bat boxes using designs that are known to be successful may be constructed and deployed to provide alternate habitat. No hibernacula have been documented on JBER; however, current monitoring activities (i.e., late season acoustic monitoring and visual inspection) aim to locate and confirm suspected hibernacula.

JBER will work and coordinate with USFWS and ADF&G to ensure the protection of bats and help prevent the introduction of the fungus (*Pseudogymnoascus destructans*) known to cause white-nose syndrome. NRMs will also consult with JBER's Cultural Resource Manager when installing bat monitoring devices or bat boxes, as these activities often involve older buildings that may be historically significant. JBER will pursue the development of additional guidance on logging windows to limit impacts on potential hibernacula or maternity roosts.

Acoustic monitoring is the primary means to sample bat presence, composition, relative abundance, and activity levels. Mist-netting surveys are also frequently used in tandem with acoustic monitoring to verify species identification. When properly applied, acoustic monitoring devices and analytical software can detect species composition, arrivals, distributions, and population trends. At the time of this INRMP update, bat surveys are focused on mapping little brown bat activity on base and identifying hibernacula, maternity roosts, and areas with high-density use. Bats are frequently identified in wetland areas with standing water and large invertebrate populations. Most of these surveys have occurred in JBER-E, with most of the area north of Eagle River and the south post being unsurveyed. Monitoring plans for future surveys are needed to obtain baseline data for long-term monitoring. An increased understanding in bat activity will be essential if the little brown bat is listed as a T&E species. All future bat survey data collected on base will be shared with the North American Bat Monitoring Program to support regional studies of the little brown bat and other bat species.

The little brown bat is a state SGCN, so harassment or take is prohibited without a permit. Take in the State of Alaska is defined by Alaska Statute (16.05.940 (35)) as "taking, pursuing, hunting, fishing, trapping, or in any manner disturbing, capturing, or killing or attempting to take, pursue, hunt, fish, trap, or in any manner capture or kill fish and game." Accordingly, the unauthorized harassment of fish and wildlife is considered "take, closed season" under 5 Alaska Administrative Code (AAC) 85.015.

Bears (Black and Brown)

In 1997, a nuisance black bear study was conducted on JBER. Based on the preliminary report, approximately 35 to 42 bears were estimated to occur on base. The study recommended that black bear populations for JBER be kept at no more than 40 bears (Bostick 1997). Conducting a current black bear population size study at this time would be impracticable with the available in-house resources. However, levels of nuisance bears and sightings suggest a stable to abundant population that would not be impacted by a modest harvest. Through a collaborative bear management effort led by ADF&G, JBER incorporated a permit lottery black bear hunt on JBER-R using only shotgun with non-toxic slug beginning in spring 2017.

Radio collaring of brown bears occurred in 2005, aiding in the understanding of the presence of brown bears on JBER lands. A minimum of 15 brown bears were found to use JBER lands during a 2005 to 2007

study, but evidence suggests that more bears were present but undetected by the sampling methods (Farley et al. 2008).

ADF&G and JBER cooperate to monitor and evaluate bear populations due to their ecosystem importance and the potential for conflicts with humans on JBER. Monitoring and evaluation approaches include DNA-based identification for population estimation and conflict-impact analysis, determination of habitat use and the ranking of habitats for their value to black and brown bears, and measures of the nutritional cost of locomotion by bears as landscapes are modified by changes in seasonal patterns and human activities. Natural Resources personnel use both nuisance bear activity and sightings as tools to identify fluctuations in bear activity near road-accessible areas. Levels of nuisance bear activity cannot be used as reliable indicators of bear populations, as many other factors such as natural food availability or the habituation levels of bears can impact those activity levels. Further discussion of the installation's nuisance bear management program is provided in the Wildlife Conflict and Nuisance Wildlife Management subsection below.

The current populations and trends of black and brown bears utilizing JBER lands is unknown, and additional monitoring is needed to identify the extent of bear presence on the installation and in the surrounding area. Long-term monitoring would also clarify trends in bear behavior and movement around high-conflict areas, especially those with recorded maulings. JBER staff is currently working with ADF&G staff to develop a bear monitoring program.

Moose

Moose management focuses on minimizing human-wildlife conflict (e.g., vehicle-moose collisions, direct contact), reducing impact to the military mission (e.g., delays of military training), maintaining healthy wildlife habitat and moose populations by enhancing winter moose browse, and allowing for recreation opportunities such as hunting, subject to safety requirements and military security. The moose on JBER are a subpopulation of a larger population within GMU 14C, and they are an important management focus for JBER due to their size and proximity to humans. The base regularly develops moose browse habitat to encourage moose activity away from high-conflict areas ([Section 7.8.2](#)). The installation also installed moose gates along busy roads and highways to reduce the potential for vehicle-moose collisions. These gates are closed to discourage human trespass. JBER Natural Resources personnel, CLEOs, Security Forces, and ADF&G work collaboratively to monitor and open moose gates as needed to allow moose movement onto the installation. These collaborative efforts will be formalized in an MOA (under development) to provide clear roles, responsibilities, and procedures. Identified boundary deficiencies warrant additional security measures such as new fencing. Moose movement off the transportation corridor will be considered when modifying the perimeter fence. JBER's nuisance moose management program is further discussed in the Wildlife Conflict and Nuisance Wildlife Management subsection below.

JBER surveys moose population numbers and composition to assess productivity. ADF&G conducts aerial surveys of JBER each fall/early winter, depending on the weather. While aerial survey results provide an indication of population trends, additional directed research and the use of collaring surveys would be beneficial for understanding moose ecology and potential causes of changes in the population (e.g., cause-specific mortality, disease). These studies would also help managers understand moose behavior around the developed moose browse habitat, which would aid in future management decisions regarding these areas.

Furbearers

Wildlife surveys for furbearers are a key component of the JBER Natural Resources program. JBER's mission is to provide a natural training environment, and documenting species presence on JBER can help

inform management to support that mission. If some furbearer populations increase, they have the potential to negatively affect the mission through increased human–wildlife conflict or impacts to training infrastructure. No trapping is allowed on JBER, other than for beaver control. Under Alaska state law, it is legal to harvest coyote and red fox on JBER-R with a hunting license. However, harvest numbers of small game, waterfowl, and furbearers have not historically been tracked. Therefore, information on furbearer populations on JBER is limited. Wildlife surveys aim to fill information gaps on species presence, abundance, and distribution across JBER. These data can also help with documenting the effects of harvest, habitat change (natural or human-caused), and other environmental changes on populations.

Most species of furbearers (e.g., wolverine, Canada lynx, American marten) occur at low densities and exhibit secretive behaviors, making it difficult to document their distribution and abundance on JBER. Thus, the Natural Resources program is using a combination of ground-based track surveys and/or game camera surveys to document furbearer species presence/occupancy and radio-collaring to elucidate population dynamics, movement patterns, and habitat selection. The information will provide key insights on the furbearers on base to support management decisions and multi-agency collaboration. Further discussion of the installation’s nuisance furbearer management program is provided in the Wildlife Conflict and Nuisance Wildlife Management subsection below.

Wolves are a furbearer species of top concern on JBER because of the risk they can present to public safety. In May 2010, 2 female runners were pursued until forced to climb a tree by 2 wolves on Artillery Road. The runners were accompanied by a dog, but these 2 wolves reportedly ignored the dog and focused their attention on the humans. During the winter of 2010 to 2011, ADF&G and JBER Conservation personnel removed 9 wolves from JBER via trapping and ground-based shooting efforts. This operation was deemed successful due to the removal of specific wolves thought to be involved in aggressive incidents and the reduction of wolf numbers in the area, but there was no way to determine whether all aggressive wolves were removed. Although wolf attacks on humans are rare, previous attacks in Alaska have occurred, involving individual wolves that exhibited similar habituated and aggressive behaviors (McNay 2002, Butler et al. 2011).

Wolf populations can shift dramatically over short time spans, so it is important to frequently survey population sizes in this GMU to have up-to-date information. A collaborative study with ADF&G was implemented in 2020 to 2021 to collar wolves from every pack on JBER and the portion of GMU 14C outside of the JBER management area (Saalfeld et al. 2023). Aerial surveys and game cameras documented 11 wolves in the Ship Creek Pack and 4 wolves in the North Post Pack during winter 2021 to 2022, although the report acknowledges high uncertainty in these estimates. By spring 2023, a single wolf was thought to remain in the North Post Pack, and the size of the Ship Creek Pack was “likely lower”. As of June 2023, 10 individuals from the 2 wolf packs were being tracked on JBER; 2 additional captured and collared individuals—listed as part of the “Knik” pack—were mentioned only once in the report (Saalfeld et al. 2023). Of the 10 individuals in the Ship Creek and North Post packs, the dispersal rate was 50%, with 5 subadults dispersing as far away as Fairbanks. The mortality rate was 50 to 60%, but one mortality remains unconfirmed. At the time of the report’s publication (June 2023), 3 individuals were still collared and alive on JBER, and a single individual was moving through the Matanuska Valley (Saalfeld et al. 2023).

Small Mammals

Small mammal monitoring is part of the broader Long-term Ecological Monitoring (LTEM) management framework. As previously mentioned, some small mammals such as snowshoe hare are monitored in conjunction with furbearers. The snowshoe hare is considered a keystone species due to its close relationship with lynx and other furbearers. Snowshoe hare are also a major prey species for numerous

predators such as coyotes, foxes, owls, Great Horned Owls, and American Goshawks. Snowshoe hare populations are closely tied to early forest successional stages and can serve as ecological indicators in this respect. The airfield and its surroundings provides ideal habitat for snowshoe hares, and when hare populations are high, their avian and mammalian predators may also become more abundant, posing additional risks to airfield operations. When hare numbers are high, additional removal of animals from the airstrip will likely be required. Canada lynx are an ideal surrogate for understanding small mammal and avian abundance, as their populations are directly tied to snowshoe hare numbers and can provide insight into the number of potential hazards that could be around the airstrip in a given year. Increased lynx observations are often used to inform staff of increasing hare numbers, which allows staff to proactively respond to increased hazards around the airfield.

The collared pika was identified as a SGCN in the State Wildlife Action Plan (ADF&G 2015). Collared pika are found on JBER in the Chugach Mountains within and around Training Areas 427 and 431. They inhabit high-elevation talus slopes and rely on consistent snowpack for insulation. Alaska Pacific University surveys in 2013 and 2014 documented collared pika and habitat within JBER's alpine areas (Dial et al. 2014). The JBER Natural Resources program collaborated with ADF&G to incorporate collared pika surveys on JBER into a larger ADF&G study on species presence, abundance, and reproduction across southcentral and interior Alaska. Surveys were completed from 2018 to 2023 and will provide critical information on the status of collared pika at JBER and effects of habitat variables such as microclimate, forage type, forage availability, and vulnerability to change (i.e., alpine habitat changes, shrub expansion).

Marine Mammals

CIBWs, harbor seals, and harbor porpoises are commonly detected on or adjacent to JBER. These species have been detected up to 2.6 miles upriver in the Eagle River and upriver in Otter Creek. Monitoring these species is critical for JBER to comply with the MMPA and, in the case of the CIBW, with the ESA as well. Both laws require analysis of the potential impacts to marine mammals resulting from military activities, especially as a result of noise.

Belugas and harbor porpoises rely almost exclusively on sound to forage, navigate, and avoid predators in the extremely turbid waters of Knik Arm. Exposure to anthropogenic noise can have serious effects on these animals, which can include hearing fatigue (TTS) and hearing damage (PTS). The onset of PTS or TTS as a result of anthropogenic noise is considered a Level A (Harmful) and Level B (Harassment) take, respectively, and is strictly prohibited (without authorization) under provisions of the MMPA and ESA.

NMFS recently published new criteria for evaluating the potential onset of PTS and TTS (NMFS 2016b). These criteria require sound data measurements using specific metrics (i.e., peak SPL and SEL) that differ from the measurements that were required in the past. The US Navy (2019) report on acoustic measurements of explosive detonations within the ERF is discussed in [Section 2.4.4](#).

[Section 7.4](#) and [Section 7.5](#) describe the management program for these species. Marine mammal monitoring methodology and results are detailed in the 673 ABW (2020a) marine mammal monitoring protocol and results report.

Migratory Birds

Migratory birds are a large, diverse group of birds that includes songbirds, waterfowl, birds of prey, waterbirds, and shorebirds. Migratory birds on JBER can occur as year-round residents, which live on the installation throughout the year; breeding residents, which breed in the region in the summer and migrate

south to wintering grounds in warmer regions; or transients, which use JBER as stopover habitat during migration.

Regardless of how birds use JBER, their presence provides important ecological services and an important indicator of ecosystem health. Primary considerations for migratory bird management include habitat management and compliance with the MBTA and BGEPA. Guidance for compliance with these laws is provided under EO 13186, *Responsibilities of Federal Agencies To Protect Migratory Birds*, and the resulting MOU with the USFWS and the Final Rule for the Take of Migratory Birds by the Armed Forces (50 CFR Part 21). To minimize take under the MBTA, JBER adheres to the USFWS guidance of no tree/vegetation clearing within the 1 May to 15 July migratory bird nesting window to the maximum extent practicable.

Passerines

Many of the priority neotropical species that are vocal during May and June can be adequately monitored through breeding bird surveys using a combination of point counts and roadside surveys. JBER has a longstanding Breeding Bird Survey route in the Richardson training areas, which is surveyed in conjunction with USFWS annually. Breeding bird point count surveys are also a component of the LTEM project and use modified Alaska Landbird Monitoring Survey methods.

Wetland areas, which are potential breeding habitat for Rusty Blackbirds, Solitary Sandpipers, and Lesser Yellowlegs, can be surveyed using techniques described by Matsuoka et al. (2008), who used a combination of rapid surveys of selected wetlands and revisited those with positive results to delineate breeding pairs and nest locations. Application of these methods to other wetland nesting species including sandpipers should provide an adequate estimation of nesting densities by these species on JBER. Management activities likely to benefit the abovementioned species include wetland and adjacent spruce forest protection.

Loons and Grebes

Common Loons, Pacific Loons, Red-throated Loons, and Horned Grebes are visually monitored on JBER each year by Alaska Loon Watch volunteers, and their nesting success is determined. Loon Watch volunteers report their results to the USFWS, per ADF&G (2025) guidelines.

Loon pairs and chick production seem very consistent over the years. The primary management activity to maintain a productive loon population is public education. Habitat loss and disturbance of nesting loons are primary human causes for nest abandonment or low production. ADF&G signs at JBER's boat-launching sites warn boaters against disturbing loons. A primary cause for limitation to chick fledging seems to be predation by aerial predators such as Bald Eagles. Management activities that are likely to benefit loons include wetland protection and shoreline restoration. Abandoned lead tackle and fishing line also play a role in loon and grebe mortality. In partnership with the USFWS "Loons, Line, and Lead" program, JBER has installed line and tackle recycling bins near lakes to help keep discarded line and lead tackle from being ingested by or entangling loons.

Owls

Owls are identified as BASH risks and unique species with the need for improved population understanding. Owls are aerial predators whose populations rely on prey availability and nesting habitat. The US Department of Agriculture–Animal Plant Health Inspection Services–Wildlife Services (USDA–APHIS–WS) BASH team regularly captures Great Horned Owls and Short-eared Owls on the Elmendorf and Bryant Army Airfields. The birds are then translocated to the Palmer Hayflats to reduce the risk of aircraft strikes.

When available, USDA–APHIS–WS, USFWS, and JBER Conservation staff place GPS tags on these translocated animals to gather critical information about their movements. In previous years (2003 to 2005, 2010, and 2012), owls were monitored with breeding-season call surveys using techniques recommended by Andres (2001). These surveys were conducted on established routes that provide coverage of most of JBER-E and a small portion of Richardson. Owl surveys conducted during 2003 to 2005 showed a stable trend in Great Horned Owls, a declining trend in Northern Saw-Whet Owls, and an increase in Boreal Owls. JBER installed owl nesting boxes throughout the base. Surveys have documented that these nest boxes are mainly occupied by Boreal Owls and Northern Saw-Whet Owls.

Bald Eagles

Bald Eagles are protected under the BGEPA and also pose a serious BASH risk. Documenting their distribution and population levels on JBER is necessary to support future BASH actions. Aerial Bald Eagle nest surveys are conducted annually in collaboration with USFWS to identify the locations of all occupied nests. These surveys are conducted prior to leaf-out but late enough that active pairs are displaying nesting behaviors, typically in late April. Subsequent ground checks in mid- to late June and late July/early August can identify productivity and success. If available, an aerial survey of the previously identified occupied nests in late July can determine the outcomes of nesting efforts. This monitoring strategy is relatively easy to duplicate with little cost, as it does not exceed 10 hours of flying time in total. Locating and documenting occupied Bald Eagle nests is included as part of the project identified in [Section 7.4.5](#). Bald Eagle populations are currently displaying a stable trend. [Section 7.4.5](#) discusses eagle management activities pursuant to the BGEPA and USFWS guidelines, which primarily involves protection of eagles and nesting trees.

American Goshawks

American Goshawks have a narrow habitat preference for boreal forests. This species requires mature to old-growth trees as nesting sites, making them an indicator species of forest health (Anderson et al. 2005). Surveys for American Goshawks within JBER are being conducted by the USFWS. Surveys for presence and productivity of the American Goshawk can be completed on foot early in the nesting season, when pairs are extremely vocal and territorial. Productivity can be measured by visiting the occupied nest sites prior to fledging. Land conversion and forest management are the primary management actions affecting American Goshawk populations on JBER.

Geese

The number of geese observed on the ground within the Wildlife Exclusion Zones (WEZs) has substantially decreased since 1995 due to an aggressive BASH program. Canada Geese within the Bird Exclusion Zones (BEZs) and WEZs pose BASH risks, and their population level on JBER reflects the effectiveness of BASH reduction management and procedures. The numbers of birds observed, hazed, and killed are maintained in a GIS-based database by USDA–APHIS–WS.

Other Birds and Mammals

Management of birds and mammals that are not discussed above is primarily limited to protection from poaching and management/protection of habitats. Management activities may involve moving small birds and mammals if these species pose BASH risks or become a nuisance in housing or facilities. All actions must be coordinated with ADF&G.

On JBER, small game, furbearer, and waterfowl harvest is allowed in designated areas. The JBER hunting program is described in [Section 7.2.3](#).

3913 **Amphibians**

3914 With global declines in amphibian populations, there is a growing concern for wood frogs, the only frog
 3915 species found on JBER. Current frog population surveys include spring calling counts during the peak
 3916 breeding period. The North American Amphibian Monitoring Program recommends following a survey
 3917 route that includes predesignated stops near wetland areas during mid-evening. Calling frogs are counted
 3918 (if few in number) or categorized by relative density (if numerous). Survey efforts will provide a baseline
 3919 dataset for future comparison. The health of wood frog populations on JBER should be assessed in
 3920 collaboration with the USFWS to determine if wood frogs can serve as indicators of environmental health.

3921 While wood frog surveys suggest a well-distributed population on JBER, there are aquatic systems with
 3922 very low frog densities. Specifically, fewer than 2 or 3 frogs were heard in the 2003 and 2004 spring surveys
 3923 in wetlands between the decommissioned JBER-E power plant and golf course. Green Lake also had a low
 3924 density of frogs during listening surveys, which is probably a reflection of its habitat quality. Wood frog
 3925 numbers seem to be highest in emergent wetlands surrounding Hillberg Lake. Wood frog populations on
 3926 JBER-R appear to be highest in Otter Lake, with other sizeable populations in emergent wetlands. Wood
 3927 frog numbers in seasonal wetlands are highly influenced by standing water levels. Breeding, productivity,
 3928 and abnormality surveys were conducted from 2012 to 2015 in over 50 waterbodies through a cooperative
 3929 agreement with Alaska Pacific University, and wood frogs were detected in approximately two-thirds of all
 3930 waterbodies sampled across JBER (Dial et al. 2015).

3931 **Pollinators**

3932 There is limited information on the presence of pollinators on JBER, so the installation is developing a
 3933 pollinator survey with a focus on the western bumble bee (*Bombus occidentalis*). The western bumble bee
 3934 is under review for federal listing. The University of Alaska Anchorage developed a pollinator survey for
 3935 the wider Anchorage area (Fulkerson et al. 2023), and JBER personnel will support this survey on base.

3936 **Macroinvertebrates**

3937 Macroinvertebrates are important indicators of water quality, and they have also been identified in the
 3938 ADF&G Alaska Wildlife Action Plan as ecologically important species. The dependence of insects on water
 3939 quality is well established. Streams and rivers are important habitats, and the presence of species in the
 3940 Ephemeroptera, Plecoptera, and Trichoptera orders indicates high water quality. A comprehensive survey
 3941 of benthic macroinvertebrates on JBER was conducted during the 2015 to 2017 field seasons. [Appendix J](#)
 3942 provides a list of genera present on JBER. Wetlands are identified as another important habitat type for
 3943 macroinvertebrates. The Odonata order was selected for evaluating lentic aquatic systems due to the
 3944 visibility and ease of sampling of its species in both larval and adult stages. Baseline data for this group of
 3945 insects, however, are limited for this area of Alaska and military lands, specifically. A baseline survey is
 3946 needed to establish composition and the spatial and temporal distribution of this order, identify habitat
 3947 correlations, and develop a species monitoring protocol. A baseline population diversity and abundance
 3948 indicator will provide a metric for water quality, indicating ecosystem health.

3949 **Wildlife Conflict and Nuisance Wildlife Management**

3950 Wildlife on JBER is protected under several statutes, including the ESA, MBTA, BGEPA, and State of
 3951 Alaska fish and game laws. The following are examples of specific methods employed by JBER to avoid
 3952 conflicts with wildlife during training:

- 3953 • US Army Alaska (USARAK) Regulation 350-2 prohibits Soldiers from intentionally targeting
 3954 wildlife when conducting firing activities and from harassing wildlife during maneuver activities.

- The Army minimizes activities or operations directly and negatively impacting fish and wildlife during sensitive time periods or seasons.
- The Army will not intentionally fire into the open waters of Eagle River at any time.
- Eagle nesting surveys are completed annually, and their results are disseminated to the relevant offices.
- Informational signage and materials are provided for personnel and visitors to ensure they are aware of wildlife protection and conflict guidelines.

Wildlife conflict management under the JBER BASH program is described in [Section 7.12](#).

JBER adheres to principles of the Living with Wildlife MOU between ADF&G, Fort Richardson, and EAFB ([Section 2.4.1](#)), although portions of the document are outdated and obsolete. To manage nuisance wildlife, including moose, bears, and wolves, JBER has established clear procedures developed with ADFG. Under a State Public Safety Permit, trained personnel such as JBER Biologists, Conservation Law Enforcement Officers (CLEOs), and Military Conservation Agents (MCAs) are authorized to respond to wildlife incidents. When wildlife from a call is located, these personnel will monitor and haze the animal under the permit's authority until it no longer poses an immediate threat. Wildlife calls include dispersing moose, bears, wolves, and other small mammals. The majority of these conflicts, particularly those involving black bears, occur during the summer months. The number of black bear calls continued to rise, increasing from 623 in 2024 to 647 in 2025, with both years remaining above the five-year average of 537 calls. This ongoing increase may be due to more bear activity or increased vigilance from installation personnel and the public reporting wildlife, including bears in the area. In contrast, the number of moose calls was relatively stable, with a slight decrease from 163 in 2024 to 162 in 2025, both of which are just below the five-year average of 169. Calls for other wildlife saw a significant jump, increasing from 16 in 2024 to 43 in 2025, surpassing the five-year average of 22..

Nuisance Bears

JBER has an extensive bear–human conflict management program in place. The nuisance bear management program is a combination of public education, solid waste management, and enforcement. Section 1(c) of the Alaska MOA AK-MOA-054, *Joint Management of bear/human conflicts on military lands near Anchorage, Alaska*, states that FRA and EAFB shall be individually responsible with respect to each entity's jurisdiction for garbage management and enforcement of state and military regulations concerning food storage, garbage, and feeding of bears. JBER wildlife biologists, CLEOs, and MCAs handle nuisance bear problems, respond to reports of bears in developed areas, conduct hazing, and engage in other bear management efforts. All MCAs receive bear safety and food-conditioned bear procedure training that was developed between JBER and ADF&G. Nuisance bear activity/behavior and locations are documented in the Wildlife Response Call Database. Currently, nuisance bears found in housing or developed areas are hazed out of the area, if possible.

In the 1990s, a black bear study (Bostick 1997) was completed to determine basic population parameters and test various types of nuisance bear management techniques. Over the course of the 7-year study, 23 black bears were radio-collared and monitored, and nuisance bears were subjected to different types of adverse conditioning. The study identified physical types of adverse conditioning to be the most effective and provided recommendations concerning bear management on military lands within the Anchorage area.

JBER implements the following activities for the management of nuisance bears:

- Public bear awareness education, proper waste management education, and enforcement of feeding laws and regulations are conducted.

- Bear-resistant trash/garbage cans, dumpsters, or similar containers designed and used to hold waste are required on JBER.
- Risk classifications are applied to known nuisance bears.
- CEIEC will secure and maintain a State Public Safety Permit (along with relevant federal permits) authorizing trained personnel to respond to, monitor, haze, or take hazardous wildlife.
- JBER Biologists, CLEOs, and MCAs—will respond to and monitor reports of nuisance bears or hazardous wildlife to ensure public safety.
- When a nuisance bear is located, authorized and trained personnel (JBER Biologists, CLEOs, or MCAs) will monitor and haze the animal under the authority of the State Public Safety Permit until it no longer poses an immediate threat..
- Hazing techniques include (but are not limited to) human presence, lights, sirens, vehicles, bear spray, pepper balls, rubber slugs, cracker shells, and loud noise.
- Nuisance bears may be opportunistically trapped and tagged in collaboration with ADF&G so repetitive nuisance behavior by an individual bear can be monitored and documented.
- Bears that are monitored and documented to demonstrate repetitive nuisance behaviors or behaviors that pose a high-risk to human safety may be recommended for lethal removal. Removal of nuisance bears is done at the discretion of and in collaboration with ADF&G.
- DNA may be collected opportunistically from nuisance black bears in collaboration with ADF&G to assist in the confirmation of specific individuals and to inform ongoing management decisions..
- CLEOs and JBER Biologist participate on the Anchorage Bear Committee.
- A black bear hunt is implemented through ADF&G draw hunt. Results from this hunt will be monitored to inform future hunt recommendations and nuisance bear management.
- JBER continually strives to reduce wildlife conflict risk. Means and methods of reducing risk is discussed in conjunction with ADF&G biologists.

The Anchorage Bear Committee was established by the ADF&G in 2001 to minimize conflicts between humans and bears in the Municipality of Anchorage. Member agencies include the ADF&G; Municipality of Anchorage parks, planning and police departments; FRA; EAFB; Alaska State Troopers; Chugach State Park; US Forest Service; BLM; and the Alaska Waste company. The group meets twice a year to discuss human–bear incidents and methods to avoid or minimize adverse encounters through information, education, solid waste storage, regulation, enforcement, or land-use policies.

Minimizing nuisance wildlife conflict is an ongoing, dynamic process. Previous management strategies have focused on solid waste issues. In 2011, JBER spent \$50,000 on bear-resistant dumpsters for the cantonment areas to help alleviate this problem. In 2019, JBER allocated \$100,000 to purchase additional bear-resistant dumpsters. In 2020, the 673 CES also worked with 673 FSS to reduce wildlife conflict at Otter Lake by adding bear-resistant food-storage lockers. Additionally, the 673 CES, 773 CES, and 673d Contracting Squadron met tri-annually from 2019-2025 for the Solid Waste and Wildlife Working Group to discuss and develop actions to help reduce wildlife conflict. Through these efforts, the working group successfully updated the JBER Solid Waste Contract, achieving a transition to 100% bear-resistant dumpsters across the base to further reduce wildlife conflicts associated with solid waste..

Wild Canids

Foxes and coyotes occasionally cause problems in housing areas. These conflicts are often caused by the feeding of these animals, either deliberately or inadvertently. Numerous pets have likely been killed by foxes, coyotes, and wolves. Conflict management includes public education concerning feeding wildlife and aversive conditioning. The USDA–APHIS–WS have used leghold traps and snares to remove foxes

and coyotes associated with the airfield, but those capture devices cannot be used in most problem areas due to safety considerations. Translocation or euthanasia of foxes or coyotes requires approval by ADF&G.

Feral Animals

Feral cats and dogs are occasionally a problem. Feral cats are effective predators, directly competing with native mammals, and are considered invasive species. They exist in small numbers on JBER. Efforts are taken through the 773 CES/CEOIE to eliminate feral cats and control stray dogs. When possible, dogs and cats are captured and taken to the Anchorage Animal Control facility or JBER Veterinary Services. [Section 7.11](#) further discusses feral animal control.

Urban Moose Conflicts

Moose present a threat to life and property of personnel by frequently wandering through the developed portions of JBER. CLEOs, MCAs, and occasionally 673d Security Forces Squadron personnel respond to calls from base publics and haze moose away when there is a clear threat to personnel, dependents or military readiness. Critical times of year are early spring during heavy snowfall years and late May and June, when cows are present with calves. Moose can become aggressive with responding agents. Several individuals off-base, in the Anchorage area have been severely injured or killed by moose.

Property damage also occurs as a result of moose–vehicle accidents. Even at the relatively slow speeds posted on JBER, 2 to 6 accidents occur each year, primarily during winter, when darkness reduces visibility and road conditions make stopping more difficult. Vehicle damage can range from slight to total. The Alaska Department of Transportation and Public Facilities estimates that each moose–vehicle collision in rural Alaska averages \$15,000 in property damage, medical bills, etc. (Sinnott 1995). The moose sometimes suffer minor injuries but more often are killed or suffer serious injuries and must be euthanized by responding personnel. Road-killed moose are the property of the state, and the Alaska Department of Public Safety maintains a list of charitable organizations in the community that are contacted on a rotating basis to salvage the meat.

Prevention of moose–human conflicts focuses on habitat improvement areas that are designed to draw moose away from conflict areas and increased public education concerning critical times of year, problems created by feeding moose, and how to prevent and react to conflict situations. Urban forest practices in cantonment areas include prohibition of planting new fruit-bearing trees in WEZs and BEZs. An effort to kill and remove 985 fruit-bearing trees in the BASH zone around the Elmendorf Airfield in 2018 and 2019 resulted in immediate and significant reduction in wildlife conflict incidents compared to those in areas where fruit-bearing trees remained. Future moose-habitat enhancement efforts should be located where they are likely to draw moose away from the airfield and residential areas.

Information is provided in Newcomers Briefings to all Active-Duty personnel, and their families are also encouraged to attend. Several notices are also published through JBER Public Affairs annually to make personnel aware of the potential hazards that moose represent. Increased enforcement of feeding regulations is also recommended, as some aggressive moose have a history of having been hand-fed.

Beaver Management

Beavers cause problems on JBER by plugging culverts and cutting trees. The plugging of culverts has resulted in the flooding of some parking areas and roads, causing a substantial increase in maintenance costs. Beavers have caused damage to trees, leaving hazards along roadways and trails that required clearing for safety.

Preventative measures to minimize beaver damage include painting or fencing large trees near beaver lodges, installing beaver-resistant culverts and dams, and in cases where individual beavers are causing damage, removing the beaver under an ADF&G depredation permit. These permits can be issued outside the local GMU trapping season, as the beaver population in the Anchorage area is very healthy. Where possible, beavers are trapped within the legal trapping season by a small number of experienced volunteer trappers that attend the Alaska Trapper's Association trapper school, possess all required state licenses, and are willing to assist in conducting fall cache surveys. The ADF&G has also issued permits for beaver control to MCAs and USDA–APHIS–WS personnel. Since depredation trapping occurs as problems arise during summer, the pelts are in poor condition. The meat is retained as bear bait and pelts are turned over to the ADF&G.

Nuisance Birds

The construction of nests by Cliff Swallows (*Hirundo pyrrhonota*) on facilities creates an annual nuisance and health concern. Droppings are unsightly and are a growth medium for fungi that can cause the respiratory infection histoplasmosis. Swallows are heavily infested with mites that enter the quarters when the birds leave the nest. Although mites do not attack people, their presence causes considerable distress to occupants. Cliff Swallow nesting has diminished greatly as a result of more aggressive nest removal prior to egg laying (H. Griesse and J. Morrill, USDA–APHIS–WS, personal communication, 2010).

Control measures include building modifications (e.g., installation of anti-perching devices, covering or enclosing all potential nesting surfaces on the structure with suitable exclusion material), removal of food and nesting habitat, and direct removal of nests in the spring during nest construction. 773 CES/CEOIE personnel knock down nest concentrations under the authority of a USFWS permit. This is the most effective means of reducing the problem, but the destruction of eggs or young has been criticized.

Gulls and Rock Doves cause occasional problems during their nesting season, particularly around warehouses and open bay buildings. The 773 CES/CEOIE is responsible for control of these birds ([Section 7.11](#)).

7.1.4 Ecosystem Management

The fish and wildlife habitat on JBER managed lands is not managed for individual species or specific population levels. JBER NRMs use ecosystem management to maintain biological diversity, rather than focusing on the habitat needs of specific species. JBER's policy is to effectively manage JBER lands for wildlife habitat, timber, erosion control, and military cover and concealment. Ecosystems are managed through the Natural Resources and ITAM programs.

Scientifically sound inventory and monitoring protocols are necessary to compare and validate changes to justify future management actions and serve as the foundation for effective natural resource management. Accurate population and habitat information is needed to foster the exchange of information with other resource management agencies, aid in the continuation of knowledge with installation personnel changes, and reduce repeated efforts, thus reducing the cost of managing JBER natural resources. In addition to protocol development, several other tasks must be completed to enhance the effectiveness of the JBER Natural Resources program, including the following:

- Compiling and assimilating all available natural resources (species and habitats) inventory, survey, and monitoring results to date.
- Evaluating inventory and monitoring efforts to date.

- Defining future inventory and monitoring needs (e.g., species of special concern, managed species, wildlife conflict).
- Developing statistically valid inventory and monitoring protocols for future efforts, stressing cohesion among projects, departments, and outside agencies.

JBER has established LTEM plots that are representative of the entire installation. Monitoring these plots helps monitor the health and changes to the entire installation ecosystem. An extensive vegetation and ecotype survey was conducted throughout the Elmendorf area in 1982 to 1983 (Gabriel and Tande 1983) and throughout the Richardson Training Areas in 1994 and 2003. As part of this survey, the aerial photography used to map vegetation types was ground-truthed. Vegetation plot monitoring began in the late 1990s, using a protocol established by Tande et al. (2001), generally following the Forest Inventory Analysis protocol. This protocol was followed between 1999 and 2001 across 30 permanently established LTEM sites. Between 2001 and 2007, Fort Richardson established 50 permanent and variable plots to conduct forest stand inventory and health monitoring. In 2013, HDR Alaska, Inc., updated and revised the protocol to consolidate the Richardson and Elmendorf plots, standardize the methodology, and add monitoring protocols for small mammals and birds on the same plots. A total of 119 LTEM sites have been permanently established, stratified across all major land ecotypes and through all areas of JBER. Ten percent of these are monitored annually on a 10-year rotation (HDR Alaska, Inc. 2012). LTEM sampling IAW the current protocol and 10-year rotation plan has occurred since 2013.

This management strategy allows JBER to articulate and map the vegetation and habitat associated with the priority management species identified in [Table 7-1](#). JBER biologists work with established scientists and biologists through cooperative agreements and interagency partnerships to monitor and manage habitat consistent with established methods. Field monitoring, in the form of on-the-ground vegetation and wildlife surveys, helps determine diversity, abundance, and occupancy of the habitats identified through remote sensing or other appropriate techniques.

In 2014, vegetative studies on elevational changes in shrub cover, succession of woody vegetation in wetlands, and silviculture were conducted on JBER (Dial et al. 2015). Alpine training areas present logistical complications to maintaining current ecological, hydrological, and biological field data. Aerial imagery may be helpful but does not allow for monitoring wildlife or evaluating ecological features where field data may be lacking. These recent studies indicate that recently observed increases in temperature and changes in seasonal patterns are having a profound impact on ecosystems at higher elevations. The last comprehensive alpine ecological survey was conducted by Walker et al. (1997), and JBER management would benefit from additional surveys to track changes in these ecosystems and support the adaptive management of the species within them.

Changes in growing degree days may influence forest habitats in higher-elevation areas, attracting and increasing the presence of the species already found in those areas. These habitats should therefore be monitored. With these potential benefits for the wildlife on JBER, management changes may be necessary to reduce conflicts with the mission. These could include an expanded hunting program to reduce populations of nuisance wildlife, expanded waterfowl exclusion zones to limit BASH concerns, or increased brush removal and habitat management to discourage the presence of wildlife in certain areas. Habitat loss in these areas may be further exacerbated by increased competition with nonnative species that are more adapted to warm weather, so it may not be possible to preserve the habitat in the long term without extensive invasive species control efforts. The occurrence of conditions conducive to more invasive species establishment in other ecosystems throughout JBER should also be considered ([Section 2.3.2.3](#)), as these would alter the vegetative communities on which the wildlife in the area currently depend. Invasive species

management and removal efforts may need to increase to offset this reduction in habitat quality ([Section 7.11](#)).

7.2 Outdoor Recreation and Public Access to Natural Resources

Applicability Statement

This section applies to all DAF installations that maintain an INRMP. The installation is required to implement this element.

Program Overview/Current Management Practices

7.2.1 Policy and Background

A basic tenet of ecosystem management is the consideration of human consumptive and non-consumptive use. JBER strives to maintain an interactive relationship with local communities by providing as many opportunities for public access as military training, security, safety, and environmental conditions allow. This section discusses programs that directly relate to the management of natural resources and support of troop morale. Recreation on JBER primarily includes fishing, hunting, camping, wildlife viewing, photography, hiking, off-roading, boating, winter sports, and wood cutting.

The INRMP will address only Class II (dispersed recreational areas) and Class III (special interest areas) recreational areas. Examples of Class II areas include hunting, fishing, birdwatching, boating, and hiking areas. Examples of Class III areas include valuable biological, cultural, or scenic features that warrant special protection and access control (e.g., fish spawning grounds, wildlife viewing areas, or homestead remnants).

Pursuant to the Sikes Act, INRMPs must provide for public access to military installations in a way that is compatible with the sustainable use of natural resources and does not interfere with military readiness. Hunting, fishing, and other forms of dispersed recreation may also be provided in compliance with the installation's security and safety requirements. Also pursuant to the Sikes Act, installations are authorized to collect, spend, and administer fees for hunting, fishing, or trapping on military lands. DAFMAN 32-7003 states that "administrative and management costs associated with hunting, fishing, trapping and the management of outdoor recreation access should be fully reimbursed by user fees." DoDI 4715.03(6)(i) states that "hunting, fishing and access permitting and fees, if collected, must be deposited and used pursuant to the Sikes Act and should be used only on [the] installation where collected." The Sikes Act allows hunting, fishing, and other outdoor recreation fees to be reimbursed to the base at which they were generated. Such fees are used for the protection, conservation, and management of fish and wildlife on the installation from which the fees are collected, including habitat restoration and improvement, biologist staff and support costs, and related activities, but those fees should not be used for other purposes.

Recreational activities are permitted in portions of the undeveloped areas of JBER-E and training areas on JBER-R, as long as there are no conflicts with the military mission or training activities. This is for the safety of the public and military members and to maintain the integrity of the military training experience.

Cultural Resource Requirements and Tribal Coordination

Public recreation and access to natural resources has the potential to negatively impact cultural resources and sacred sites found on base, and JBER is required to mitigate impacts to these resources in compliance with Section 106 of the NHPA, NAGPRA, ARPA, and AIRFA. Additionally, the development of any new recreational facilities, trails, or features must be reviewed for the potential to require the NHPA Section 106 consultation process. Access to cultural resources found on JBER is a high priority for the installation and

many Tribal stakeholders. Coordination with these stakeholders helps to identify resources that may be at risk and inform activities that reduce any risk. JBER will continue to coordinate with Tribal stakeholders to ensure that actions taken by the cultural and outdoor recreation programs are mutually beneficial. Trails and other recreational sites will be rerouted or altered as needed for cultural resource protection and management.

7.2.2 Outdoor Recreation Management

The continuous identification of appropriate outdoor recreation opportunities and the review of current impacts on the mission are essential for JBER outdoor recreation management. Outdoor recreation services are provided by various organizations, including the 673 CES/CEIEC and the 673 FSS. Generally, recreational areas with facilities designed to support intensive recreational activities (e.g., campgrounds, picnicking areas, paved walking/jogging or cross-country ski trails, river raft tour areas) are managed by the 773d Force Support Squadron (773 FSS). The 673 CES/CEIEC is responsible for managing dispersed recreational activities (e.g., fishing/hunting, hiking, berry or mushroom harvesting, sightseeing, birdwatching). Refinement and clarification of roles and responsibilities of these organizations related to outdoor recreation activities on JBER is an ongoing process. An example is the way that trail maintenance is tasked out to these units. The maintenance of remote, unimproved, hiking, and ORV trails are generally tasked to the 673 CES/CEIEC when funding is available. At the same time, paved, cross-country, and Eagleleglen trails are 773 FSS responsibilities. Efforts to ensure that repetitive services are not provided by both organizations are important customer service obligations.

Other priorities for outdoor recreation management include regular evaluation of JBER's fee structure and permit system (discussed below). Public outreach on changes to policy or recreation is another important focus ([Section 7.15](#)). The program regularly reviews and implements a variety of improvement projects, including construction or maintenance of fishing docks, lake access points, portage sites, bear-resistant food storage lockers, and informational kiosks. Consideration should include making docks handicapped-accessible, particularly at Hillberg and Lower and Upper Sixmile lakes.

Gates and buried posts have been installed to prevent unauthorized access by vehicles, while allowing foot and bicycle traffic. Gates should be locked, with key access available for enforcement and work crews. This system is similar to that used on JBER-R to prevent illegal ORV access and infrastructure damage.

Other opportunities for recreation facility improvements include the following:

- The Clunie Lake area could be improved by graveling the parking area and installing barriers to keep vehicles out of wetlands.
- Bear-resistant food lockers should be installed at Otter Lake to reduce wildlife conflict.
- Waldon Lake has a good parking area, but adjacent natural areas are being degraded by uncontrolled, unauthorized uses such as illegal waste disposal and camping. A boardwalk or portable pier for anglers could be installed to enhance fishing opportunities.
- Thompson Lake requires the installation of barriers around common parking areas to reduce degradation to wetlands and shoreline.
- Improvements to Gwen Lake should concentrate on shore rehabilitation from the extensive damage caused by beaver activity and human foot traffic. Development of a trail and possibly boardwalks in marsh and wetland areas could greatly improve angler access.
- Hardened foot-trails need to be upgraded at several lakes on JBER to increase safety and access over muskeg surrounding stocked lakes. This action will improve fishing access.

- Informational kiosks conveying educational content on conservation practices such as wildlife interactions, prevention of the spread of noxious and invasive weeds, and protection of wetlands and water resources should be installed.

Outdoor Recreation Permits and Fee Structure

DAFMAN 32-7003 states that administrative and management costs associated with hunting, fishing, trapping, and the management of outdoor recreation access on installations should be fully reimbursed by user fees. JBER requires recreational access permits to separate and safeguard military training from recreational activities. Specific policies related to public access ([Section 7.2.3](#)), hunting and fishing ([Section 7.2.4](#)), and seasonal activities ([Section 7.2.5](#)) are discussed further below.

Permits

All persons (military, military-affiliated, and civilian) wishing to recreate on JBER must obtain a General Recreation Permit (RecAccess permit) through the RecAccess system (jber.recaccess.com). Recreators must have a valid RecAccess permit and sign in/out using the RecAccess system prior to recreating, with the exception of MWR-sponsored facilities. Recreation on military lands is subject to availability and dependent on military security/training requirements. Some activities require an additional permit. This includes but is not limited to personal-use firewood cutting, holiday tree cutting, moose hunting, bear hunting, and special group camping. Information on how to obtain permits is provided on the JBER RecAccess website. JBER will be installing signage that clarifies the requirement for visitors to use RecAccess. JBER requires RecAccess users to watch a video on JBER's recreational and safety requirements prior to purchasing permits. The Tribal Liaison engages with local Tribal groups, town halls, and homeowner associations to inform them of policies regarding recreation and the use of RecAccess.

All hunters on JBER must have all required state and federal hunting licenses and stamps and state-issued hunter safety cards in possession while hunting. A state fishing license is required on JBER. Public access to JBER is based on the current security status of the installation. Access is allowed only during normal or routine security operations. Hunters must also complete a proficiency test to reduce wounding rates of hunted wildlife and view a training video that discusses general rules for hunting on the installation. This video is updated regularly as mission, hunting, or permitting requirements change.

Individuals desiring to obtain a JBER moose or black bear hunt permit must:

- Successfully draw a State of Alaska moose or black bear hunting permit
- Show proof of successful completion of a State of Alaska-approved Basic Hunters Education course (may be from any state but must meet Alaskan standards)
- In addition to hunter education, moose hunters must also complete a State of Alaska-approved bowhunter or muzzleloader education course, depending on which hunt they have drawn
- Purchase all appropriate state licenses and tags (i.e., non-resident moose or black bear tags)
- Pass a proficiency test administered by JBER
- Attend a hunt orientation presented by JBER
- Obtain a RecAccess permit
- Pay a moose permit (\$175) or black bear permit (\$125) conservation fee to JBER

JBER moose and black bear hunts are intensively controlled, requiring hunter completion of several administrative and procedural steps prior to issuance of a permit. Hunts are unguided and not regulated in terms of area selection or hunter density. Harvested moose or black bear may be checked at the kill site by either natural resources personnel or by Conservation Law Enforcement personnel. Checks allow for

collection of data (sex, age class, antler size, general health, exact location) and samples (as appropriate) and for checking hunter compliance with pertinent policies and regulations. Hunters are required to report wounded animals.

User Fees

JBER has initiated access fees for certain recreational activities. In 2001, for example, in coordination with ADF&G, JBER began charging moose hunters an access fee. In 2015, JBER initiated a \$10 recreational access permit fee, and a reduced \$5 fee was established for seniors and disabled individuals. Roughly 5,000 permits are sold each year.

[Section 7.8](#) discusses procedures for commercial timber sales and personal use firewood sales on JBER. These procedures ensure that the US Treasury receives proceeds from wood product sales on BLM lands IAW federal regulations, while also ensuring that the DAF receives sufficient timber receipts to fund forest management activities and regeneration costs.

On 26 October 2018, JBER stopped issuing free woodcutting permits. Beginning on 1 November 2018, woodcutting permits were sold at \$17.50 per half-cord and \$35.00 per full cord. Since 25 August 2023, woodcutting permits are sold by the half-cord only. JBER sales of timber, firewood, and holiday trees are required to comply with the requirements detailed in DoDI 4715.03 and DAFMAN 32-7003. Approximately 300 cords are sold annually.

Reimbursable Conservation Program Funds

Proceeds are deposited into reimbursable conservation program accounts and can be withdrawn to be reinvested in installation natural resources programs, as outlined by the Sikes Act. Two separate accounts are maintained with different limitations. Per DoDI 4715.03, forestry funds go into the Military Service's forestry account, IAW Section 2665. Recreational permit access fees are collected in RecAccess through pay.gov. Program funding is consolidated at AFCEC and returned to JBER annually, as required by DAFMAN 32-7003 and the Sikes Act. The average annual recreational access revenue generated is approximately \$55,000. This revenue is used to support and improve the RecAccess recreational access program.

7.2.3 Public Access

While the DAF and Army have been training Airmen and Soldiers at EAFB and Fort Richardson for more than a century, they have also provided access to quality recreational opportunities for military personnel, their families, employees, and the public. In 2023, 4,834 users purchased General Recreation Permits. Of these permit holders, 78% were affiliated with the military and 22% were unaffiliated civilians. However, all recreational access is dependent on compatibility with military readiness and security. Since December 2023, public access to the JBER cantonment area and the training areas north of the Glenn Highway has been permitted only for individuals possessing a DoD identification card or those that are being escorted by someone with a DoD credential. Members of the public are not allowed to self-sponsor onto this section of the base. Access to open training areas south of the Glenn Highway is available to persons with DoD affiliation and members of the public. Attendees of DoD-sponsored recreation or conservation events or activities may obtain a base access credential for the duration of the activity. Such credentials are valid only for the area of the activity and travel to and from the activity site. Access for these activities will be coordinated between the DoD sponsoring agency and 673d Security Forces Squadron. Individuals without DoD affiliation who have special draw permits for moose and/or black bear hunts on JBER will be sponsored by 673 CES/CEIEC, and upon completion of JBER hunt program requirements ([Section 7.2.3](#)),

they will receive a base access credential and be granted unescorted access for the duration of the hunt. All members of the public seeking a base access credential are subject to criminal history vetting and a positive fitness determination for entry to JBER. The DAF access memorandum ([Appendix H](#)) provides details regarding recreation access restrictions on JBER.

The primary concern related to public access for outdoor recreation is safety. Those unfamiliar with the area and/or military operations and regulations may put themselves in danger or cause disruptions to military activities if they wander into off-limits or restricted areas. To mitigate this hazard, JBER worked with RecAccess programmers to develop an online interactive map that allows users to determine their exact location in relation to training areas and other property boundaries. The interactive map also displays openings and closures of all JBER lands. This information is updated in real time by Range Control.

Traditionally, there have been ample opportunities for the public to participate in recreational activities on JBER lands. In maintaining a liberal policy of public access, JBER relies on a responsible public to adhere to installation policies, which are designed to promote physical security, minimize safety hazards, and protect natural and cultural resources. All recreation activities must be conducted IAW applicable rules and regulations.

Civilians and military personnel requesting recreational access to JBER lands and waters must obtain a recreation access permit from RecAccess. This permit provides conditional authorization to enter the training lands and is valid for 1 calendar year. All recreational users must log in to the RecAccess program to ascertain which training areas are available for recreational use. Individuals are prohibited from entering areas other than those that are indicated as open. Individuals are also prohibited from entering any of the areas indicated as closed by placard, blockade, verbal warning, red flag, or other means of communication. Authorization for access is subject to change based on the current Force Protection Condition levels and mission training requirements.

All recreational users on JBER must be logged into the RecAccess permit system while on base. Additionally, all recreational users requesting access north of the Glenn Highway and who do not possess an authorized DoD identification card must be sponsored and escorted by a DoD cardholder throughout the duration of their visit to the area. Recreational visitors to JBER-R may be checked into a maximum of 3 training areas that are listed as opened to recreation on the RecAccess permit system. All recreational visitors on JBER training areas must log out and physically vacate the areas by 2300 hours on the day of use. Training areas reopen at 0600 for recreation.

7.2.4 Hunting and Fishing

Moose hunting and fishing are by far the most popular form of outdoor recreation on JBER, and hunting opportunities for moose and black bear are far outweighed by the demand. In contrast, the demand for the hunting and fishing of other species is met by current installation resources. Hunting and fishing may be permitted so long as harvest rates are sustainable and accordant with the carrying capacity of specific wildlife habitats, maintain viable population levels IAW ADF&G guidance, and are consistent with the sustained yield principle. Membership in organizations such as rod and gun clubs is not a prerequisite to obtaining permits or authorization to hunt or fish on JBER lands.

Hunting

Hunting is an important natural resources-based form of outdoor recreation on JBER lands. Hunting on JBER is conducted under regulations promulgated by the Alaska Board of Game and administered by ADF&G. The Alaska Board of Game process ensures public input in adopting regulations and a sustainable

harvest of game species. JBER falls within GMU 14C, which encompasses 7 different management areas, and follows the corresponding regulations and harvest objectives. JBER manages hunting in terms of areas available, dates within ADF&G seasons, safety requirements, permit and reporting requirements, and other parameters to avoid conflicts with the military mission and provide safe, high-quality recreational experiences. Hunting on JBER includes opportunities for both large and small game IAW ADF&G regulations. Moose and black bear hunting requires a special ADF&G draw permit. As specified in ADF&G regulations, there is no prioritization for hunting opportunities on JBER, and anyone eligible to hunt in Alaska can apply for drawing permits and participate in small game and furbearer hunting, as long as that person obtains a recreational access permit and can meet basic security review requirements. [Section 7.2.5](#) provides more information on the outdoor recreation permits and fee structure.

Opportunities differ between JBER-E and JBER-R. In addition to ADF&G regulations found in 5 AAC and state statutes (Title 16. Fish and Game), hunting and fishing regulations specific to JBER-E are delineated in 673 ABWI 32-7001, which conforms to state laws and outlines additional and more restrictive regulations for JBER-E. Firearm restrictions on JBER-E limit hunting opportunities to an archery-only draw hunt for moose. Opportunities on JBER-R are more expansive, including draw-permit moose hunting on JBER-R for both archery and muzzleloader and draw-permit black bear hunting for shotgun. Small game and waterfowl hunting is permitted on JBER-R, with waterfowl hunting restricted to areas north of Eagle River. Access to otherwise-restricted areas is occasionally permitted during larger guided hunts. Falconry is not authorized on JBER lands.

673 ABWI 32-7001 authorizes and discusses black bear hunting on JBER-R. As documented in the 2014 INRMP, ADF&G and JBER collaboratively agreed to pursue a potential ADF&G-permitted black bear hunt using only shotgun with slugs on JBER-R. In March 2015, the Alaska Board of Game increased black bear hunting opportunities in GMU 14C by including JBER. The method of take authorized was use of a shotgun, and JBER additionally required hunters to use non-toxic slugs during the hunt. The black bear hunt began in spring 2017. For safety purposes, during military training activities, portions of JBER are closed to the public while training occurs. Due to military training requirements, access to portions of JBER for the 2016 black bear hunt was curtailed for most of the hunting season for the safety of military members and the public. To provide hunters with the greatest opportunity to have a successful hunt, the JBER Natural Resources program submitted a proposal to extend the open season dates for the black bear hunt. The Alaska Board of Game approved this proposal at its March 2019 meeting in Anchorage. The black bear season on JBER is now from 1 September to 15 June. Black bear harvest statistics for JBER can be found in [Table 7-2](#).

Table 7-2. Black bear hunt statistics for Hunt #DL455 on Joint Base Elmendorf-Richardson

Year	Number of Permits	Number of Hunters	Harvested
2016*	25	10	3
2017*	25	11	1
2018*	25	8	2
2019**	25	18	4
2020	25	12	1
2021	25	13	3
2022	25	14	3
2023	25	12	3
2024	25	9	3

Table 7-2. Black bear hunt statistics for Hunt #DL455 on Joint Base Elmendorf-Richardson

Year	Number of Permits	Number of Hunters	Harvested
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*Based on Regulatory Year, spring only.

**Beginning in 2019, the hunt was scheduled to start 1 September and continue through the following 15 June.

Reliable estimates of harvest rates and knowledge of population dynamics are necessary requirements for sound management. Therefore, it is important for JBER to be able track game population levels and harvest rates as they pertain to the installation and to provide such metrics to ADF&G. JBER currently tracks the harvest of big and small game species. Big-game hunters are required to report their harvest to JBER staff, which is then reported to ADF&G. Small-game hunters are requested to report their harvest through JBER's RecAccess. Historical records indicate an average annual harvest of 250 Spruce Grouse, 100 to 500 snowshoe hare, and 10 ptarmigan (US Army Garrison Alaska 2007). From 2015 to 2017, an average of 201 grouse, 50 snowshoe hare, 20 waterfowl, 4 ptarmigan, and 58 other game species were reported to be harvested annually. An average of 51 moose were harvested annually from 2001 to 2016. Current moose harvest statistics can be found in [Table 7-3](#).

Table 7-3. Moose hunt statistics on Joint Base Elmendorf-Richardson

Year	Number of Permits	Number of Hunters	Harvested
2016*	122	105	46
2017*	121	103	43
2018*	121	109	54
2019*	121	102	37
2020	121	103	51
2021	121	94	53
2022	121	103	53
2023	121	103	56
2024	88	76	28

*Based on Regulatory Year, hunt dates 1 September to 15 January

Moose hunting areas are shown in [Figure 7-1](#) and black bear hunting areas are shown in [Figure 7-2](#). Although [Figure 7-1](#) provides an overview of the management and hunting areas, it includes the boundaries of multiple, legally distinct draw hunts, and is therefore not legally sufficient for navigation on JBER lands and is not authorized for use during the draw hunts. Hunters and recreators must use the authorized hunt map that is updated annually and provided during orientation.

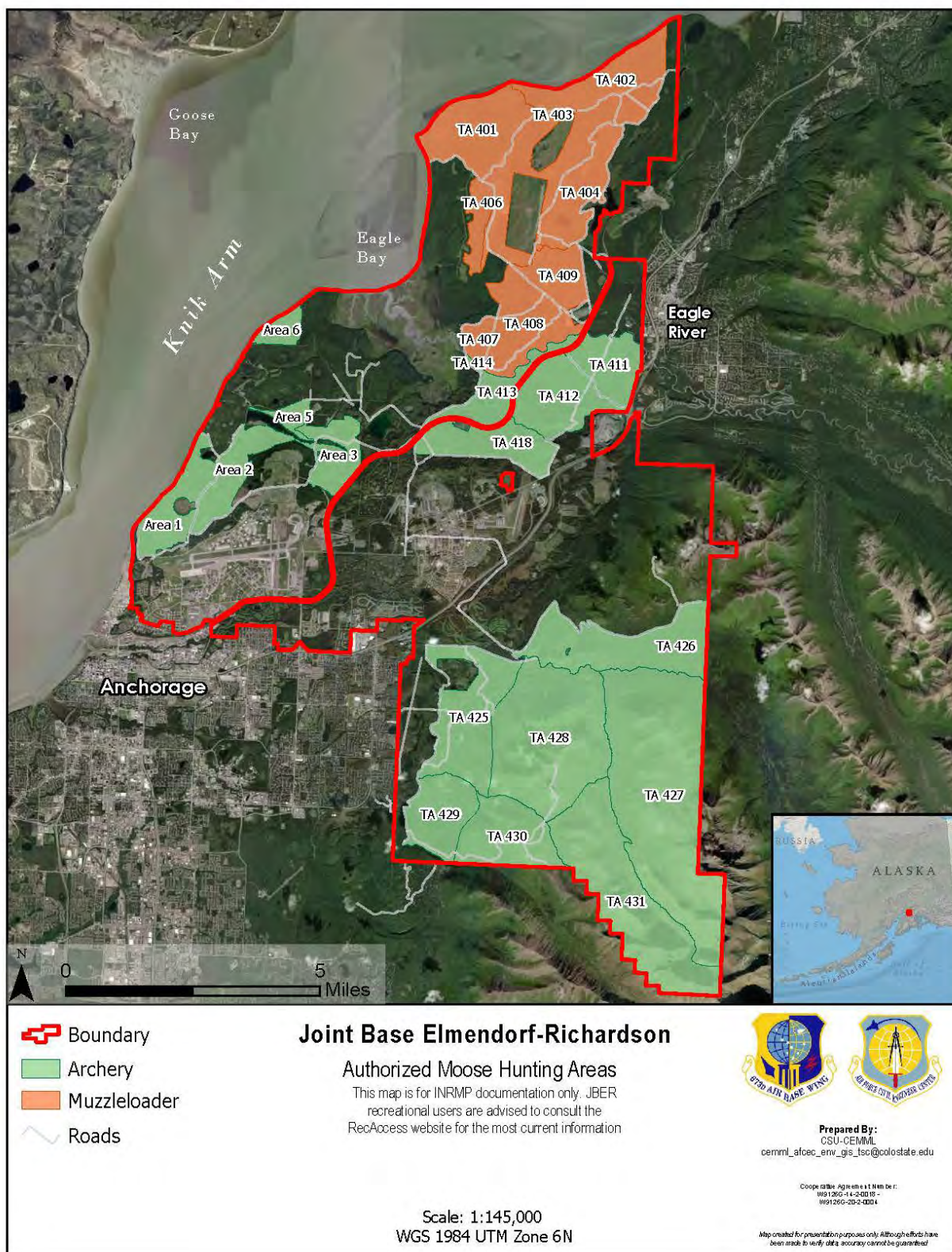
The opening of 2 hunt areas near the JBER-E cantonment and housing areas and the late-season hunt have successfully minimized problem moose prior to winter. In addition to hunting mortality, several moose each year are killed by cars or trains. Non-hunting mortality is also reported to ADF&G.

JBER manages its moose hunt in support of ADF&G's management goals and objectives, JBER is part of the Anchorage Management Area for fisheries and within GMU 14C. The goals of the moose hunt on JBER are to maintain the moose population on JBER and the greater GMU 14C for consumptive and non-consumptive uses and mitigate human-moose conflicts to promote public safety. The current intensive management objectives for GMU 14C are as follows:

- Maintain a population of 1,500 to 1,800 moose and an annual harvest of 90 to 270 moose

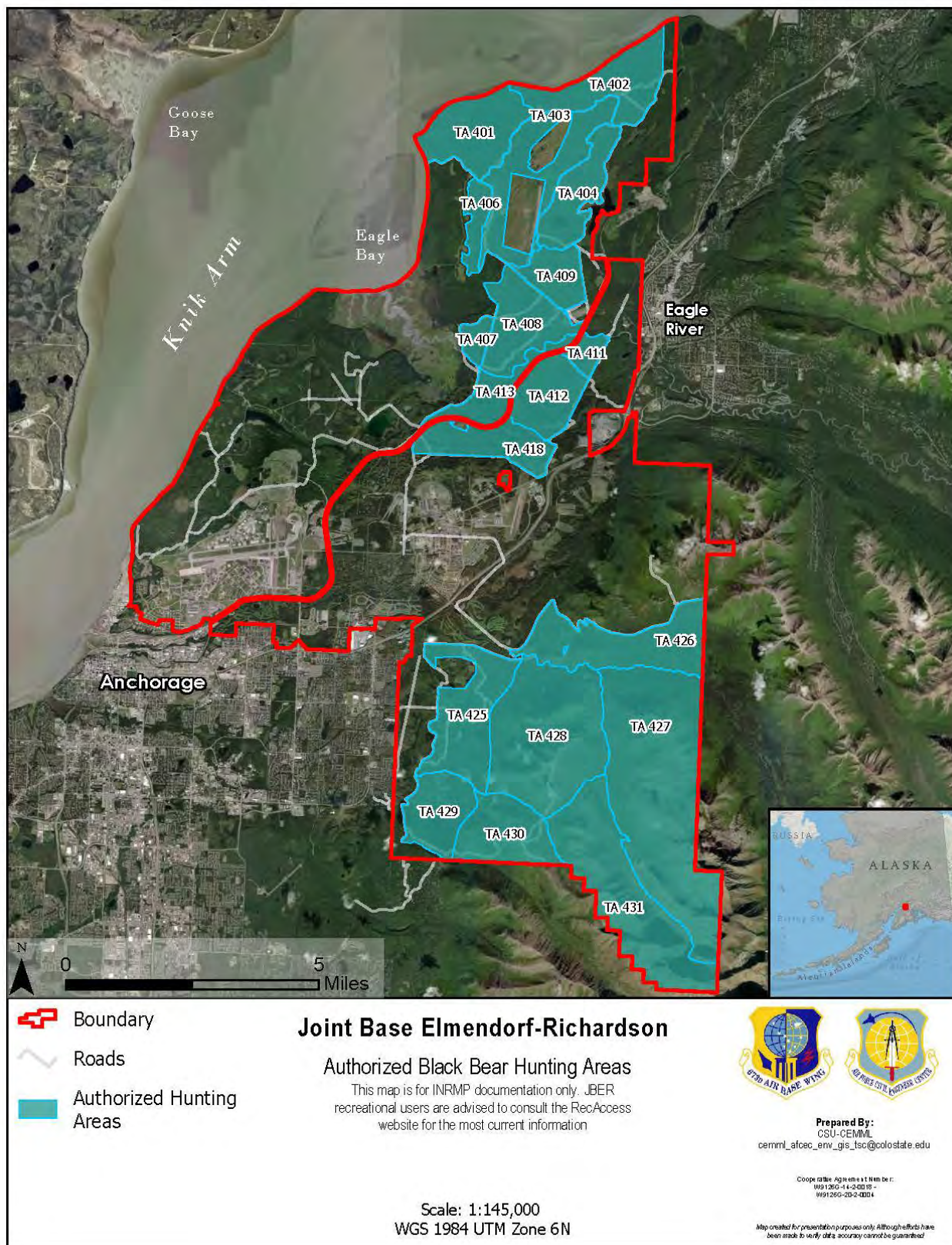
- 4437 • Maintain a post-hunting season sex ratio of no fewer than 30 bulls:100 cows
- 4438 • Maintain the moose population at a level to promote public safety by reducing conflicts

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4440 Figure 7-1. Map of moose hunt areas within Joint Base Elmendorf-Richardson



4441

4442 Figure 7-2. Map of authorized black bear hunting areas within Joint Base Elmendorf-Richardson

Fishing

Fishing is extremely popular year-round on JBER and is centered primarily on stocked lakes. JBER is part of the ADF&G Anchorage Management Area for sport fisheries. There are 30 stocked lakes in this management area, with 11 on JBER. Stocking numbers are based on ADF&G-estimated carrying capacity and estimates of fishing pressure. The stocking program has changed greatly since its establishment. The stocking program currently stocks rainbow trout, lake trout, Arctic char, and landlocked salmon. JBER collaborates with the ADF&G Sport Fish Division to assess the stocked lakes on JBER to support management decisions for stocking strategies ([Section 7.1.2](#)).

Ice fishing is allowed on most JBER lakes from mid-November through late-March under state regulations and bag limits. Driving privately owned vehicles (gross weight of 1,500 pounds or over) onto frozen lakes is prohibited for safety reasons.

Two sections of Ship Creek and upstream of Bravo Bridge on Eagle River are also open to fishing under state regulations and bag limits. Sixmile, Otter, and EOD creeks are closed to fishing. To better estimate fishing pressure, users can self-report their fish harvest through creel surveys on RecAccess (these surveys were on iSportsman prior to August 2023). In 2021 and 2022, a total of 6,381 and 5,642 check-ins for fishing on JBER occurred through the iSportsman system. A reported estimate of 9,163 fish were caught in 2021, and 7,124 fish captures were reported in 2022, which was a 21% decrease from the previous year. [Table 7-4](#) depicts the fish caught and harvested in 2022. Permit requirements are discussed in [Section 7.2.2](#).

Table 7-4. Fish caught and harvested within Joint Base Elmendorf-Richardson in 2022

Type of Fish	Caught (Percent of Total)	Harvested (Percent of Total)
Rainbow Trout	6,300 (87.5%)	1,915 (86.7%)
Lake Trout	29 (0.4%)	13 (0.5%)
Dolly Varden/Arctic Char	50 (0.7%)	50 (0.2%)
Chinook Salmon	362 (5.1%)	92 (0.4%)
Sockeye Salmon	31 (0.4%)	7 (0.03%)
Coho Salmon	151 (2.1%)	29 (0.1%)
Misidentified fish	201 (2.8%)	101 (0.4%)
Total	7,124	2,207

Subsistence

Subsistence is the practice of harvesting and processing wild resources for food, raw materials, or other traditional uses. Subsistence activities can include hunting, fishing, trapping, gathering, camping, ceremonial activities, sharing, consuming, trading, and bartering. Subsistence resources include fish, mammals, birds, marine invertebrates, edible and medicinal plants, mushrooms, and firewood. These resources are considered renewable sources of material for food, fuel, and materials to make clothing, shelter, tools, and art.

Subsistence is more than a method of obtaining food and raw materials; it is a central aspect of the customs and traditions of many cultural groups throughout Alaska. The systems built around subsistence allow for cultural practice, resource distribution, and community connections that extend beyond the boundaries of the household and community. For Indigenous people, subsistence activities are rooted in traditional cultural values, spirituality, and a sense of community.

Anchorage and the Matanuska-Susitna Borough are considered non-subsistence use areas, whereas the west side of Cook Inlet is a subsistence area. Several important subsistence species migrate between these areas, including land mammals, sea mammals, and fish. As a result, natural resource management activities must include an analysis of potential impacts to subsistence resources on JBER lands.

JBER consists of mostly public-domain federal land that was withdrawn for military purposes. Federal regulations do not provide for subsistence priority on lands that are withdrawn for military use. 50 CFR 100.3(d), published 27 December 2005, states that “the regulations contained in this part apply on all other public lands, other than to the military, US Coast Guard, and Federal Aviation Administration lands that are closed to access by the general public, including all non-navigable waters located on these lands.”

Title VIII of the Alaska National Interest Lands Conservation Act applies to federal public lands in Alaska. As a result, some subsistence hunting and fishing in Alaska is regulated by the federal government. Federal law and Alaska state law (Alaska Statute 16.05.940[32]) differ regarding who qualifies for participation in subsistence fisheries and hunts. Under federal law, rural Alaska residents qualify for subsistence harvesting. Since 1989, all Alaska residents are entitled to participate in state-administered subsistence hunts and fisheries outside of non-subsistence use areas. The Anchorage and the Matanuska-Susitna boroughs are non-subsistence areas. However, under the North Anchorage Land Use Agreement, future subsistence activities may occur should the federal government ever declare JBER lands excess to military requirements.

7.2.5 Seasonal Activities

JBER offers a variety of seasonal activities throughout the installation’s outdoor areas, with the most popular being offered during the summer. Summer activities include ORV use, boating, hiking, backpacking, wildlife viewing, nature and wildlife photography, biking, berry and mushroom gathering, archery, and limited camping. JBER has also periodically been used for marathons, dog trials, and Special Olympics. Pets must be under either voice or leash control in all areas and must be leashed in developed recreation sites and waterfowl nesting areas.

Winter activities include cross-country and downhill skiing, snowmobiling, snowshoeing, sledding, ice skating, ice fishing, winter biking, and dog sledding. Skiing facilities include a downhill ski slope at Hillberg Lake and a cross-country skiing facility at Eagle Glen Fitness Park, both of which are managed by the 773 FSS. JBER-R also offers over 50 miles of cross-country ski trails, with the most popular being the Red, Green, Blue, Yellow, Five Mile, Bulldog, and Recreational trails (US Army Alaska 1998).

The following recreational activities are prohibited on JBER: Swimming in any lake, stream, creek, or reservoir; horseback riding; removal of minerals (including gold panning, dredging, or mining of any kind) or fossils; metal detecting; collection of plant seeds or other plant propagules for personal or commercial use; boating on Ship Creek; trapping; geocaching; falconry (including active hunting, training, or collecting eggs/chicks from nests); operation of unmanned aerial systems; and trap or target shooting (outside of approved FSS facilities).

The demand for non-consumptive recreational uses (e.g., hiking, camping, wildlife viewing, and cross-country skiing) is seasonal and is being met by JBER’s outdoor recreation program. There is an occasional request for land-use changes that may not be appropriate or currently permitted (e.g., unrestricted use of ORVs, mountain bike trails, extension of snowmachine trails across JBER-R). Environmental impact analyses must be conducted prior to authorizing any such activities. Descriptions of management guidelines and the most prominent types of activities are further described below.

Areas Suitable for Outdoor Recreation Activities

Most lands outside of developed areas are open to recreation activities. However, there are some areas that are off-limits to hunting, fishing, or other recreational activities and are officially designated and marked as such. Hunting is permitted only in the areas depicted in [Figure 7-1](#) and [Figure 7-2](#). General recreation facilities on JBER include 4 campgrounds, several picnic areas, and several winter and water sports areas (e.g., Hillberg Ski Area or Otter Lake Recreation Area) that are managed by 773 FSS ().

Allowable Use Guidelines

Allowable use guidelines define maximum recreational usage rates for facilities and management areas. Usage rates vary by activity type. Limitations and restrictions on public use of military lands depend on the type of military use. Military use can be broken down into the following general categories that affect access:

- **Training areas and non-firing facilities**—Public access into training areas is allowed, subject to safety restrictions and military security, when access does not impair the military mission. Compatible uses generally include natural resources management, habitat improvement, and consumptive use.
- **Firing ranges, surface danger zones, and non-duddled impact areas**—Public access into firing ranges, surface danger zones, and non-duddled impact areas is normally not allowed due to conflicts with the military mission. However, natural resources monitoring, range maintenance, fire prevention and suppression, hunting, and fishing are allowed when feasible.
- **Duddled impact areas**—Public access into dudded impact areas is prohibited because of the hazard of unexploded ordnance. Compatible uses include remotely monitoring natural resources and military impacts and prescribed burning to reduce fire hazards and improve habitat.

Trail-Related Activities

Trail-related activities on JBER include snowmachining, off-roading with four-wheelers, hiking, snowshoeing, and cross-country skiing. JBER-E has an extensive trail system, including Knik Bluff Trail, Upper Sixmile Trail, Spring Lake Trail, and an extensive snowmachine trail system. Summer trails, with the exception of the ORV trail, are non-motorized, multiple-use trails. Most trails are also open during winter but are not maintained. Refueling is not permitted while snowmachining on lakes. Snowmachine trails are much more extensive than the summertime ORV trails, as the wetlands are frozen during winter and damage by snowmachines is minimal. Trails are jointly maintained by the Natural Resources office, 773 CES/CEOIE, and volunteers.

Some trails provide access to the Chugach State Park, crossing portions of JBER-R, and are used primarily by hikers, skiers, and mountain bikers. An important and heavily used trail to the Ship Creek drainage in Chugach State Park originates on JBER-R, below Site Summit.

Wildlife-Related Activities

Wildlife viewing and photography are popular in summer. Many JBER residents drive back roads in evenings, hoping for a glimpse of a moose or bear. [Section 7.15](#) discusses the use of kiosks, interpretive signs, etc., to enhance these outdoor experiences on JBER. Recreators need to keep a safe distance from wildlife and be aware of inherent dangers associated with recreating in moose and bear country. Guidelines from ADF&G on moose and bear safety are presented at Newcomers Briefings and other events and should be followed. Photographing anything associated with the military is strictly prohibited. This includes but is

4558 not limited to aircraft, vehicles, troops, and buildings. Photographing wildlife or natural areas on JBER is
4559 permitted.

4560 The Watchable Wildlife program provides wildlife viewing opportunities for military members, civilians,
4561 Alaska residents, and visitors, as well as opportunities to benefit public relations. The Watchable Wildlife
4562 program includes wildlife viewing platforms, nature trails, interpretive signs, facilities, public
4563 presentations, and cooperative publications with local, state, and federal agencies. This program provides
4564 recreation and enhances environmental awareness among participants.

4565 A wildlife viewing platform is located at the entrance to Lower Sixmile Lake, where visitors can see
4566 spawning and migrating salmon from July through October. JBER Fisheries worked with a local Boy Scout
4567 troop during fall 2019 to construct a foot bridge over the Otter Lake outlet and conduct trail maintenance
4568 to the North Otter Lake Wildlife Viewing Platform. The new foot bridge at the lake outlet provides viewing
4569 opportunities of the salmon migrating to spawn in Otter Lake. Another wildlife viewing platform is located
4570 at Upper Otter Lake, providing viewing opportunities of birds, fish, and wildlife in that area.

4571 **Water Sports**

4572 Water resources on JBER include natural lakes and ponds, artificial impoundments, streams, and saltwater
4573 shoreline. Water-related activities include fishing and boating. Additionally, most outdoor recreation
4574 facilities, such as campgrounds, chalets, and picnic areas, are found around lakes and impoundments.
4575 Canoes, inflatable fishing boats, and other non-motorized watercraft are allowed on all JBER lakes.
4576 However, boats of any design and any other flotation devices are not authorized on Ship Creek, North Fork
4577 Campbell Creek, or any other stream on JBER, with exception of Eagle River when on an FSS-sponsored
4578 activity. Lower Eagle River is rated as a Class II whitewater (Embrick 1994). At high water, some reaches
4579 of the river may be a low Class III. Motorized boating is restricted to electric trolling motors. When
4580 necessary for installation or removal of flight line floats on Sixmile Lake, outboard motors may be used
4581 with authorization from the Natural Resources office.

4582 All personal use boats and rafts must adhere to Alaska state law for safety and registration requirements on
4583 JBER. In addition, JBER requires that all individuals, regardless of age, wear Coast Guard-approved
4584 personal flotation devices while operating a boat or raft.

4585 **Special Group Activities—Camping**

4586 Per 673 ABWI 32-7001, overnight camping is allowed only at 3 established camping areas: Black Spruce
4587 Travel Camp, Fam Camp, and Otter Lake. The Black Spruce Travel Camp and Fam Camp are full-service
4588 overnight camping facilities. The cabin in Snowhawk Valley is for official use only, not for recreational
4589 use. Recreational tent camping on JBER is restricted to special groups, such as Boy and Girl Scouts and
4590 church groups. Primary concerns for tent camping on JBER include interruptions of military training, fire
4591 safety, and conflicts with bears. Any tent camping site developed on JBER should be thoroughly evaluated
4592 and well planned, with designs to provide bear-proof food storage. Rules for food use and storage must be
4593 clearly defined and enforced.

4594 **Management of Outdoor Recreation and Participants**

4595 There are a number of elements involved in the management of outdoor recreation and its participants.
4596 Recreational facility inventory, user monitoring, and impact monitoring are program components.
4597 Monitoring recreational use on JBER to determine impacts on the ecosystem is an important facet.
4598 Monitoring includes field and user surveys to determine location, type, duration, and frequency of use.

4599 Recreational use of military land creates impacts on military training lands, primarily a result of legal
4600 recreational use and illegal trespass of recreational vehicles.

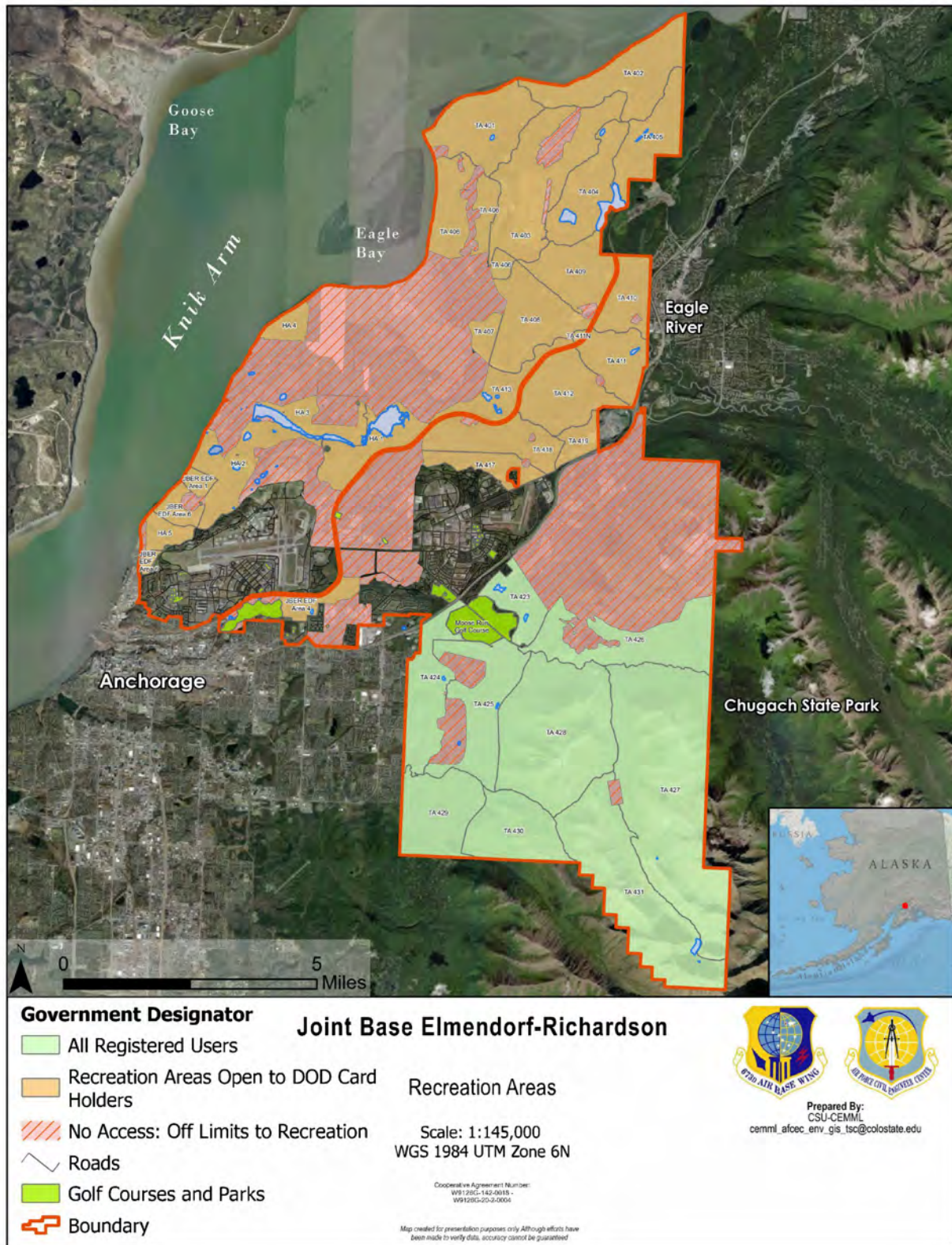
4601 Recreational user monitoring on JBER includes monitoring users during hunting and fishing seasons,
4602 recording and maintaining a database of users through the RecAccess permit system ([Section 7.2.5](#)), and
4603 conducting recreational user surveys. The RecAccess system database is a useful tool to measure the
4604 amount of recreational use. The system records user days and the general location of use on the installation.
4605 The system also collects the zip code of the recreational user and allows managers to assess the population
4606 segments utilizing JBER recreational areas. For certain activities such as woodcutting, small-game hunting,
4607 and fishing, a required user survey provides important data to land managers.

4608 Recreational use impacts usually result from ORV use, but can also result from campsites, river use, and
4609 foot use along stream and lake banks. Impacts from recreation should be identified, delineated, mapped,
4610 and prioritized for restoration. Additional recreational use monitoring and management should focus on
4611 critical areas such as nesting sites, and areas with high erosion potential.

4612 **Extreme Weather and Natural Hazards**

4613 Regular surveys of outdoor resources and proactive grounds, fish, and wildlife management will be helpful
4614 to ensure continuous opportunities for recreation when major extreme weather or other natural hazard
4615 incidents occur. Extreme storms and periods of intensified rainfall and streamflow have the potential to
4616 increase flooding and erosion in some areas, including campgrounds, trails, and the Eagleglen fitness park,
4617 which could reduce the quality and safety of these areas if they are not monitored and actively managed.
4618 Extreme precipitation events may also have negative impacts on JBER recreational activity, as many
4619 facilities (e.g., Moose Run Golf Course, Eagleglen Fitness Park, and Cottonwood Park) intersect with
4620 known flood risk zones.

4621



4622

4623 Figure 7-3. Map of recreation areas within Joint Base Elmendorf-Richardson.

7.3 **Conservation Law Enforcement**

Applicability Statement

This section applies to all DAF installations that maintain an INRMP. The installation is required to implement this element.

Program Overview/Current Management Practices

7.3.1 Policy and Background

A critical component of the JBER natural resources management program is conservation law enforcement. CLEOs are responsible for enforcing numerous federal, state, and local natural and cultural resource laws and regulations. CLEOs are frequently involved in the protection of rare or unique species and their habitat, the illegal disposition of hazardous and solid wastes, air and water quality issues, and the protection of historic, pre-colonial, and paleontological resources.

Without professional natural resources enforcement personnel in the field and successful prosecution, natural resources management activities are ineffective. Harvest controls, protection of sensitive areas, pollution prevention, hunting and fishing recreation, and nongame protection are dependent on effective law enforcement.

Conservation law enforcement has a long history of providing service to EAFB and Fort Richardson. The MCA program has a 26-year history at EAFB and the surrounding community. Military Police game wardens provided similar service at Fort Richardson, except from 1999 to 2005, when Fort Richardson implemented a contract to provide civilian conservation enforcement. Military Police game wardens were reinstated from 2005 to 2014. The JBER Conservation Law Enforcement section has evolved and been redefined to incorporate community policing practices with more encompassing duties, including educational outreach programs, minimizing wildlife conflict risk, and protection of environmental, cultural, historic, and natural resources.

7.3.2 Authority and Jurisdiction

The JBER Conservation Law Enforcement section is within the Natural Resources office. The section is made up of personnel who have met or will meet law enforcement training requirements outlined in DAFMAN 32-7003 and DoDI 5525.17, *Conservation Law Enforcement Program (CLEP)*, or who serve as MCAs. These personnel work under the supervision of a fully certified CLEO, as outlined in the abovementioned regulations, 673 ABWI 32-7001 (will be superseded by JBERI 32-7003), and USARAK Operating Instruction 32-700.

The State of Alaska is responsible for the management of fish and wildlife populations (including management of hunting, fishing, and trapping activities) throughout the state, including on military installations, IAW the Sikes Act (16 USC § 670, (4)(A)(ii)), which states that “nothing in this title enlarges or diminishes the responsibility and authority of any State for the protection and management of fish and resident wildlife.”

JBER operates under a concurrent jurisdiction system with ADF&G and Alaska Wildlife Troopers regarding fish and wildlife enforcement.

Guiding regulations that establish conservation enforcement roles and authority include the following:

- 4662 • The 2014 Sikes Act Improvement Act—Includes 2 specific professional natural resources
4663 enforcement items:
 - 4664 o Required enforcement of applicable natural resource laws (including regulations)
 - 4665 o Expansion of DoD authority, stating that “all Federal laws relating to the management of
4666 natural resources on Federal land may be enforced by the Secretary of Defense with respect
4667 to violations of the laws that occur on military installations within the United States.”
- 4668 • The Assimilative Crimes Act (18 USC § 13)—Makes state law applicable to conduct on lands
4669 reserved or acquired by the Federal government as provided in 18 USC §7(3), when the act or
4670 omission is not made punishable by an enactment of Congress.
- 4671 • 10 USC § 2671, *Military Reservations and Facilities: Hunting, Fishing and Trapping*
 - 4672 o 10 USC § 2671, paragraph (a)(1), requires that all hunting, fishing, and trapping at the
4673 installation or facility be IAW the fish and game laws of the state in which it is located.
 - 4674 o 10 USC § 2671, paragraph (c), states that whoever is guilty of an act or omission which
4675 violates a requirement prescribed under Subsection (a)(1) or (2), which act or omission
4676 would be punishable if committed or omitted within the jurisdiction of the state in which
4677 the installation or facility is located, by the laws thereof in effect at the time of that act or
4678 omission, is guilty of a like offense and is subject to a like punishment.
- 4679 • DoDI 5525.17—Outlines personnel and training requirements, authority powers and jurisdiction,
4680 federal laws with enforcement requirements, charging documents and procedures to notify
4681 magistrate court of misdemeanors, the DAF Office of Special Investigations, USFWS, and Special
4682 Assistant US Attorney for felonies and enforcement coordination and agreements.
- 4683 • DAFMAN 32-7003, Section 3.33, *Conservation Law Enforcement*—States that “Commanders are
4684 responsible for the enforcement of state and federal laws for the protection and management of
4685 natural resources on DAF installations. IAW the Sikes Act (16 USC § 670a(b)(1)(H), installations
4686 must address how natural resources laws will be enforced in the INRMP. DoDI 5525.17 provides
4687 guidance for implementing conservation law enforcement requirements on DoD installations.”
- 4688 • DAFMAN 32-7003, Section 3.33.1, *Cooperative Law Enforcement*—Pursuant to the Sikes Act (16
4689 USC § 670a(d)) and DoDI 4715.03, DAF installations shall coordinate with appropriate agencies
4690 to support conservation law enforcement to enforce federal and applicable state laws and
4691 regulations pertaining to the management and use of natural resources. Pursuant to the Sikes Act
4692 (16 USC § 670a(d)(2)), reimbursable agreements for conservation law enforcement services are
4693 authorized with federal and state agencies having responsibility and jurisdiction over fish and
4694 wildlife resources. The Installation Commander shall give access to federal or state conservation
4695 law enforcement officers for the purpose of fish and wildlife law enforcement.
- 4696 • DoD, USFWS, and Association of Fish and Wildlife Agencies (2013)—In addition to outlining
4697 how cooperative management will take place, this MOU states that “the states in general possess
4698 broad trustee and police powers over fish and wildlife within their borders, including—absent a
4699 clear expression of Congressional intent to the contrary—fish and wildlife on federal lands within
4700 their borders. Where Congress has given federal agencies certain conservation responsibilities, such
4701 as for migratory birds or species listed as a T&E species under the ESA, the states, in most cases,
4702 have cooperative management responsibilities.”
- 4703 • JBER operates under a concurrent jurisdiction system in coordination with other federal, state, and
4704 local law enforcement agencies, including the 673d Security Forces Squadron within JBER
4705 borders. Agencies involved in natural and cultural resources enforcement on JBER include

USFWS, Alaska Department of Public Safety/Alaska Wildlife Troopers, ADF&G, State of Alaska Department of Law, 673 ABW Judge Advocate's Office, 673 CES Natural Resources office, NMFS, and BLM.

- Other references: ARPA (16 USC § 470aa–470mm); DAFI 51-201, *Administration of Military Justice*; DAFI 51-202, *Non-Judicial Punishment*; and AFI 51-206, *Use of Magistrate Judges for Trial of Misdemeanors Committed by Civilians*.

7.3.3 Conservation Law Enforcement Program

The 673 CES/CEIEC has 4 full-time GS-1801 Conservation Law Enforcement Officer positions and is in the process of expanding the team to 6 personnel. Enforcement duties include conducting short- and long-term investigations, preventative enforcement, public education, issuing citations, patrols, and wildlife response. These individuals also serve to recruit, train, equip, and supervise up to 50 MCAs. Conservation Law Enforcement personnel also conduct wildlife safety briefings and assist natural resource and cultural resource staff as time permits.

Federal citations are handled through the Federal Magistrate's Office via the 673d Security Forces Squadron and issued for violations of state/federal fish and game laws IAW 10 USC § 2671, the Sikes Act, DoDI 5525.17, and AFI 51-206. In certain situations, involving violations of state fish and game laws/regulations, CLEOs reach out to Alaska State Troopers and citations are issued/handled through the state court system.

7.3.4 Military Conservation Agent Program

MCAs are selected from Active-Duty 673 ABW and supported and tenant unit applicants. The MCA program is a means to augment the Conservation Law Enforcement Program in accordance with DoDI 5525.17, support conservation programs, public safety, outreach and education, response to wildlife incidents, and wildlife safety during field work, as well as ensuring compliance with local Air Base Wing policies at the discretion of the Installation Commander. More information on MCA training is provided in Section 5.0.

There are 3 levels of MCAs. Level 1 MCAs are allowed to ride along and assist fully qualified agents as part of their on the job training. Level 2 agents are those who have been trained IAW Section 5.0 and designated in writing by the 673d Civil Engineer Squadron commander annually, IAW 673 ABWI 32-7001 (to be superseded by JBERI 32-7003). They are authorized to enforce Department of War and local instructions and policies to ensure compliance at the discretion of the Installation Commander. Level 3 agents are supervisory agents, conduct independent patrols and serve as sub-permitees under the JBER Public Safety Permit.

Unlike CLEOs, MCAs have a limited scope of authority as described in DoDI 5525.17, *Conservation Law Enforcement Program* (August 3, 2020). MCAs are not full-time law enforcement personnel and are not trained or authorized to apprehend, detain, initiate traffic stops, or perform complex investigations. They expand the Conservation Law Enforcement footprint, act as eyes and ears for the CLEOs to identify non-compliance with federal and state natural and cultural resource/fish and game laws, enforce base policies, positively engage in community education and outreach, and support CLEOs on investigations.

7.3.5 Cultural Resources Enforcement

Cultural resources enforcement is not a significant problem at JBER. However, incidents of trespassing and vandalism have occurred at remote sites, which has required additional monitoring from JBER CLEOs. Conservation Law Enforcement personnel are provided with cultural briefs in addition to training on ARPA

and NAGPRA implementation. Trespassing at the Nike Site Summit is an ongoing problem and may become a higher CLEO priority in the future if the trespassing is harming the site. The use of metal detectors also poses a significant risk to cultural resources and is not permitted on the installation. JBER CLEOs periodically check the Nike Site Summit and other known archeological sites on JBER to monitor for trespassing or vandalism.

7.3.6 *Other Enforcement Areas*

The Conservation Enforcement Section also enforces various natural resources and outdoor recreation activities, including wood- and holiday-tree cutting (permit required), water sports, all-terrain vehicle operation, snowmachining, and safety issues. Problem areas include cutting firewood without a permit, selling firewood, and extensive illegal and unsafe ORV operations. Public outreach, force protection, and compliance and safety checks for day-use, sport fishing, boating, and other activities (jogging, hiking, skiing, berry picking, etc.) are also performed. Providing an enforcement presence near CIBW habitat has become an added responsibility.

The Conservation Enforcement Section is also involved in activities such as search and rescue, health and safety checks, and nuisance wildlife response. Search and rescue on JBER averages 4 incidents per year. The Conservation Enforcement Section maintains Search and Rescue Incident Command credentials and appropriate certifications. Health and safety checks occur during patrols and routine checks of vehicles parked in remote portions of JBER to ensure public safety, especially during adverse weather conditions. Search and rescue efforts are heavily supported by the public's use of RecAccess, which helps CLEOs and MCAs more quickly determine visitor locations in the event of an emergency. JBER adheres to the Living with Wildlife MOU between ADF&G, Fort Richardson, and EAFB ([Section 2.4.1](#)).

7.3.7 *Prosecution of Natural and Cultural Resource Violations*

IAW the authorities outlined in [Section 7.3.2](#), JBER is predominantly a concurrent jurisdiction installation. The Alaska Wildlife Troopers and JBER have agreed to provide for concurrent state and federal enforcement jurisdiction for violations of state fish and game regulations. Violators of state and federal natural and cultural laws and regulations on JBER are subject to prosecution in Alaska and federal courts. Active-Duty military personnel, reservists, and guard personnel under Title 10 orders who violate JBER regulations or natural and cultural resource laws and regulations, in addition to being subject to prosecution in Alaska and federal courts, are also subject to administrative and disciplinary action under military regulations and the Uniform Code of Military Justice. Violations of natural resource laws include fishing or hunting without a license, fishing in closed areas, or negligently feeding game. JBER is developing an instruction that will detail penalties for certain and repeated infractions.

Trespassing

Crossing the JBER boundary or the internal boundary of an off-limits area without approval constitutes trespass. Much of the JBER-R boundary is unfenced and installed sign posts are frequently vandalized or removed. Posting additional boundary signage would reduce accidental trespass, but the effect on premeditated trespass would be minimal. Boundary marking can only be effective in concert with enforcement efforts and successful prosecution associated with premeditated trespassing. Trespassing is an ongoing security challenge for JBER that has persisted for decades. The vast size of the installation combined with encroachment of adjacent residential, commercial, and recreational land use make it particularly challenging to ensure adequate security. Frequent trespassing by snow machines, ORVs, and foot traffic, as well as evidence of garbage dumping, camping, forest resource theft, poaching, underage alcohol consumption, and vehicle abandonment have been identified as major concerns. In addition, the

need to secure our military infrastructure and installation borders from adversaries is absolutely critical to protect JBER's warfighting capabilities.

Numerous trails and waterways create easy access for an individual to enter JBER. The recreational access system requires all users to sign in and out of recreational areas on JBER. On JBER-R, users may sign into and access only those training areas that Range Control considers safe for recreational activities on that day. However, electronic survey counters indicate that many recreators do not sign in and enter training areas on their own accord. Surveys were conducted between November 2008 and February 2009 on 5 trails around Bulldog Trail (bordering Muldoon Street) and during March to April 2009 on Artillery Road (bordering Eagle River). The survey results indicated that 75% and 50% of the recreators on those trails, respectively, were unauthorized trespassers. Barrier fencing was installed across Artillery Road; this action virtually eliminated the trespassing concerns in this area. Another survey was conducted at the south Bulldog trailhead from 28 February 2017 through 31 July 2017. The results of this survey indicated that of the 2,168 individuals who entered the installation from this area, only 224 were authorized. A total of 1,231 (63%) of those individuals entered the area while it was closed to recreation.

Routine patrols in training areas south of the Glenn Highway were virtually eliminated in April 2014, after losing 4 Military Police positions. Recent patrols and the use of game cameras indicate an increase in recreational activity. All users contacted in this area during 2016 patrols were issued warning citations for trespassing.

JBER has experienced several installation breaches since January 2020. These breaches required police officers to locate, intercept, identify, and question trespassers, resulting in time away from critical DoD security posts. Trespass incidents have also been documented in detail by the 11 AFB DIV Range Control since 2023. Most encounters resulted in the trespasser being instructed to leave or escorted from the installation, without training time lost. However, since June 2023, multiple incidents have been documented that impacted soldier training (11 ABN DIV, Department of the Army, personal communication, 4 April 2024).

An Environmental Assessment is underway to assess the potential for adverse impacts of perimeter security measures such as fencing and lighting to the environment, including effects on wildlife, public safety, and water resources.

Off-Road Vehicle Activity

Illegal ORV activity is a persistent problem on JBER. This includes off-roading by trucks, jeeps, four-wheelers, dirt bikes, and snowmachines. ORV activity is particularly critical during summer due to the potential for damage to wetlands and oil and fuel contamination of lakes and streams (anadromous streams in particular). Illegal off-roading, depending on the area, can result in loss of driving privileges on JBER, fines, or a court appearance. This activity is enforced by the use of game cameras, routine patrol, Range Control, or witness reporting.

Wildlife Violations

Two major problems on JBER are poaching and wildlife feeding. Poaching is not uncommon during the salmon season, according to anonymous tips, field contacts, and citations issued. Most poaching occurs at night or at low tide at the mouth of Sixmile Creek, where it empties into the Cook Inlet. Individuals have been reported illegally taking as many as 50 salmon at this location, which is on State of Alaska tidelands. Conservation Enforcement personnel have no enforcement authority on the tidelands, creating a serious resource concern. Some poaching also occurs at the salmon census weir, on the spawning grounds in Upper

Sixmile Lake, and in the portion of Ship Creek adjacent to the Eagle Glen Fitness Park. In the past, several moose carcasses have been found under suspicious circumstances. Incidents involving illegally harvested moose, brown bears, and black bears and illegal trap lines have been jointly investigated with Alaska Wildlife Troopers and successfully prosecuted.

The feeding of wildlife, intentionally or negligently, is a significant problem, especially in the cantonment, campgrounds and housing areas. Feeding contributes to wildlife conflicts by habituating animals to humans. Feeding includes unsecured garbage, unsecured human or pet food, bird feeders during summer, and dirty barbecue grills. This is a difficult area to enforce, but state law requires a \$300 fine for violators of negligent feeding laws (\$330 on federal land, which includes a court fee/surcharge). Intentional feeding is a Class A misdemeanor (5 AAC 92.230). Means to minimize wildlife feeding problems on JBER include public education through media outlets and Newcomer's Briefings and responses to wildlife calls, which include determination of the cause of the animal's presence.

7.3.8 Labor, Funding, and Equipment

The program has 6 full-time paid positions. MCAs provide support for public outreach, wildlife response, and enforcement of JBER installation policies. EQ funding is required in order to equip and supply conservation law enforcement staff.

Despite the success of the CLEP, it is periodically hampered by limited funds and equipment. Three four-wheel-drive vehicles, along with several four-wheelers and snowmachines, are available through Environmental Conservation. Safety equipment such as firearms, ammunition, shared ballistic vests, radios, and pepper spray are also provided.

7.4 Management of Threatened and Endangered Species, Species of Concern, and Habitats

Applicability Statement

This section applies to DAF installations that have T&E species on DAF property. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

7.4.1 Policy and Background

The goals of the JBER Threatened and Endangered Species Management Program are to (1) conserve and maintain self-sustaining populations of T&E species, consistent with military policy, mission sustainability, and the carrying capacity of the ecosystem; (2) avoid jeopardizing the continued existence of T&E species within JBER, in part through analyses and studies aimed at investigating the effects of anthropogenic activities on T&E species; and (3) aid in the recovery of the CIBW by contributing to the scientific knowledge base on the species and by maintaining or enhancing prey species habitat/production. These goals will ensure that JBER is able to maintain mission flexibility through adaptive conservation and management of federally and state-protected species.

Endangered Species Act

The ESA (Title 16 USC §§ 1531–1544) requires protection and conservation of federally listed T&E plants and animals and their habitats. Conservation includes the use of all necessary strategies to bring T&E species to the point where the measures pursuant to the ESA are no longer necessary.

Migratory Bird Treaty Act

The MBTA prohibits the harassment, capturing, selling, trading, transport, or otherwise taking of migratory birds without authorization by the USFWS. In addition, according to 16 USC §§ 703-712 and EO 13186, military installations must conserve and limit negative impacts on migratory birds and their habitat. Take or removal permits can be obtained from the USFWS when the removal of migratory birds or their nests is required to conserve the respective individuals or when the take of an individual is unavoidable during mission activities (3 WG 2020).

Bald and Golden Eagle Protection Act

The BGEPA (16 USC § 668-668c) prohibits the harassment or take of Bald Eagles and Golden Eagles or the removal of their nests without a take permit from the USFWS. Permits may be obtained for the removal of eagles or their nests only when removal actions mitigate negative impacts on the species and when the take cannot be avoided while undertaking an otherwise lawful and permitted activity.

Marine Mammal Protection Act

Impacts to marine mammals are regulated under the MMPA. The MMPA prohibits the unauthorized take of marine mammals. Take is defined under the MMPA as “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.” Harassment was classified into 2 levels in the 1994 amendments to the MMPA: Level A (potential injury) and Level B (potential disturbance). The National Defense Authorization Act of Fiscal Year 2004 (FY04), PL 108–136, amended the definition of harassment for military readiness activities. Military readiness activities, as defined in PL 107–314, Section 315(f), include all training and operations related to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat. The amended definition of harassment for military readiness activities is any act that “injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild” or “disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including but not limited to, migration, surfacing, nursing breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered” (16 USC § 1362[18][B]).

Section 101(a)(5) of the MMPA directs the Secretary of Commerce to allow, upon request, the incidental but not intentional take of marine mammals by US citizens who engage in a specified activity (exclusive of commercial fishing) within a specified geographic region. These incidental takes may be allowed if NMFS determines that the taking will have a negligible impact on the species or stock and will not have an unmitigable adverse impact on the availability of such species or stock for subsistence purposes.

Cultural Resources Requirements and Tribal Coordination

Alaskan Tribes hold a vested interest in the conservation and management of the state’s T&E species and their habitats, including the CIBW on JBER. JBER’s Natural Resources program is directly supported by the conservation, identification, and management efforts that Tribes and Tribal-affiliated contractors carry out independently or in coordination with the installation. JBER will continue to coordinate T&E species management actions with the Tribes to implement mutually beneficial programs wherever possible.

7.4.2 Protection of the Cook Inlet Beluga Whale on JBER

[Section 2.3.4](#) discusses the endangered CIBW and its critical habitat at JBER. This section discusses actions taken with regard to possible resumption of year-round live-fire training at the ERF Impact Area. The actions included a draft EIS (US Army Alaska 2010a) and a biological assessment (US Army Alaska 2010b) that resulted in a BO (NMFS 2011b). The BO concluded that implementing the proposed action under Alternative 2 is not likely to jeopardize the continued existence of the CIBW, nor destroy or adversely

modify its critical habitat. Since the issuing of this BO, which is no longer current, changes to the proposed project and the publication of new acoustic guidelines have prompted new research and a new Environmental Impact Analysis Process (EIAP) with associated Section 7 and MMPA analyses.

JBER has heavily invested in CIBW monitoring, although it is difficult to determine the full extent of CIBW presence. Visual observations are difficult because of the heavy sediment load in the ERF, which is stirred up by the high tide differential in the area. Acoustic monitoring can help assess the level of CIBW activity, but it is difficult to differentiate individuals through this method, and CIBWs often go silent when they perceive a potential threat. Nevertheless, JBER will continue extensive monitoring to develop more long-term trend data to understand ecological and mission impacts on this species. These data can also be used to guide future mission and management changes. Past surveys can be used to supplement long-term behavior and population analyses (US Army Garrison Alaska 2007, 2008).

The management goals and conservation measures described below and in [Section 8.0](#) are expected to provide adequate protection for other marine mammals, although high-frequency cetaceans (e.g., harbor porpoises) are known to be more sensitive than mid-frequency cetaceans (e.g., belugas) to in-water noise. In addition, special consideration should be given to projects generating in-air noise around Eagle River and Eagle Bay during spring to fall, due to the amphibious hearing capabilities of the harborseal.

Fish management, specifically of salmon, is closely related and tied to CIBW conservation measures, due to the importance of these prey species for CIBW survival. This factor outweighs anthropogenic impacts on CIBW in some instances and should continue to be a primary focus of CIBW conservation (Swenarton 2022, McHuron et al. 2023).

The following conservation measures are employed for the protection of the CIBW and other marine mammals in Knik Arm:

1) Enforce ESA and MMPA by JBER through:

- Close coordination with NMFS Enforcement
- Restriction of boat launching from JBER lands in Knik Arm, with exception of national security or activities coordinated with NMFS
- Closure of Eagle River to boat navigation from Bravo Bridge to its outlet in Eagle Bay, except as allowed by the 11th ABN DIV Commander

2) Educate JBER residents and visitors on the presence and protection of endangered species and marine mammals through:

- Inclusion of species information and ESA restrictions in Newcomers' Briefings
- Briefing for Commanders, range control, and flight operations
- News media articles on any aspect of the JBER CIBW program or projects involving primary biological features (formerly, primary constituent elements), as appropriate (in this document, primary biological features and primary constituent elements are considered synonymous).

3) Monitor/study the following:

- CIBW usage of Knik Arm and Eagle River throughout the year
- Timing and extent of ice cover on the tidally-influenced portion of Eagle River
- Stormwater discharges, specifically focusing on deicer and suspended solid (sediment) concentrations, identified in the current JBER SWPPP
- Prey assemblage and run timing in Knik Arm and Eagle River

- 4955 4) Continue fisheries harvest management, annual enumeration studies, and habitat protection efforts at
 4956 Sixmile Lake, Eagle River, and Otter Creek, among others ([Section 7.1.2](#))
- 4957 5) Increase scientific knowledge on CIBWs and their habitat, prey, and potential stressors by:
- 4958 • Assisting with related studies and conservation efforts in Cook Inlet to the greatest extent possible,
 4959 as dictated by funding, staffing, and military constraints
 - 4960 • Investigating beluga foraging ecology
 - 4961 • Incorporating improved methods and technologies allowing for greater detection and ethological
 4962 sampling (potential methods include photo-identification using high-definition cameras, thermal
 4963 imaging [e.g., FLIR], active acoustic monitoring [e.g., DIDSON], passive acoustic monitoring, and
 4964 bathymetry mapping)
 - 4965 • Measuring noise levels (in the air and water) of specific military training activities, as well as
 4966 behaviors of animals present during anthropogenic noise events, as applicable
- 4967 6) Consider the viability of the following:
- 4968 • Enhancing spawning substrate in appropriate locations ([Section 7.1.2](#))
 - 4969 • Conducting stream bank restoration and erosion control projects on anadromous streams and
 4970 shorelines on JBER to minimize effects on beluga whale habitat and prey ([Section 7.1.2](#))
- 4971 7) Protective actions required by the ESA Section 7 Informal consultation on winter firing into ERF Impact
 4972 Area (JBER Winter Firing, Letter of Concurrence, NMFS #AKR-2016-9589):
- 4973 • JBER will not intentionally fire munitions into Eagle River or any open body of water at any time.
 - 4974 • JBER will not intentionally fire munitions into areas outside military reservation boundaries (Army
 4975 Policy and US Army Alaska [11 ABN DIV] Regulation 350-2). Eagle Bay is outside reservation
 4976 boundaries.
 - 4977 • Harassment of fish and wildlife without the required permitting is prohibited. Any action that
 4978 disturbs fish and wildlife is considered harassment by federal and Alaska law. Harassment includes
 4979 such activities as pursuit with vehicles or aircraft, feeding, and shooting of wildlife. Individuals
 4980 who harass fish and wildlife are subject to prosecution (federal and state law reflected in 11 ABN
 4981 DIV Regulation 350-2).
 - 4982 • Range safety regulations (DA Pam 385-63) dictate that every training activity include a surface
 4983 danger zone (SDZ) tailored to the selected target(s) and specific to the weapon system to be used.
 4984 The SDZ defines the area which contains all rounds and their effects to a 1:1,000,000 probability.
 4985 Once the SDZ has been reviewed and approved by Range Control, the unit leadership converts this
 4986 into specific firing limits for both lateral and vertical displacement (deflection and quadrant) to
 4987 ensure all rounds land and effects are contained within the specified SDZ. The SDZ may not extend
 4988 beyond military boundaries (e.g., into Eagle Bay). These policies and regulations are designed to
 4989 ensure that units fire strictly at authorized targets and that the arrangement of those targets is
 4990 carefully designed such that all rounds and their effects are contained, to a very low probability of
 4991 failure, within a known and carefully mapped out area.
 - 4992 • The establishment of habitat protection buffers, within which no targets may be located. Buffer
 4993 distances will be reevaluated as new information becomes available. These buffers are:
 - 4994 ○ A 1,640-foot-wide swath of land extending along the shore of Eagle Bay
 - 4995 ○ A 3,280-foot-wide swath of land extending along the shore of Eagle Bay when 120-
 4996 millimeter mortar HE rounds are used

- 4997 o A 426-foot-wide swath extending outward from each bank of Eagle River, beginning from
- 4998 the mouth at Eagle Bay and extending upstream to a point 328 feet above the confluence
- 4999 with Otter Creek
- 5000 o A 164-foot-wide swath extending outward from each bank along the main Eagle River
- 5001 channel, beginning at the point 328 feet upstream from the Otter Creek confluence and
- 5002 extending upstream to the Bravo Bridge
- 5003 o A 164-foot-wide swath extending outward from each bank of Otter Creek, beginning at the
- 5004 confluence with Eagle River and extending upstream to the ERF Impact Area boundary to
- 5005 include a tributary for the protection of essential fish habitat

- 5006 • JBER will continue to work cooperatively with NMFS to monitor beluga whales in Eagle Bay and
- 5007 Knik Arm. Monitoring will continue to be refined to improve the ability to detect belugas.
- 5008 • JBER will conduct monitoring during the summer/fall to identify the presence of beluga whales in
- 5009 Eagle River.
- 5010 • JBER will continue to implement the most current INRMP. The INRMP contains specific actions
- 5011 to protect, inventory, maintain, and improve wildlife habitat and fisheries resources and protect
- 5012 water quality.
- 5013 • JBER will continue to comply with federal and state laws and regulations relating to fish and
- 5014 wildlife conservation and management.
- 5015 • JBER will continue to observe the ban on using white phosphorus in wetlands.
- 5016 • Long-term monitoring for white phosphorus will continue as outlined under the CERCLA ROD.
- 5017 • JBER will continue implementation of existing environmental programs.
- 5018 • ERF is permanently off limits to maneuver training and all recreation.
- 5019 • JBER will not provide recreational boating access to Knik Arm and Eagle Bay from JBER land.
- 5020 • JBER will continue to prohibit rafting access to the ERF Impact Area.
- 5021 • Eagle River will remain unobstructed to normal passage of beluga whales through the entirety of
- 5022 ERF. Army activities will not cause any impedance to either ingress or egress of beluga whales
- 5023 along the stretch of Eagle River from Bravo Bridge downstream to the mouth at Eagle Bay.
- 5024 • JBER will fire only under frozen conditions (generally November to March), a time period when
- 5025 beluga abundance in the action area is low and when adult salmon numbers are expected to be low
- 5026 to nonexistent. Thus, the likelihood of having a beluga present in either Eagle Bay or River during
- 5027 firing is greatly diminished.
- 5028 • JBER will post remote cameras throughout the winter, along Eagle River at summer Cetacean
- 5029 Porpoise Detector (C-POD)/acoustic monitoring (CPOD) sites and review the imagery in the spring
- 5030 upon completion of the action.
- 5031 • Indirect live-fire weapons training using weapons systems and munitions would continue to be
- 5032 conducted only during winter months when the following ice cover requirements are met: (1) 2
- 5033 inches or more of ice cover to enable firing of 60-millimeter and 81-millimeter mortars (US Army
- 5034 Garrison 2001), and (2) 5 inches or more of ice cover to enable firing of 105-millimeter howitzers
- 5035 and 120-millimeter mortars (US Army Garrison 2005).
- 5036 • As explained in the 1991 Environmental Assessment (EA), only variable or mechanical time (air
- 5037 burst) or point detonating super quick fuses will be employed in the ERF to minimize artillery and
- 5038 mortar rounds from penetrating the ice layer and exposing and redistributing white phosphorus.

5039 7.4.3 *Bald and Golden Eagles*

5040 As discussed in [Section 2.3.3.2](#), Bald Eagles are year-round residents of JBER, and Golden Eagles are
 5041 frequently sighted in Snowhawk Valley. [Figure 7-4](#) depicts the identified Bald Eagle nests on JBER, and
 5042 [Table 7-5](#) depicts the data recorded from 2015 to 2024.

5043

Table 7-5. Bald Eagle nest status

Year	Number of nests observed	Number of occupied nests	Percent fledgling success
2015	38	16	50
2016	41	16	19
2017	47	16	56
2018	45	17	47
2019	44	17	47
2020*	28	8	Unknown
2021	48	18	33
2022	—	17	—
2023	54	19	—
2024	36	22	73

*Unable to conduct complete aerial and productivity surveys due to COVID-19 restrictions.

5044

5045 Eagles are specifically protected by the BGEPA. Federal agencies are required to support the intent of the
 5046 BGEPA by integrating conservation principles, measures, and practices into agency activities and by
 5047 avoiding or minimizing, to the extent practicable, adverse impacts on eagles when conducting agency
 5048 actions. To avoid disturbing nesting Bald Eagles, the USFWS has developed National Bald Eagle
 5049 Management Guidelines (USFWS 2007). JBER adheres to these guidelines and communicates with
 5050 USFWS when a newly discovered nest presents mission or eagle safety concerns. [Table 7-6](#) shows the
 5051 closest distance to a nest at which an activity should be conducted, per USFWS (2007).

5052

Table 7-6. Recommendations for some Category A and B activities (USFWS 2007)

Condition	If there is no similar activity within 1 mile of the nest	If there is similar activity closer than 1 mile from the nest
If the activity will be visible from the nest	660-foot landscape buffers are recommended	660 feet, or as close as existing tolerated activity of similar scope; Landscape buffers are recommended
If the activity will not be visible from the nest	Category A: 330 feet; Clearing, external construction, and landscaping between 330 feet and 660 feet should be done outside breeding season Category B: 660 feet	330 feet, or as close as existing tolerated activity of similar scope; Clearing, external construction and landscaping within 660 feet should be done outside breeding season

5053

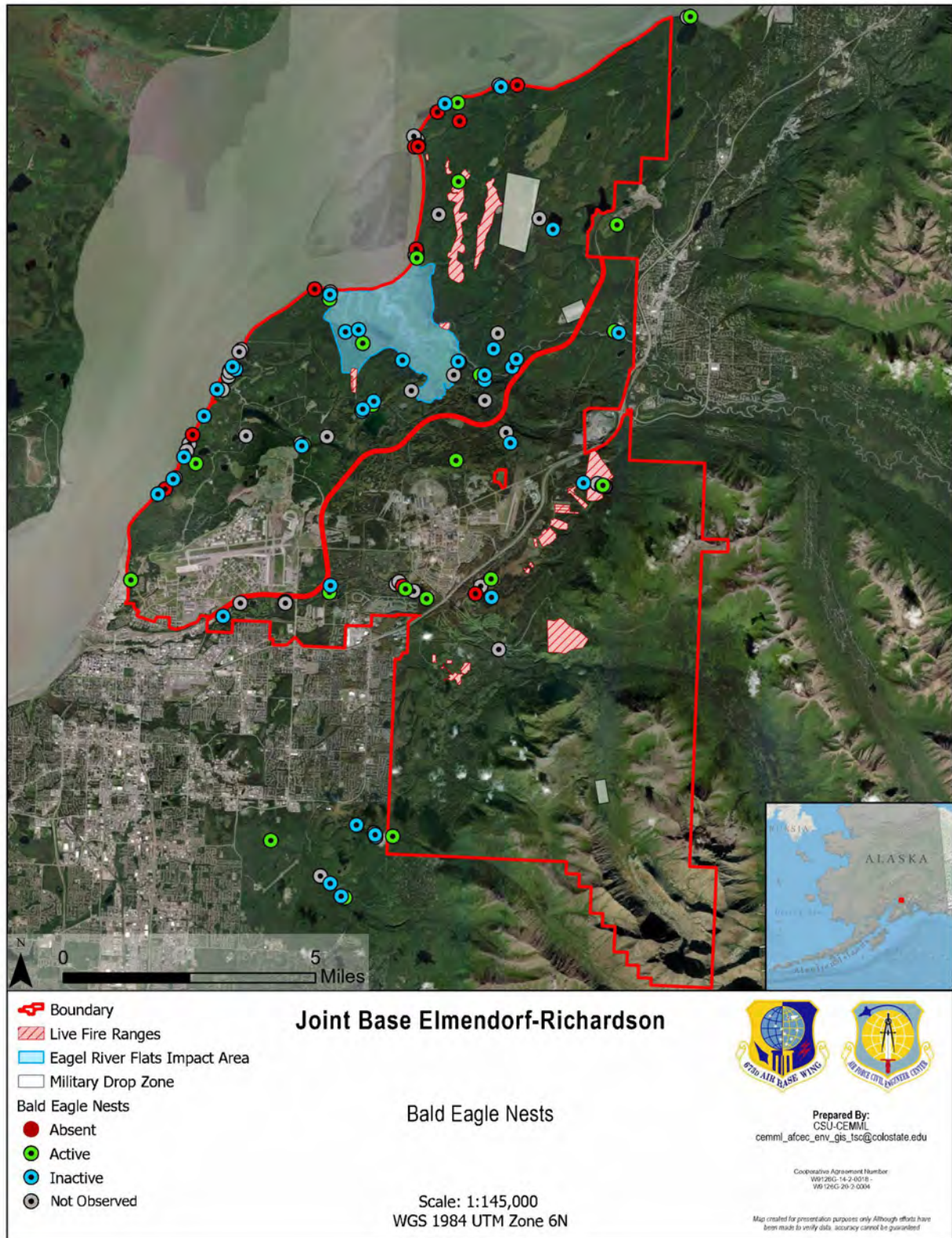
5054 In 2009, the USFWS announced a final rule on 2 new permit regulations to allow for the take of eagles and
 5055 eagle nests under the BGEPA. The final rule (50 CFR, Parts 13 and 22, *Eagle Permits: Take Necessary to*
 5056 *Protect Interests in Particular Localities*) was published on 11 September 2009. The permits authorize
 5057 limited, non-purposeful take of Bald Eagles, authorizing individuals, companies, government agencies

5058 (including Tribal governments), and other organizations to disturb or otherwise take eagles in the course of
5059 conducting lawful activities.

5060 Most permits issued under the new regulations authorize disturbance. In limited cases, a permit may
5061 authorize the physical take of eagles, but only if every precaution is taken to avoid physical take. Removal
5062 of eagle nests would usually be allowed only when it is necessary to protect human safety or the eagles. In
5063 the unlikely event that take of eagles or removal of eagle nests become necessary, JBER must apply for a
5064 take/removal general permit through USFWS.

5065 The USFWS has since revised the regulations, effective 2024, of eagle non-purposeful take permits and
5066 eagle nest take permits. These revisions include changes to permit issuance criteria and duration,
5067 definitions, compensatory mitigation standards, criteria for eagle nest removal permits, permit application
5068 requirements, and fees. The revisions intended to clarify eagle permit regulations, improve their
5069 implementation, and increase compliance, while maintaining strong protection for eagles.

5070



5071

5072 Figure 7-4. Map of Bald Eagle nests within and surrounding Joint Base Elmendorf-Richardson

7.4.4 *Species of Special Concern*

Species that are candidates for federal listing are not protected under the ESA until they are officially listed. JBER strives to minimize impacts that may result in the need to list these candidate species. JBER will document the distribution of candidate species on the installation and monitor their listing status. Additional species of concern that are monitored on JBER include the Rusty Blackbird, Lesser Yellowlegs, Olive-sided Flycatcher, Solitary Sandpiper, Blackpoll Warbler, Violet-green Swallow (*Tachycineta thalassina*), and Tree Swallows (*Tachycineta bicolor*) (McDuffie and Johnson 2019). Lists of rare and imperiled species include the Audubon Society watchlist (Butcher et al. 2007), USFWS (2024) Birds of Conservation Concern, and the University of Alaska's Alaska Center for Conservation Science rare species list. JBER manages and monitors the species identified in these lists according to the migratory bird conservation strategies developed by the DoD Partners in Flight (2014).

Prior to 2011, species of special concern included state-listed species. However, in August 2011, ADF&G eliminated their species of special concern and endangered species lists. ADF&G maintains a website for the State Wildlife Action Plan (ADF&G 2015) and uses that plan to assess the needs of species with conservation concerns and prioritize conservation actions and research. Whenever feasible, JBER will cooperate with state authorities in efforts to conserve these species. [Section 2.3.4](#) and [Table 2-10](#) identify species in the Alaska Wildlife Action Plan that are relevant to JBER.

7.4.5 *Future Considerations for Threatened and Endangered Species Management*

Management actions required to mitigate the effects of extreme weather events and natural hazards on T&E species and their habitats will be influenced by the intensity, duration, and character of these events and the species' ability to tolerate them. As discussed in [Section 2.3.4.6](#), T&E species on JBER are considered highly vulnerable to recent environmental trends, and management efforts will likely need to increase to avoid impacts on the mission. At the time of this INRMP update, the CIBW is the only resident ESA-listed species on the installation, but changing conditions may result in the listing of additional species, which can increase the regulatory burden on JBER. Few populations have been sufficiently studied to reliably estimate their response to changes in the environment, and little is known regarding their vulnerability to short-term events such as drought, post-wildfire conditions, heat waves, or extreme storm events. Adaptive management can alleviate the impacts of new stressors and may mitigate the need for more extreme actions in the future (DoDM 4715.03, Enclosure 6).

DoDI 4715.03 requires that installations implement adaptive and ecosystem-based management to support focal species and their habitats. Single-species approaches to management have the potential to interrupt ecosystem functions and adaptations; therefore, T&E management on JBER prioritizes projects that support the larger ecosystem over those that are focused exclusively on the CIBW. Many of JBER's current projects support the wider ecosystem that is used by the CIBW and its prey, and they will likely be appropriate for increasing the resiliency and adaptability of the system as a whole.

Continuous monitoring will be needed to track population trends related to weather, natural hazard impacts, and mission activities, especially if there are changes to the mission. If environmental stressors cause significant declines in CIBW populations, the base may need to implement additional protections or habitat/prey support projects to mitigate mission impacts and avoid conflicts with new regulatory constraints that may emerge.

7.5 **Water Resource Protection**

Applicability Statement

5115 This section applies to DAF installations that have water resources. This section **IS** applicable to this
5116 installation.

5117 *Program Overview/Current Management Practices*

5118 *7.5.1 Policy and Background*

5119 Water quality monitoring and management are required to formulate options for managing species that
5120 depend on high water quality. Water quality reflects environmental pollution, including erosion. Thus, land
5121 management activities must use applicable BMPs to minimize non-point sources of water pollution.
5122 Maintaining clean water is a critical part of ecosystem management.

5123 [Section 2.2.4](#) discusses surface water resources on JBER. [Figure 2-11](#) shows JBER's watersheds and
5124 significant surface water features, and [Section 2.2.4](#) discusses lesser surface waterbodies on JBER.

5125 *7.5.2 Water Resources Management*

5126 Water resources management actions on JBER are centered on stormwater planning and management,
5127 erosion control, BMPs, and impact area management. BMPs address methodologies, techniques, and
5128 equipment and personnel requirements. Stormwater pollution prevention and erosion control are closely
5129 tied. Surface water management consists of protecting creek sides, stream banks, lake shores, and
5130 immediately adjacent areas that are easily damaged. Managing water quality consists of developing and
5131 implementing BMPs that are designed to reduce chemical release from expended munitions in impact areas.
5132 For example, moving targets away from open water and wetlands reduces the likelihood that releases may
5133 occur. JBER's SWPPP (673 ABW 2020b) and Storm Water Management Plan (SWMP; 673 ABW 2021)
5134 include BMPs to ensure that sediment and other runoff do not enter wetlands or other WOTUS.

5135 *7.5.3 Surface Water Quality Monitoring*

5136 Surface water quality within JBER's cantonment area is managed by 673 CES/CEIEC (Compliance). As
5137 an operator of industrial facilities, JBER is required to operate under the ADEC's MSGP for Storm Water
5138 Discharges Associated with Industrial Activity. Under the MSGP, JBER is responsible for ensuring
5139 stormwater runoff (rain, snow, snowmelt) that comes into contact with industrial activities (aircraft
5140 refueling, quarrying operations, hazardous waste storage) and associated materials does not adversely affect
5141 the water quality of receiving waterbodies. A key condition of the MSGP is the development and
5142 implementation of a SWPPP. The SWPPP (673 ABW 2020b) describes the installation's stormwater
5143 conveyance system, potential pollutant sources, stormwater control measures, water quality monitoring
5144 procedures, and facility inspections.

5145 As an owner and operator of a municipal separate storm sewer system (MS4) within an urbanized area,
5146 JBER is also required to operate under the ADEC's Permit for Storm Water Discharges from Small MS4s.
5147 The MS4 permit is intended to minimize the discharge of stormwater pollutants from the installation's
5148 stormwater conveyance system to Ship Creek, Knik Arm, and other receiving waterbodies. A key condition
5149 of the MS4 permit is the development and implementation of a SWMP. The SWMP describes how JBER
5150 samples and characterizes its stormwater discharges; how it manages facilities, roads, and airfields with the
5151 potential to drain to JBER's MS4; and how it performs stormwater pollution prevention public outreach
5152 (673 ABW 2021). Stormwater discharges covered by other permits, such as industrial activities under the
5153 MSGP or construction activities addressed under the ADEC's Alaska Construction General Permit, are also
5154 subject to compliance with JBER's MS4 Permit. Stormwater sampling locations (MSGP and MS4) are
5155 shown in [Figure 7-5](#). JBER currently meets all state and federal pollutant discharge elimination system
5156 discharge requirements.



5157

5158 Figure 7-5. Map of stormwater monitoring locations within Joint Base Elmendorf-Richardson

7.5.4 *Drinking Water Quality Management*

JBER's water is supplied primarily by Ship Creek, which traverses JBER from east to west. The Ship Creek dam, with a structural height of 50 feet, forms a reservoir that impounds an estimated 6.5 million gallons of water at maximum capacity. The dam and intake facilities are located near the base of Ship Creek Canyon. Most of the domestic water for JBER comes from the reservoir. Anchorage also receives part of its water supply from Ship Creek. The JBER water treatment plant draws water from the Ship Creek Reservoir and filters and treats the water before delivering it to residential and industrial sites on JBER (Pacific Air Forces 1998). Treatment includes extraction of sediments and minor chemical processing with chlorine and fluoride. Three groundwater wells, each approximately 100 feet deep, serve to augment production from the main water treatment plant during periods of high demand (typically during the summer) or when there is an operational need. Water from the wells is virtually pollution-free due to protection of the deep aquifer by a dense confining substratum (Gossweiler 1984). More information regarding Ship Creek and the Ship Creek Dam is available in Quirk (1997).

To maintain the water quality of the installation's potable water sources, JBER has limited development along Upper Ship Creek above the dam and around its 3 main groundwater wells. JBER also limits development and Army training in the vicinity of both Ship Creek and the north fork of Campbell Creek to the greatest extent possible to protect surface water quality (US Army Alaska 1998). The LRAM component also plays a major role in protecting water quality on JBER-R.

7.5.5 *Groundwater*

The groundwater program is important to natural resources management, but it is not considered a Natural Resource program function. Rather, it is a responsibility of the compliance and/or restoration program, as groundwater monitoring is an important environmental compliance activity. Groundwater monitoring data on JBER-E indicated localized shallow aquifer contamination that was not impacting deeper aquifers. The Bootlegger Cove formation appears to serve as an effective barrier between the aquifers (Brabets 1998, 673 ABW 2023a). Aquifers underlying JBER are discussed in [Section 2.2.4](#).

Industrial activities associated with JBER-R have had some minor effects on groundwater. These effects are associated with underground storage tanks, facilities where chemicals were stored, and places where chemicals were dumped. These areas are being intensively monitored, and there has been no indication of deep groundwater pollution. Pollution has been minor and localized, and there are no significant risks to human health.

7.6 **Wetland Protection**

Applicability Statement

This section applies to DAF installations that have existing wetlands on DAF property. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

7.6.1 *Policy and Background*

The JBER policy concerning wetlands is to protect and conserve wetlands in a manner that incurs no net loss of wetland acreage or wetland functions, unless necessary to support mission or training requirements. Mission-dependent project planning requires that proponents first avoid wetlands to the maximum extent practicable, then minimize impacts where they must occur. Avoidance and minimization of impacts to wetlands must occur regardless of whether the wetland is under federal jurisdiction (pursuant to Section

5200 404 of the CWA). Where impacts to wetlands under federal regulatory jurisdiction are unavoidable,
5201 authorization for necessary impacts and subsequent compensatory mitigation must be secured, when
5202 applicable.

5203 The USACE is the ultimate authority for regulation of wetlands. Many wetlands on JBER are potentially
5204 jurisdictional and should be evaluated in consultation with USACE prior to incurring any impacts for an
5205 evaluation of purpose and need, assessment of practicable alternatives, and if necessary, assess
5206 compensatory or other mitigation requirements. A wetland delineation must be conducted during the
5207 growing season, and a request for a jurisdictional determination must be made to the USACE. Jurisdictional
5208 determinations are good for 5 years. If an impact to the wetland will occur beyond the 5-year timeframe, a
5209 new jurisdictional determination may be required.

5210 Permits for fill of jurisdictional wetlands may be required under Section 404 of the CWA. The permitting
5211 process allows JBER to mitigate unavoidable permanent and/or temporary, direct, and/or indirect impacts
5212 to wetlands during military, recreation, maintenance, and fire-suppression activities. USACE is the
5213 authority for ensuring compliance with requirements of Section 404 of the CWA, which regulates use of
5214 wetland areas. As such, USACE may conduct follow-up inspections to ensure compliance with issued
5215 permits.

5216 Compensatory mitigation is required only for loss of jurisdictional wetlands. Similarly, CWA Section 404
5217 permits are needed only when fill is being placed in a jurisdictional wetland. EO 11990, *Protection of*
5218 *Wetlands*, requires a “Finding of No Practical Alternative” for all construction activity in a wetland,
5219 including both jurisdictional and non-jurisdictional wetlands. However, any net loss of wetlands,
5220 jurisdictional or otherwise, should be mitigated whenever possible.

5221 In addition to wetland mapping and inventory, wetland functional assessments are tools to evaluate wetland
5222 functions and values within the managed landscape. The Anchorage Wetland Assessment Methodology
5223 was developed in 1982, updated in 1996, and revised in 2012, adding the “Credit-Debit” method for
5224 calculating compensatory wetland mitigation. In 2016, JBER adapted the Anchorage Wetland Assessment
5225 Methodology for use on JBER. Resources and criteria were updated and functions were tailored specifically
5226 to military land use on JBER and specific ecological and wildlife management objectives. Functional
5227 assessment data from both tabletop and field assessments can be used to monitor changes in wetland
5228 functions over time. From the results of the functional assessment, a Debit-Credit evaluation can be derived
5229 to facilitate development planning in instances where wetland impacts may be unavoidable and
5230 compensatory mitigation may be required. The method provides a mathematical means of expressing
5231 adverse impacts as debits and beneficial impacts as credits. Several considered factors include:

- 5232 • The pre- and post-project Relative Ecological Values of the site and surrounding area
- 5233 • The nature and extent of disturbance already affecting the site and surrounding area
- 5234 • The extent, nature, and permanence of anticipated direct and indirect adverse impacts
- 5235 • The type and extent of improvements in function expected to result from restoration, enhancement,
5236 and creation/establishment projects
- 5237 • The extent of the threat of future development or other adverse impacts at proposed preservation
5238 sites

5239 The functional assessment and LTEM protocol are used together to evaluate and monitor wetlands.
5240 Additionally, the Debit-Credit approach may be applied to assist in managing planning efforts. Where
5241 wetland impacts may be unavoidable, the Debit-Credit approach classifies wetlands into high-functioning
5242 (Class A), moderate-functioning (Class B), and low-functioning (Class C) wetlands and assigns a Relative

Ecological Value of up to 1 for each wetland. Compensatory mitigation credits may be calculated using this approach and purchased from a local wetland mitigation bank.

Wetlands in developed areas receive the same protection that they do elsewhere. As part of the EIAP, all activities that may affect wetlands are carefully screened to ensure that impacts are avoided or minimized. Appropriate coordination with federal or state agencies is conducted prior to activities occurring, as required by federal and DAF regulations. When activities take place in these areas, silt curtains, silt fences, coir logs or other effective BMPs must be followed to limit the movement of silt generated by construction or repair activities. Activities requiring access through wetlands or temporary impacts to wetlands are best conducted when the ground is frozen and the least amount of damage will be incurred to the soil surface. The use of timber mats or other ground surface protection may be required when temporarily working in wetlands, especially during the growing season. Utility and maintenance work in jurisdictional wetlands is typically covered under a USACE General Permit, which may require only a brief pre-construction consultation. All federal general permit conditions and Alaska Regional Permit Conditions will apply. Compliance with federal regulations is monitored by the 673 CES Environmental Flight, as well as federal and state agencies.

7.6.2 Riparian Area Management Setback Requirements

According to the Soil and Water Conservation Handbook (US Forest Service 2006), riparian areas serve to restore sediment; help maintain desired water temperature; provide aquatic and riparian ecosystem habits for fish, wildlife, and recreation; protect channels and streambanks; stabilize the floodplain; and provide a long-term source of large organic debris to the stream channel system. JBER has adopted the following policies, where mission-essential and/or training elements are not compromised.

Vegetation Buffers

BMPs in the Alaska Forest Resources and Practices Act (Alaska Statute 41.17.115, *Intent for riparian areas*) require the following:

- Harvest of timber may not be undertaken within 100 feet immediately adjacent to an anadromous or high-value resident fish waterbody.
- Between 100 and 300 feet from the waterbody, harvest of timber may be authorized but must be IAW BMPs for maintenance of important fish and wildlife habitat.
- Necessary removal of trees along riparian or wetland areas, such as for flightline safety within designated Clear Zones, must be conducted in such a manner that the soil within the designated setback is not disturbed.
- Clearing near streams and in wetlands and along riparian areas, where necessary, should be conducted in winter.

The Anchorage Coastal Management Plan (Municipality of Anchorage 2007) requires the following:

- 100-foot setback from anadromous streams
- 85-foot setback from headwaters and tributaries of anadromous streams
- 65-foot setback from all other waters

Wetlands that are of high function (Debit-Credit: Class A) require a 25-foot setback. Wetlands of moderate function (Debit-Credit: Class B) require a 15-foot setback.

Clearcuts are not authorized in buffer lands where the forest is in general good health. Selective cuts with artificial seeding or hand-planting can be used as required to maintain the forest stands in these areas.

Exceptions to the buffer policy may be granted for the development of recreation areas, road construction, training areas, or other mission requirements. Any impact to wetland/riparian areas due to the building of structures, roads, or trails or habitat modification will go through the EIAP and Section 404 to evaluate and mitigate impacts, IAW EO 11990 and EO 11988, *Floodplain Management*. Riparian areas also have a high potential for archaeological deposits and ancestral trees. Actions that remove trees or disturb soils must be coordinated to assess requirements under Section 106 of the NHPA.

Vehicle Maneuvering

USARAK Regulation 350-2 requires that vehicles “remain on marked trails and designated routes except when directed otherwise during tactical deployment. Vehicles will drive on established roads during administrative time. During breakup (usually 1 April through 15 May), all vehicles are restricted to established roads and dry trails. During summer months (usually May through September), cross-country movement is permitted in all areas except designated creek bottoms, lakes, streams, and open, flowing water. No tracked or wheeled maneuvering is permitted within a 50-yard buffer around all streams, lakes, and any open, flowing water during the summer unless crossing at a 90-degree angle to the stream. Fish spawning streams will not be crossed during summer. Vehicular stream crossing is allowed in winter months (usually October through March) at permitted ice bridge sites and other areas if there is no flowing water. Tactical turns, such as missile avoidance or neutral steer turns, will be avoided unless absolutely necessary.”

7.6.3 Wetland Inventory and Monitoring

Wetland inventories and monitoring provide an indicator of ecosystem integrity, the status of sensitive plant species and communities, and data required to comply with wetland-related laws, EOs, directives, and other regulations. In addition, inventory and monitoring help determine areas where improvements or rehabilitation are needed to maintain ecosystem integrity and support military activities or that may be used over time to monitor changes in function or persistence as a result of development or recent environmental trends.

Wetlands have been inventoried on JBER using both tabletop and field-delineation methods. Annually, as regions of JBER are studied, project actions are taken, or regulatory determinations are made, the accuracy of the inventoried wetland boundaries is improved and the GIS data are updated, as practicable. According to USACE, however, the “official” wetland map is still maintained by the USFWS’s NWI. The most recent update to that map was in 2024. Supplemental wetland inventories on JBER ([Section 2.3.5](#)) can be used, with substantive field observations, to validate, invalidate, or amend those of the NWI.

The NWI process is not to be confused with the process to delineate wetlands or establish jurisdictional authority. Because many of JBER’s wetlands are small, unmapped areas can be overlooked when conducting planning using aerial photos and GIS maps. On-the-ground field verification, conducted during the growing season, is critical to ensure that small wetlands are not overlooked.

Distinct but complementary to the wetland boundary determination, wetland functional assessments are conducted to establish qualitative and quantitative benchmarks for monitoring the functions and values of wetlands within the landscape. JBER Natural Resources program, CEMML, and the USACE derived the JBER Wetland Functional Assessment from the Municipality of Anchorage’s method to assess the biological, hydrological, habitat, and social functions of wetlands within JBER.

Mission-support priorities have required wetland investigations in some unique habitats on JBER. [Section 2.0](#) includes detailed descriptions of the Elmendorf Moraine-Kettle Lakes, the ERF, and alpine depressions

and swales. Other areas, however, lack reliable information on the presence or absence of wetlands, including wetlands in black spruce-dominated forests and slope-discharge wetlands that form on hillslopes and in subalpine areas. Ground-truthing efforts are needed to verify the presence or absence of wetland characteristics in these problematic areas to improve the accuracy of the monitoring and planning tool. Sampling of several black spruce-dominated areas mapped as wetlands occurred in 2016 to 2017 in the Knik Arm and Eagle River watersheds, with many sites failing to meet wetland criteria. Wetlands within the JBER installation boundary in the Snowhawk, Chester, and Ship Creek watersheds were investigated in 2018 to 2019.

In 2017, the USACE performed several wetland delineations in kettle depressions and verified them to be isolated. Wetland delineations were specifically conducted in 2017 for the Vigilant Shield Exercise Site (POA-2017-415) near Hillberg Lake and the Bryant Army Airfield Flight Line Safety Project (POA-2017-511) within the BASH area around Bryant Army Airfield. For Project Vigilant Shield, Hillberg Lake and the wetland into which it directly drains were included in the JBER wetland inventory and were determined by the USACE to be jurisdictionally isolated. The other 2 wetland areas identified in the field delineation, but not in the JBER wetland inventory, were also determined to be isolated. For Project Bryant Army Airfield Flightline Safety, some of the areas that were mapped as wetlands were determined to be uplands through field investigations (e.g., POA-2011-1124), which was validated by the USACE. The Bryant Army Airfield stormwater pond is isolated, having been incidentally constructed from gravel pit operations in the 1980s. A second wetland area located just outside the Richardson Visitor's Center, near the Glenn Highway, was investigated by the USACE for connectivity to McVeigh Marsh and/or Ship Creek. An approved Jurisdictional Determination was made in 2018.

7.6.4 Wetland Management

Wetland management on JBER is primarily conducted through protection and conservation practices to ensure avoidance and minimization of impacts to wetland acreage or function to the maximum extent practicable. Conservative management of wetland areas requires coordination with regulatory agencies, and all projects, including construction projects, that may permanently or temporarily and either directly or indirectly affect wetlands must be coordinated with the EIAP Planning Function (EPF) to meet the requirements of EO 11990 for early public notification and a Finding of No Practicable Alternative. Projects that may impact wetlands or floodplains are subject to Section 404 of the CWA ([Section 2.3.5](#)), EO 11990, and/or EO 11988, and they must be coordinated with the JBER EPF. Construction in or near wetlands must use BMPs such as silt curtains or fences to minimize silt movement that results from construction or repairs.

As necessary, work in wetlands should incorporate the following BMPs to mitigate permanent, temporary, direct, and/or indirect impacts:

- Where work in wetlands is necessary or has occurred, coordination with 673 CES/CEIEC is required.
- Where clearing of vegetation is required for operational efficiency, trees should be hand-felled or cut only above the ground surface, preferably during winter to minimize the impacts to soils and ground cover in wetlands.
- Riparian area management setback requirements ([Section 7.6.2](#)) must be adhered to, where work in wetlands abuts lakes, streams, or other surface waters.
- Equipment will be cleaned prior to deploying into wetlands or natural areas such that it is free of seeds, propagules, or other fragments of vegetation which may vector invasive species into those areas.

- Areas where soil disturbance has occurred must immediately be seeded with a native wetland seed mix ([Section 7.7.7](#)) and monitored until 70% coverage is achieved.
- Wetland delineations that use soil probes or shovel tests that exceed 3 inches must get an ABW Form 3 (Dig Permit) to ensure that any ground disturbances will not impact cultural resources, CERCLA sites, or buried utilities.

Impacts to wetlands must be analyzed IAW applicable federal laws and EOs before approving any projects that have the potential to alter wetlands, streams, or tributaries on JBER. Impacts to wetlands and/or floodplains require an Early Public Notice and must conclude in a Finding of No Practicable Alternative. Adverse impacts may require an EIS with an ROD. Mitigation, such as the purchase of compensatory mitigation credits, may be used to achieve a mitigated Finding of No Significant Impact. DoDI 4715.03, Section 3.3.7(a-b), states that installations may participate in off-site mitigation/banking.

Education is an important aspect of wetland management. The Natural Resources and ITAM programs will continue to incorporate wetland conservation education into environmental awareness programs to prevent avoidable impacts to wetlands from mission- and recreation-related activities. To that end, project managers will be educated to coordinate early on with natural resources personnel to assess adverse impacts of their projects and seek timely permit applications. The ITAM program's Sustainable Range Awareness component provides environmental awareness to reduce damage to wetlands within training lands from maneuver or other training activities.

Some wetland protection measures conflict with the JBER BASH Plan ([Appendix C](#)). Waterbodies within the WEZ around the airfield attract birds, especially waterfowl ([Figure 7-9](#)). BASH procedures call for hazing and occasionally depredating birds in these wetlands. The intent of conserving wetlands is multifaceted, but protection of wetlands that provide habitat for waterbirds must be weighed carefully against the health and safety of mission operations. If a wetland occurring in the WEZ serves to attract birds that are then destroyed, the wetland value is substantially diminished. The snowmelt pond at the western end of Runway 06 is an example of an attractive wetland that results in large numbers of birds being hazed or killed. While this wetland would be valuable in most other locations, it serves only to increase bird mortality. Action begun by the Port of Alaska to extract gravel resources in this and other wetland areas near the airfield may remove wetlands and may also work to diminish mortality of a large number of birds annually. Mitigating the impacts to birds at this hazardous location is completed through conservation of waterbodies outside the WEZ, where birds may find safe refuge that does not affect the military mission.

Wetland enhancement and rehabilitation may be conducted on JBER to repair and restore wetland functions affected by military and non-military activities. Military mission-related wetland projects need to be coordinated through the 673 CES Natural Resources office and the ITAM program's LRAM component. Techniques for repairing damage include installing waterbars, recontouring areas to match the surrounding area, rolling back the vegetative mat, and revegetation using native plant species.

As of 2024, JBER is working with the USFWS to update functional descriptions and background knowledge of local waterbodies to identify interconnectivity for jurisdictional determinations. Standardized and long-term monitoring data help identify trends in wetland environments and the species within them, and JBER should pursue opportunities to expand monitoring projects where practicable.

7.6.5 Riparian Area Management

Riparian areas on JBER include Eagle River, Otter Creek, Ship Creek, Snowhawk Creek, Jerry's Creek, South Fork Chester Creek, North Fork Campbell Creek, Sixmile Creek, Fire Creek, Moonshine Creek, Clunie Creek, and EOD Creek. Primary efforts to protect these areas include restricting access, restricting

development and disturbance such as logging, and streambank stabilization efforts. Any activities occurring in a stream must be coordinated with the ADF&G Habitat Section and the USACE. Construction work is timed to minimize in-stream work when salmon are present.

The Anadromous Fish Act requires prior notification and permit approval from ADF&G before altering or affecting “the natural flow or bed” of a specified anadromous waterbody. All activities within or across a specified anadromous waterbody require approval from the ADF&G Habitat Section, including road crossings, gravel removal, mining, water withdrawals, the use of vehicles or equipment in the waterway, stream realignment or diversion, bank stabilization, and the placement, excavation, deposition, or removal of any material. Permitting requirements apply to individuals, commercial entities, government agencies, and other organizations.

The Fishway or Fish Passage Act (Alaska Statute 16.05.841), requires that an individual or government agency notify and obtain authorization from the ADF&G Habitat Section for activities within or across a stream used by resident or anadromous fish if it is determined that such uses or activities could represent an impediment to the efficient passage of those fish.

7.6.6 Floodplain Management

44 CFR, Parts 9 and 60 (pursuant to EO 11988) requires federal agencies to take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains in carrying out their responsibilities for managing federal lands. Before taking an action, JBER must determine whether the proposed action will occur in a floodplain and, if so, alternatives to avoid adverse effects must be considered. Incompatible developments in floodplains must also be considered. Currently, there are insufficient map resources available to determine the extent of floodplains adjacent to all waters on JBER. Floodplain maps and hydrologic models of the type and accuracy used by the Federal Emergency Management Agency to delineate floodplain boundaries are not available.

Floodplain boundaries within the installation boundary have been estimated only along Ship Creek. Those floodplain extents for Ship Creek are inaccurate, which can be seen when current imagery is overlaid with the “floodplain” polygon in GIS. JBER will review the potential for impacts adjacent to and within floodplains on a project-by-project basis using current LiDAR, aerial imagery, and field investigations, when necessary, to determine the potential for projects to affect or be affected by flooding. JBER must produce, at a minimum, concept floodplain maps using current field data, including the surveyed ordinary high water mark and elevations of flood events observed in the field. Such evidence may also include drift lines, debris lines, water marks, and scour marks, particularly those that can be attributed to specific storm events where the flood stage was recorded. As resources allow, priority waterbodies in need of floodplain assessment will be investigated. Priority waterbodies include Campbell Creek, Brandon’s Creek, and Chester Creek.

7.7 Grounds Maintenance

Applicability Statement

This section applies to DAF installations that perform ground maintenance activities that could impact natural resources. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

7.7.1 Policy and Background

IAW DAFMAN 32-7003, DAF land management activities are intended to protect and enhance desirable natural and artificial features on the installation. It is federal policy that environmentally and economically beneficial landscaping practices be used, per EO 13148, *Greening the Government through Leadership in Environmental Management*, and as outlined in the Presidential Memorandum, *Memorandum on Environmentally Beneficial Landscaping* (26 April 1994). The Presidential Memorandum directs federal agencies to:

- Use regionally native plants for landscaping
- Design, use, or promote construction practices to minimize adverse effects on the natural habitat
- Prevent pollution by reducing fertilizer and pesticide use, using integrated pest management, recycling green waste, minimizing runoff, and conducting similar practices
- Implement water efficient practices
- Create outdoor demonstrations incorporating native plants and following other similar practices

Cultural Resource Requirements and Tribal Coordination

Grounds maintenance activities have the potential to negatively impact the condition or access to culturally and historically significant resources on the installation. As described in DAFMAN 32-7003, Section 2.25, all ground-disturbing activities must be reviewed to ensure compliance with NHPA Section 106, NAGPRA, ARPA, and AIRFA. Additionally, the JBER Natural Resources program will continue to coordinate with the Tribes to ensure that actions carried out on the installation are beneficial for all stakeholders.

7.7.2 Management Issues and Planning

Grounds management on JBER is implemented by the 773 CES Grounds Management section (773 CES/CEOH) according to the seasonal priorities identified annually in collaboration with the 673 CES/CEIEC and the 773 CES/CEOIE. These seasonal priorities often focus on tree plantings, landscape and forest area management, and management of invasive weeds, the latter of which is primarily implemented by or in coordination with the 773 CES/CEOIE. Improved grounds throughout the cantonment provide habitat for many wildlife species; thus, forest patches are maintained in a natural state where practicable. JBER's status as a "Tree City USA" (designated by the National Arbor Day Foundation and ADNR's Division of Forestry [AKDOF], Office of Community Forestry) since 1996 requires landscape tree management and tracking of expenditure and effort to install, maintain, and remove landscape trees. Natural areas within improved grounds provide opportunities for education and outreach; scenic beauty; protection of water, air, and soil; and habitat for wildlife. Natural areas serve as buffers around waterways to manage stormwater, improve water quality, and prevent erosion. Grounds maintenance and landscaping includes the use of native or regionally adapted plants in developed areas, reduction of fertilizer and pesticide use, and invasive species control. Cooperative management of grounds and urban forests within the cantonment area will ensure that the public and environmental functions of the landscape are enhanced.

Vegetation clearing, site preparation, or other construction activities that may result in the destruction of active bird nests or nestlings would violate the MBTA. In Southcentral Alaska, USFWS recommend these activities not be conducted between 1 May and 15 July. Timing guidelines are not regulations but are intended to help comply with the MBTA. Some species and their nests have additional protections under other federal laws, including species listed under the ESA and BGEPA.

JBER must provide timely vegetative clearing to support military training. The Bob Stump National Defense Authorization Act for Fiscal Year 2003 (PL 107-314 § 315(f), 116 Stat. 2458 [12 December 2002])

defines military readiness activity as that which (1) includes all training and operations of the Armed Forces, (2) relates to combat and the adequate and realistic testing of military equipment, or (3) tests vehicles, weapons, and sensors for proper operation and suitability for combat use, excluding (a) routine operation of installation operating support functions such as administrative offices, military exchanges, commissaries, water treatment facilities, storage facilities, schools, housing, motor pools, laundries, MWR activities, shops, and mess halls, (b) operation of industrial activities, or (c) construction or demolition of facilities listed above. To further clarify this, JBER believes military readiness activities include (1) air and ground maneuver training, (2) live fire demolition, direct and indirect fire activities, (3) range construction, range upgrade and range maintenance activities which are required for military operational readiness, and (4) those vegetation management activities which directly support readiness activities and Soldier safety such as prescribed burning and mechanical- or hand-thinning to reduce fire danger in range training areas.

Biological/Physical Constraints

Land management practices on JBER are constrained by topography, soils, and climate. Most improved and semi-improved lands are found on the thin, gravel soils that are common on alluvial and outwash plains. Low annual rainfall and poorly developed soils place great stress on new plantings. Low soil temperatures can restrict root formation to the upper 18 inches of soil. Relatively low soil fertility mandates fertilization, particularly on areas such as golf courses. Lawns established on these soils are often subject to drought during early to mid-summer. Transplanting works well with native species, but nonnative species often require extra care, grow more slowly, and occasionally cannot survive the local conditions. [Section 2.2.3](#) discusses soils inventories that have occurred on JBER lands and includes a soils map and soils series information.

Landscape management is also constrained by biological forces. The most abundant native tree species in Southcentral Alaska, within JBER's ecoregion, include black spruce, white spruce, paper birch, and balsam poplar. [Section 2.3.2](#) includes a broader description of forest ecotypes on JBER. Spruce are particularly vulnerable to spruce beetles and spruce budworms (*Choristoneura fumiferana*), and paper birch are vulnerable to birch leaf-roller (*Epinotia solandriana*) and birch leaf-miner (*Fenusa pusilla*). In 2016, a devastating outbreak of spruce beetles began on JBER, and 3 years later, the first mortality of landscape trees from spruce beetle attack was observed. Significant loss of spruce in remnant natural areas and in the greater forested training areas occurred with progressive intensity since around 2017, and over 15,639 acres of spruce forest on JBER have been negatively affected by spruce beetles. While nonnative tree species have been historically planted in the landscaped areas of JBER, the current general policy for planting is with preference to native trees. This considerably limits the planted species, and with particularly active outbreaks of disease, which are highly driven by changes in temperature and precipitation, the question of how to improve the diversity and resiliency of local community forests is very relevant.

Landscape Planning

Landscape standards include the selection, placement, and maintenance of plant material on JBER. Landscape standards are included in the JBER Airfield District Areas Development Plan (673 ABW 2019), developed cooperatively between the 673 CES, Installation Support, Planning office and the JBER Facilities Board, on which the 3d Wing and 3 WG/SE serve. A plant palette and plant categories are included to help landscape designers select the best plant for each particular set of design requirements. Plants must be hardy enough to survive the harsh Alaskan climate while not creating BASH and wildlife attractants near housing. The planting of berry-producing trees and shrubs is highly discouraged anywhere on JBER and strictly prohibited within BEZs and WEZs.

Landscaping on JBER should be compatible with adjacent surroundings and complementary to architectural features and the overall natural setting of the area. Native plants are preferred, and caution will be taken so that no new noxious or invasive species are introduced. Species that have been introduced and escaped or pose a noxious weed threat, including European bird cherry or Japanese knotweed (*Polygonum cuspidatum*), are controlled.

The Landscape Management Plan, incorporated into [Section 7.7.6](#), and the Airfield Landscape Standards must adhere to the DAF Landscape Planting Standards, with adaptations suited to the local climate, as recommended. Included in the plan and standards are a list of acceptable native trees and shrubs, including suitable native and/or non-invasive alternatives to commonly planted nonnative landscape trees.

7.7.3 Airfield/BASH Program

Vegetated areas and low-lying areas where ponding may occur around active airfields are managed under the BASH program to discourage wildlife use ([Section 7.12](#)). BEZs and WEZs are established areas in and around airfields and cantonment areas where natural or established elements that are attractive to birds or wildlife are discouraged or prohibited to protect public safety, operation efficiency, and mission sustainability. The 3 WGI 91-212 includes the BASH Plan for the Elmendorf Airfield ([Appendix C](#)). Bryant Army Airfield has a separate but complementary BASH Plan. The following relevant stipulations are detailed in Section 5, *Habitat Modification*, of that plan:

- When possible, large lawns should have trees and shrubs dispersed at 6 to 10 plants per acre to discourage geese.
- Mature berries can attract several species of birds during fall and winter. Minimizing their presence within the BEZ/WEZ is a BASH objective. Berry/fruit-producing trees within the BEZ were phased out in 2015. No new berry/fruit-producing trees or shrubs will be planted within the WEZ. All new planted trees and shrubs will be species that do not produce berries/fruits. As funds allow, berry/fruit-producing trees and shrubs will be replaced with those that do not produce berries/fruits.
- To fill gaps in shrubland areas, native shrubs and small trees will be planted to provide over 60% canopy coverage to discourage raptors from hunting small mammals and to discourage the presence of grasshoppers. Selected plantings will be species that do not produce berries or fruits and that easily regenerate after aggressive cutting; these include alder, willow, poplar, and birch. Shrubs will need to be cut to 6 to 8 inches above the ground on a 2- to 3-year rotational basis. Cutting should be conducted in early April, prior to ground thaw and before leaf-out.
- Hydroseeding within BEZs and WEZs is only permitted from 15 May to 31 July to minimize the attractiveness of young grass to migrating geese.

The management of fruit-producing trees in BEZs and WEZs is a priority in the BASH Plan. Because European mountain ash (*Sorbus aucuparia*) produces dense clusters of berries that are capable of attracting large flocks of migratory birds, it poses a significant threat to airfield safety. In 2018, there were more than 400 fruit-bearing trees in BASH areas and nearly 1,500 in the WEZs. Removal of these trees was prioritized in the BEZs and then in WEZ areas, except in areas under control of Aurora Housing. In 2018 to 2019, efforts to apply herbicide to 965 European mountain ash, European bird cherry, apple and crabapple (*Malus* spp.), and pear (*Pyrus* sp.) trees were contracted under a Cooperative Agreement with the Palmer Soil and Water Conservation District. Removal of the trees was coordinated with 773 CES Heavy Repair Group.

7.7.4 Moose Run Golf Course

The Moose Run Golf Course is maintained by golf course grounds crews. Management procedures include seeding, mowing, irrigation, fertilization, aeration, and weed and disease control. Major natural resource-

related issues include stream bank stabilization, water quality, BASH, wildlife conflict, and preservation of fish habitat in this area. European bird cherry has spread throughout low-lying areas all along the riparian edge of Ship Creek. Survey of bird cherry upstream of Vandenberg Road has not yet been conducted, but the plant may occur as far upstream as Moose Run Golf Course. Erosion control efforts along Ship Creek within Moose Run Golf Course are also management targets. As bird cherry is removed, native trees and shrubs should be planted to replace it. Vegetation buffers should be reestablished along the entire watercourse and mowing should be ceased to allow for establishment of shrubs and trees.

7.7.5 *Eagleglen Fitness Park*

Major natural resource-related issues at Eagleglen Fitness Park include water quality, BASH, wildlife conflict, invasive species control, and preservation and improvement of fish habitat. The fish habitat improvement issue in this area is of special concern due to a likely increase in bear-human conflict if more fish return to the area, drawing more bears to the area. European bird cherry has spread throughout low-lying areas in Eagleglen Fitness Park, including along the riparian edge of Ship Creek and around ponds. Survey of bird cherry began in 2015 and treatment of a portion of the park occurred in 2016 to 2018. Additional efforts are needed to continue controlling bird cherry in this greenbelt, but a significant increase in mortality of these trees has been achieved. Areas of Eagleglen Fitness Park may be good candidates for restoration, as the area is no longer used as a golf course. Erosion control efforts along Ship Creek within the park are also management priorities. As bird cherry is controlled, native trees and shrubs should be planted to replace it. Vegetation buffers should be reestablished along the entire watercourse and mowing should be ceased to allow for establishment of shrubs and trees.

7.7.6 *Urban Forestry*

The urban forest includes individual trees and shrubs, as well as groupings and small tracts of remnant forest, scattered among complex and varied land uses in and adjacent to improved and semi-improved grounds and woodland borders. Urban forests are valued primarily for their aesthetic beauty, contribution to improved air and water quality, and erosion protection.

Urban forestry on JBER is coordinated between the 673 CES/CEIEC, 773 CES/CEOH, and the 3d Wing, as applicable, with assistance to manage invasive species supported by 773 CES/CEOIE. An initial comprehensive inventory of the landscaped areas on JBER began in 2014, and survey efforts continued through fall 2018. The Urban Forestry Inventory ([Appendix G](#)) was used to develop a comprehensive JBER Urban Forest Management Plan (673 CES/CEIEC 2021) according to the USAF (1998) Landscape Design Guide, the official standard for landscape architecture and planning for JBER. This plan partitioned cantonment areas into 5 main Urban Forest Tracts, which are re-inventoried and subsequently managed on a rotational schedule, such that inventory and management in all cantonment area tracts occurs every 5 years.

The Urban Forest Inventory entails a physical site visit, inspection and documentation of tree size, height, DBH, crown condition, location, management authority, assessment of overall condition (good, fair, poor, dead), needs for maintenance or removal, and assessment of potential conflicts with infrastructure or other hazards ([Appendix G](#)). General comments regarding tree diseases, observed damage, invasiveness, and unlisted species are also noted during the Urban Forest Inventory. The data gathered in the inventory are integrated into the geospatial attributes maintained by GeoBase and are used to generate a maintenance plan for the subsequent year.

The general landscape standards and planting densities are described in 3 WGI 91-212. The USAF (1998) Landscape Design Guide provides general guidance for landscape architecture and planning, inclusive of

the urban forest. From these resources, the Urban Forest Management Plan (673 CES/CEIEC 2021) was developed, which recommends species for planting on JBER. It also lists invasive species that should be avoided so that they do not establish and require subsequent management.

Natural resources personnel are responsible for planning for, making recommendations for, and periodically monitoring urban forestry on JBER. The 773 CES Heavy Repair Group provides support for implementing the urban forestry plan in coordination with the 673 CES Natural Resources office, typically through the work order process. Management of urban forests includes establishing native species of varying age classes; mitigating risks and pests that cause tree damage, disease, and/or death; removing hazard trees and shrubs; providing growth support for newly planted trees; limbing trees; and performing other tasks that are necessary to mission support. Significant portions of the urban forest overlap with BEZ/WEZ areas on JBER. Trees and shrubs with fruiting bodies or other animal attractants within these zones are potential wildlife hazards and increase BASH risk ([Appendix G](#)). These trees and shrubs are commonly invasive and are marked as higher-category hazards for removal during the Urban Forest Inventory. Because management tasks are tracked as part of the Tree City USA program, activities should be tracked and reported to the base Forester.

JBER's commitment to the value of urban forests is reflected in its Tree City USA status. This designation requires establishment of a Tree Board, \$2.00 per capita expenditures on urban forest management, and recognition of National Arbor Day, celebrated on the third Monday in May in Alaska ([Section 7.15.3](#)). Prior to joint-basing, both the Richardson and Elmendorf bases were independently recognized in 1996 and 1997, respectively. Once joint-based, the efforts merged.

7.7.7 Management Strategies for Vegetation Establishment

Species selected for vegetation establishment must comply with the USAF (1998) Landscape Design Guide and other directives. The BASH program ([Section 7.12](#)) includes requirements for vegetation management. Urban forestry is discussed in [Section 7.7.6](#), noxious plant/invasive species management is described in [Section 7.11.4](#), and landscape planning is detailed [Section 7.7.2](#). JBER managers recommend following the State of Alaska and Cooperative Extension Service guidance on species plantings.

Grass

The best time for lawn establishment is from 15 May to 15 June, but hydroseeding can extend that period. However, young grass is a high-risk attractant to Canada Geese during their dispersal and migration period (12 August to 15 October), so grass seeding within the BEZ and WEZ areas should be planned for June and no later than 31 July. Late-season seeding near the time of first snowfall may help to stabilize seed for overwintering so that it will emerge in saturated ground conditions in early spring, before geese and other grass-eating fowl appear. Hydroseeding or seeding under fiber mats, especially in high-traffic or sloped areas, can help to encourage growth. Red fescue will be planted and maintained in the airfield and BASH zones per the 2020 JBER BASH guidelines unless otherwise coordinated through the BASH program. Supplemental grasses may include Canadian bluejoint reedgrass and beach wildrye (*Elymus mollis*) ([Appendix C](#)).

Fertilizers must have a nitrogen:phosphorus:potassium ratio of at least 8:12:6. Soil preparation is critical to success. Disturbed sites should have soil tilled to a depth of 4 inches, and 4 inches of topsoil should be used to cover the subgrade. Fertilizer should be thoroughly mixed in, and final grades and elevations should allow for sod placement. Where revegetation is conducted with soil that is naturally high in organics and in natural areas, fertilizer may not be warranted and may give weeds an advantage. Where appropriate, fertilizer may be omitted, but sites must be monitored for establishment until vegetation coverage of at least

70% is achieved. Recommended native seed mixes should be used where practicable (Table 7-7). Seed mixes should be applied at a rate of 43 pounds per acre in dry areas and 30 to 35 pounds per acre in wet areas. If used in a restoration effort, seed mixes may be amended with non-grass herbs such as field locoweed (*Oxytropis campestris*), lupine (*Lupinus* spp.), Arctic wild chamomile (*Tripleurospermum maritimum* ssp. *phaeocephalum*), or Alaska wormwood (*Artemisia alaskana*).

Table 7-7. Native seed mix recommendations for Joint Base Elmendorf-Richardson*

Species	Wet Areas (Percent of Mix)	Dry Areas (Percent of Mix)
Actared/Boreal red fescue	20	50
“Nortran” tufted hairgrass	35	20
“Wainwright” slender wheatgrass	—	15
“Eagan” American sloughgrass	30	—
“Sourdough” bluejoint grass	10	—
Annual rye (cover)	5	15

*Mixes for outside of BASH zones only. Within BASH zones, mix should be 100% boreal red fescue.

Vegetation establishment can be accomplished by seeding, sodding, or sprigging. Seeding can be accomplished by hand-spreader, mechanical drill, or hydro-seeder. Sowing should occur at a rate of 0.5 pound per 1,000 square feet. Sowing should not occur when winds exceed 5 mph, and sowed areas should be protected. Sodding can be accomplished by rolling or plugging. Sod should be laid within 24 hours of being cut and should not be done when the ground is frozen or the sod itself was cut in the dormant stage.

All restoration and/or revegetation projects where seeding, planting, or transplanting is required must include a management plan to ensure proper support and monitoring until 70% of the intended cover crop is established. This will include monitoring growth and watering as needed.

Trees and Shrubs

Trees and shrubs can be successfully planted throughout the growing season; however, spring and fall have the highest success rate since the climate in Southcentral Alaska is drier in the early part of the growing season and wetter in the latter part. Nursery-grown seedlings or saplings should be planted before 15 June but may require more attention to watering, since little rain typically falls prior to mid-July. Wild seedlings can be planted in the spring or fall. Cuttings may be planted as late as 1 July, provided there is adequate moisture. Trees planted after August will typically receive more seasonal rainfall and thus may not require as much attention. Fertilizers used for trees and shrubs must have nitrogen:phosphorus:potassium ratios of at least 5:10:5. The University of Alaska Fairbanks Cooperative Extension, AKDOF, and ADNR’s Division of Agriculture maintain a list of landscape plants for Alaska at <https://alaska.plants.org/>.

7.7.8 Vegetation Management Programs

Mowing

JBER lawns are typically mowed from 1 May to mid-September. The 773 CES/CEOIE mows common areas, parade grounds, athletic fields, and the airfield area on Elmendorf, and a contractor executes mowing operations on Richardson. Airfield mowing procedures are detailed in the BASH Plan per 3 WGI 91-212. 773d Force Support Squadron personnel mow golf courses, ball fields, and recreation areas. Areas are mowed weekly or as required. Golf courses are mowed twice weekly, except for greens that are mowed daily. Mowing schedules for areas near the airfield have been modified due to BASH considerations. These areas are mowed once per summer and then left to grow to a height that deters goose foraging. Mowing

5699 may also be used to control weeds such as reed canary grass, when it is conducted before flowering heads
5700 go to seed.

5701 **Chemical Control**

5702 Chemical control on JBER focuses primarily on common dandelions (*Taraxacum officinale*) and other
5703 broadleaf weeds. Herbicides include KROVAR I® and WEED-B-GON®. All herbicides are applied as a
5704 ground spray, and treated areas include airfield overruns, dikes, lawns, and a small portion of the antenna
5705 fields. In addition to dandelion and weed control applications, the golf course is sprayed with a mix of
5706 fungicides to control snow mold. The mix is varied to prevent development of resistance. No fungicides are
5707 sprayed on the fairway itself. Chemical control operators are from the 773 CES/CEOIE and must be trained
5708 and certified IAW DAF standards.

5709 **Irrigation and Fertilization**

5710 Irrigation is performed primarily at the Moose Run Golf Course from 15 April to 1 October, using
5711 permanent, buried systems of pop-up sprinklers. Greens and aprons are watered twice daily; other areas are
5712 watered daily. Fertilization is currently limited to the golf courses.

5713 *7.7.9 Environmental Considerations*

5714 **Erosion Control**

5715 Erosion control is required to comply with the CWA and the Sikes Act, which requires “no net loss” in the
5716 capability to support the military mission. DAFMAN 32-7003 also requires that land management programs
5717 include soil erosion control.

5718 Soil is damaged through compaction and erosion. Compaction has not been a concern on JBER-E for the
5719 most part, as most traffic (foot or vehicle) is limited to roads and trails. Erosion is a much bigger concern,
5720 especially in connection with roads, military training trails, and disturbed stream banks. During road
5721 maintenance on JBER-E, efforts are made to correct drainage problems that may lead to erosion along
5722 roads. Removing natural vegetation along Ship Creek on the golf courses creates a concern with regard to
5723 stream bank stabilization, so efforts are ongoing to introduce more soil-holding vegetation along this area.
5724 Stream banks are addressed on a case-by-case basis. Banks that show signs of sloughing are a high priority
5725 for bank stabilization through creation of bulkheads or revegetation. All stream bank stabilization and
5726 revegetation efforts will follow the methods outlined in ADF&G streambank revegetation and protection
5727 guidance (ADF&G 2005).

5728 Between 2015 and 2017, erosion control walkways have been installed at Fish Lake, Spring Lake, and
5729 Green Lake to protect sensitive floating mat and mineral soil shorelines from damage incurred by recreators
5730 accessing shorelines.

5731 Soil resources management on FRA consisted primarily of prevention activities and restoration of disturbed
5732 areas. The ITAM Plan (US Army Alaska, draft report, 2011) contains BMPs that work in concert with
5733 stormwater runoff-prevention techniques. Restoration of disturbed areas was conducted by FRA erosion
5734 control and stream bank stabilization programs and by LRAM.

5735 The LRAM decision-making process involves identifying sites that are most in need of repair or
5736 maintenance as a result of damage caused by maneuver training. Priority is given to sites with erosion
5737 problems or access improvement projects that directly support Soldier training. The sensitivity of nearby
5738 areas to siltation is considered since eroding soil will be deposited at some point downslope. Most erosion

control that is not associated with LRAM involves road drainage correction or maintenance. Road drainage maintenance is important for controlling sedimentation.

Sources of dust, runoff, silt, and erosion debris on JBER are controlled to prevent damage to land, water and air resources, equipment, and facilities. A protective vegetative cover is maintained over all compatible areas. JBER uses bioengineered erosion control practices when possible, including live plantings, root wads, coir logs, and spruce tree revetments, to provide erosion protection and habitat for fish and wildlife. Other materials used for erosion control include gravel, fabrics, mulch, and other materials that are environmentally safe and compatible with the site and approved by the ADF&G Habitat Section. When bare ground is required to accomplish mission objectives, other soil conservation measures such as check dams, wind breaks, and diversions are used to control dust, erosion, and sedimentation.

Pollution Prevention

Fertilizer and herbicide use is regularly reviewed to ensure that these practices do not contaminate waterways in landscaped areas. Water sampling is conducted periodically and monitored by the Environmental Management Compliance section. If chemicals are detected during sampling, their necessity and application rates are immediately reviewed.

Wildlife Corridors/Fragmentation

Habitat fragmentation occurs when continuous habitats are broken up into smaller patches. Development, including the building of roads and housing, is a common way in which habitats become fragmented and can impact the connectivity of wildlife populations and their natural migrations. Remnant habitat patches can be of lower habitat quality for numerous reasons, including their increased potential for contact with invasive species and isolation from other patches. Many mammals have home ranges that exceed the size of remnant habitat patches. Thus, a way to mitigate the impacts of fragmentation is to maintain wildlife corridors—safe, connective habitats that allow wildlife to move between patches. Wildlife bridges or tunnels, along with wildlife gates incorporated into fencing, may also aid in creating safe road crossings for wildlife and reduce collision risk to cars. The Central District is a relatively undeveloped area of the base between the JBER-E and JBER-R Districts that serves as a “significant wildlife corridor” (673 ABW 2015). One previous study of radio-collared brown bears found that their main corridors for crossing onto JBER from the east were the Ship Creek and Eagle River bridges and that they used the Central District for travel between Ship Creek and the less-developed portions of the base to the north (Farley et al. 2008). Fencing to restrict moose along Glenn Highway may also limit movement of other wildlife (fox, lynx, wolf, etc.) from east to west. Radio-collared brown bears showed limited use of the Ship Creek underpass under the Glenn Highway, and wildlife game cameras operated by FRA recorded only black bears using the underpass (Farley et al. 2008). Riparian areas without barriers or impediments to movement are natural corridors for wildlife and should be preserved as practicable. Current radio-collar studies on wolves, Canada lynx, and wolverines can provide information on wildlife corridor used by these species (Saalfeld 2023, Saalfeld et al. 2023). This information should be used to guide future development towards areas where use is relatively low and conflicts between humans and wildlife can be minimized.

7.7.10 Gravel Resources

JBER supports most installation-wide construction and paving maintenance with local gravel resources. Gravel resources have also been provided to the Port of Alaska and USACE. [Section 2.4.3](#) discusses issues associated with gravel extraction on JBER. A Gravel Reclamation Priority Plan was prepared in 2019. All extraction sites will be required to meet BMPs and reclamation requirements outlined in the plan. The

gravel resource may be used for military-related construction purposes; the BLM must approve all other uses.

On EAFB, gravel extraction sites ranged in size from less than a quarter acre to pits in excess of 50 acres. Historically, gravel extraction occurred on most land management units, excluding the EOD Creek unit. During 2006, EAFB operated 4 gravel extraction sites, covering 90 acres. Four gravel extraction sites, encompassing 24 acres, were reclaimed between 1995 and 2005. There were 4 inactive sites, requiring reclamation of 8 acres. Future gravel expansion is expected to encompass 90 additional acres by 2035.

Community Partnership and Coordination

Siting of gravel pits, concrete and asphalt debris sites, and clean-fill-disposal sites must be coordinated with the 673 CES Environmental Flight. Other land management activities under this plan must be coordinated with Community Planning, Environmental Management, Pest Management, Civil Engineer Operations, and Force Support Squadron, as appropriate, depending on the type of activity.

7.7.11 Mineral Leasing

Mineral resources on public lands withdrawn for military purposes in Alaska are managed by BLM under federal regulations in 43 CFR, Subchapter C. Sale or free use of mineral materials require EIAP review and JBER concurrence. Unauthorized use of mineral materials is considered trespass and will be resolved jointly by the military and BLM.

JBER has the following minerals management objectives:

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

The BLM identifies several categories of mineral resources on federal lands (locatable, leasable, and saleable minerals), but JBER has been closed to mineral locating, leasing, and extraction since the 1950s.

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

7.8 Forest Management

Applicability Statement

This section applies to DAF installations that maintain forested land on DAF property. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

The primary objective of forest management on JBER is to maintain and enhance the ecological integrity of forested landscapes for supporting the military mission, biodiversity conservation, and maintenance of ecosystems services. Forestlands will be managed for a variety of purposes under the concept of integrated resources management.

7.8.1 Policy and Background

DoDI 4715.03, DAFMAN 32-7003, and the Sikes Act require management of woodlands, forests, and landscaping. These regulations apply to all DoD operations, activities, real property, and property interests owned, leased, permitted, or controlled in the United States, including public lands withdrawn from all forms of appropriation pursuant to public land laws and reserved for use by DoD, as well as state lands used for military training and testing.

DoDI 4715.03, Section 3.9.d(1), states that marketable forest products that require removal, including those on lands designated for privatization, must be disposed of by the Military Service. Revenues from the sale of those forest products will be deposited into the Military Service forestry account. Marketable forest products, including white spruce and birch, shall not be abandoned, destroyed, or donated. Forestry products may be sold for salvage when their condition or value is adversely affected by natural disasters, insect damage, or other events. Forest products include but are not limited to standing timber/trees, downed trees, and pine straw.

The requirements within DoDI 4715.03 and described in DAFMAN 32-7003 are applicable to forestry products outside of the areas withdrawn by Public Land Orders 2676 and 2962.

Roles and Responsibilities

The management of the forestry program on JBER is the responsibility of the 673 CES/CEIEC.

The BLM retains vegetative rights on much of JBER's forest lands under various Public Land Orders. Previously, any management activity involving forest management or removal of vegetation on those lands was coordinated through BLM and receipts were deposited in the General Fund. Proceeds of sales from lands owned by the DAF were retained by the DAF and deposited into DoD forestry accounts. In 2018, BLM and JBER signed the *Memorandum of Understanding Between Joint Base Elmendorf-Richardson and the Bureau of Land Management concerning preparing, reviewing, and implementing the JBER Integrated Natural Resource Management Plan and Management of Vegetation on JBER withdrawn land* (BLM MOU AK-2018-013; JBER-IAA-N214-FY18). That stewardship agreement allowed JBER to manage forestlands on the installation and retain all funds generated by sales of personal use firewood (contracted or permitted) on both Fee Simple and withdrawn (BLM-owned) lands. This may be accomplished through timber sales by contractual agreement, personal-use firewood permit sales, or holiday tree permit sales. Fees charged by JBER for forest products are deposited into the forestry account as required (DoDI 4715.03, Sikes Act, and outlined in DAFMAN 32-7003). Fees fund silviculture treatment efforts, support staffing needs, maintain/procure equipment, and otherwise support the forest management program. These funds will make up a portion of the financial shortfall to be used for forest enhancement and regeneration. These funds are potentially reimbursable and can be used by the installation to support forestry management. BLM coordination will continue prior to any commercial harvest of timber products from JBER. Other large timber sales may still be subject to receipt by BLM, unless otherwise negotiated.

The following procedures will be included:

- Commercial timber sales will be restricted to the portion of JBER owned by the DAF, with timber receipts going to the DAF.
- Timber sales on BLM lands will be coordinated with the BLM and administered by the 673 CES Natural Resources office.

The above procedures will ensure that the US Treasury receives proceeds from wood product sales on BLM lands IAW federal regulations, while ensuring that the DAF receives sufficient timber receipts to partially offset forest management activities and regeneration costs.

On 1 November 2018, a fee-based personal use woodcutting program was launched, allowing the installation to sell firewood to the public for personal use. The number of cords that can be purchased is regularly evaluated to meet the needs of the base's forestry program and public demand. Permits for this woodcutting program are restricted to personal-use firewood only and are separate from JBER's commercial timber sales program ([Section 7.8.2](#)).

Cultural Resource Requirements and Tribal Coordination

Similar to grounds maintenance activities, forestry management has the potential to negatively impact cultural and historical resources on base, and new forestry activities must be reviewed to identify any impacts as outlined in DAFMAN 32-7003, Section 2.25. This review should be informed by archaeological studies and surveys to ensure the identification of any relevant resources or sacred sites and to stay in compliance with NHPA Section 106, NAGPRA, ARPA, and AIRFA.

As with many other aspects of the 673 CES Natural Resources program, Tribal coordination for forestry projects creates new opportunities to preserve culturally significant resources, expand access to those resources, and implement more comprehensive management for the environments in which they are found. One of the most common examples is with the culturally modified trees that are found throughout JBER's forested areas. Culturally modified trees are trees that have been altered or marked to provide waypoints, directions, or serve another purpose. Tribal access to the installation has improved the base's ability to identify and document these resources, which directly supports the JBER cultural resources program and creates more opportunities to implement mutually beneficial forestry projects. Tribal access to the forested areas of JBER is also important because subsistence hunting and gathering is still a common practice for many Tribes, and the installation's forests include many areas that have historically been used for these purposes. JBER will continue to prioritize Tribal coordination and consultation wherever possible to support the needs of each group while improving the installation's ability to sustainably manage its natural and cultural resources.

7.8.2 Forest Management Program Overview and Current Practices

The forest management program is required to support and enhance the immediate and long-term military mission and meet natural resource stewardship requirements set forth in federal laws. The objectives and benefits of forest ecosystem management include sustainment of viable and diversified training lands to meet the military mission; biodiversity of wildlife species and habitat, including habitat for T&E species and species of concern; outdoor recreation opportunities; soil conservation and watershed protection, including erosion control; improvement of air and water quality; sustained production of commercially valuable forest products; and noise abatement.

Management of the forest ecosystem is among the most critical aspects of land management on the installation due to the high percentage of forested land and its importance to military training. The management of forest resources on JBER must consider ecosystem management principles of preservation and manipulation of habitat, conservation of wildlife, outdoor recreation, and public safety. Under ecosystem management, wood harvest levels are determined by management needs, with wood products produced as a byproduct of those activities. Harvest levels will normally be far below the levels allowed for maximum sustained yield. The main priorities for the forestry program are discussed below. The forestry

program heavily overlaps with the JBER wildland fire program ([Section 7.9](#)), with their respective projects providing multiple benefits for wildlife, tree health, and pest infestation rates.

Forest Inventory

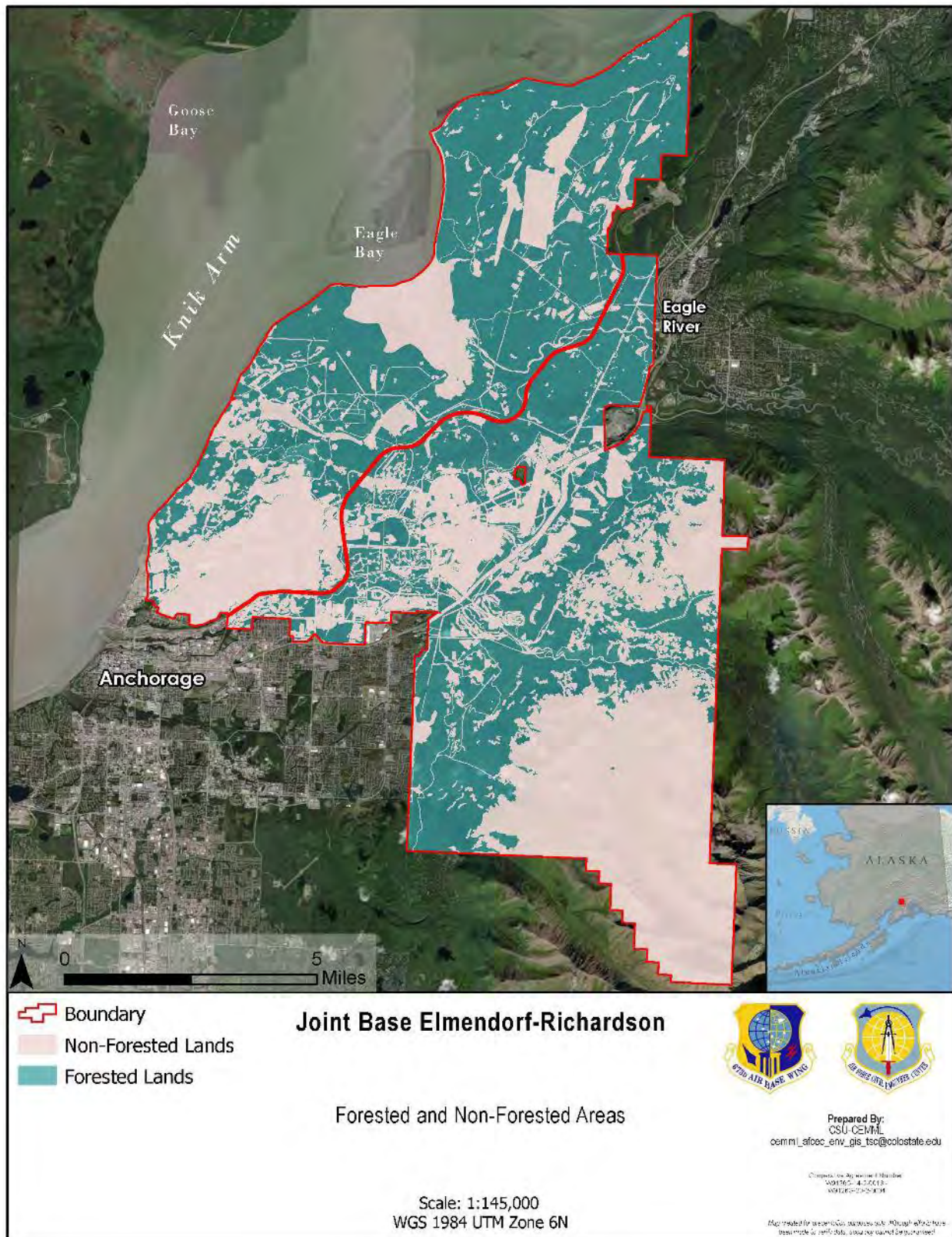
Prior to joint-basing, an initial timber cruise on EAFB occurred in 1982 to 1983 as part of a Natural Resource Inventory (Rothe et al. 1983). Pre-sale timber cruises were also conducted in 1992, 1995, and 1997. Point sampling cruises were conducted for all commercial timber sales thereafter.

In 2012, timber surveys were completed to estimate the value of timber being given away to the public as a result of infrastructure expansion projects. Additionally, in 2013, 687 random cruise points were visited and tree metrics were collected. These data were used to model timber volumes on JBER based on LiDAR and aerial imagery (Smeltz et al. 2015). An additional field survey was conducted during a forest carbon inventory in 2017 to 2018 (Dial et al. 2018).

Forest health and changes over time are monitored using the LTEM plots. LTEM plots are inventoried annually, and data are analyzed to assess ecosystem health and trends. In addition to LTEM plots, forest health assessments occur annually in prioritized spruce stands to monitor the extent and effect of spruce beetle activity and other forest pests and diseases. The best available estimate of the total forest biomass available for JBER was derived from LiDAR; however, continued data collection at LTEM and forest resource plots may be used to refine and validate these estimates.

Changes in spruce growth within wetlands, replacement of hardwoods in beetle-killed spruce-dominated areas, and replacement of dwarf vegetation with low to tall woody vegetation in alpine areas have been documented (Dial et al. 2015).

A breakdown of cover types is shown in [Table 7-8](#). Forested areas are depicted in [Figure 7-6](#). The white spruce–paper birch–aspen cover type comprises the largest proportion of forest, with 16,913 acres. The paper birch–aspen cover type is the next most abundant, covering 11,170 acres. Other cover types are much smaller, as indicated in the table below. Urban forested areas on JBER account for 4,642 acres.



5925

5926 Figure 7-6. Map of forested and non-forested areas within Joint Base Elmendorf-Richardson

5927

Table 7-8. Joint Base Elmendorf-Richardson cover types and acreages

Forest Cover	Acres
Stand Type	
White Spruce	1,207
Paper Birch–White Spruce	4,078
White Spruce–Paper Birch–Aspen	16,913
Balsam Poplar	770
Paper Birch	542
Paper Birch–Aspen	11,170
Quaking Aspen–White Spruce	410
Black and White Spruce–Paper Birch–Aspen	1,432
Black Cottonwood–White Spruce	280
Alder/Bluejoint Grass*	1,532
Other Coniferous*	748
Total Commercial Forest Acreage on Joint Base Elmendorf-Richardson (JBER)	
Total Forest Acreage on JBER	39,053
Total Non-Forest Acreage on JBER	34,053
Military Support Facilities/Developed/Cantonment	13,526
Urban Forested Acreage on JBER	4,642

*Not included in the total commercial forest acreage.

5928

5929 On JBER, the timber stand ages range from 25 to 225 years or longer. Most 50- to 125-year-old stands were
 5930 established after natural or anthropogenic fires, which burned between the turn of the 20th century and the
 5931 mid-1930s. Stands that are younger than 50 years old were established after site disturbances during or after
 5932 World War II and the early years of installation development. The JBER forestry program is working
 5933 toward associating stand-age distribution across all of JBER.

5934 Alaska Statute 44.37.200-220 identifies the need to prepare an assessment and report on the feasibility of
 5935 carbon sequestration and carbon-trading systems in Alaska. In 2018, a study of the total forest carbon
 5936 content within JBER's forested lands was completed. In the future, JBER plans to assess the
 5937 feasibility/viability of establishing a carbon sequestration or carbon-trading program. The goal of this
 5938 project is to accurately reflect the JBER carbon footprint (deficit) and carbon credit projections from
 5939 forested habitats and develop a strategic action plan to gain carbon credits or reduce the JBER footprint, if
 5940 possible.

5941 Additionally, the University of Alaska Fairbanks Cooperative Extension's Cooperative Alaska Forest
 5942 Inventory project has established 3 long-term monitoring plots on JBER, which are revisited every 5 years.
 5943 The Cooperative Alaska Forest Inventory is a comprehensive database of boreal forest conditions that can
 5944 be measured at over 615 plots across the interior and southcentral regions of Alaska, including the Kenai
 5945 Peninsula. Repeated periodic inventories on permanent Cooperative Alaska Forest Inventory plots provide
 5946 valuable long-term information for modeling forest dynamics such as growth and yield in boreal forest
 5947 systems. The University of Alaska Fairbanks Cooperative Extension periodically produces reports on these
 5948 dynamics.

5949 The USDA Forest Service also maintains long-term forest monitoring plots on JBER through their Forest
 5950 Inventory and Analysis program. This program is part of a national effort to evaluate the status and

condition of the nation's forest ecosystems. Permanent research plots were selected along a grid system and marked with silvicultural monuments, typically a tag nailed to a tree. The data collected on the plots are not identifiable to the property, nor is the exact location disclosed, even to the landowner, pursuant to 7 USC, Section 2276. The Forest Service summarizes, analyzes, and publishes these data in statistical and analytical reports. Sites are revisited approximately every 10 years.

Commercial Timber Sales Program

The principal focus of forest management is to support the military mission while pursuing long-term, ecosystem-based management goals that prioritize ecological sustainability over revenue optimization (DoDI 4715.03). Wood production is still an important consideration in that the revenue generated is reimbursable directly to JBER and is used to implement ecosystem restoration projects; however, maximum production is not an installation goal.

Commercial logging began in 1992, with approximately 31 acres logged above Upper Sixmile Lake. A second timber sale occurred in 1995, consisting of 38 acres. A third sale, located near Green Lake (approximately 40 acres), was initiated in 1997, but it received no bids and the sale never occurred. The potential for commercial sales is limited by a lack of personnel and budget, but the base's consistent use of large-scale clearcuts and sanitation harvests continues to present opportunities for commercial sales. While commercial sales have been difficult in the past, they will still be pursued as a cost-effective method for removing excess wood.

Consideration of commercial harvest practices would be guided by reasonable estimates of the annual allowable harvest. Calculations are based on the simple area cut method, which is used to estimate the annual harvest. No more than 50% of the 10-year estimated annual harvest should occur within a 10-year period due to the abovementioned factors that restrict harvestable timber resources, considering temporary or permanent habitat loss since last estimates were obtained; potential future losses due to joint-basing and mission support; protection of important habitat for T&E, candidate, and sensitive species; and maintenance of important wildlife habitat corridors.

Harvest Methods

Clearcuts, seed tree cuts, and selective cutting are options that can be used to regenerate forests. Methods will depend on site conditions and locations and will observe the following guidelines:

- Design of treatment areas is critical. In general, treatment areas should be circular or square rather than long and narrow to maximize response to light and moisture regimes. Borders should appear natural.
- Areas should be 5 to 40 acres. If areas larger than 20 acres are treated, islands of vegetation should be left for wildlife resting areas and escape cover.
- If birch is a desired regeneration species, 7 to 10 seed trees per acre should be retained.
- A minimum of 8 snag trees per acre should be retained, and snags and seed trees should be left in groups to prevent problems with wind-throw.
- Patches of mature forest should be retained near ponds, wetlands, and moose calving areas; logging or other human disturbances should be minimized during calving season (15 May to 15 June).
- Vegetation clearing (to include clearing and grubbing, and other site preparation and construction activities that would violate the MBTA) should be conducted prior to 1 May or after 15 July to avoid take of migratory birds and their nests.
- Animal dens will be considered prior to tree-clearing activities, particularly from October to May.

- No logging will be done within 660 feet of active eagle nests or within 330 feet of inactive eagle nests unless necessary permits are obtained.
- No logging shall be done within 100 feet of anadromous streams and lakes, and only selective logging shall be done within 100 to 300 feet of lakes, streams, recreation areas, or main roads IAW setback requirements ([Section 7.6.2](#)), unless necessary permits are obtained.
- Logging in wetlands should be minimized, and if necessary, conducted in the winter.
- Spruce trees should be harvested between 1 July and 31 December. All spruce trees cleared outside this window will be debarked in place or chipped to minimize risk of exacerbating or spreading spruce beetle activity.
- Summer logging in upland areas should use whole-tree-logging methods to provide some site scarification.
- Logging in sensitive areas should be restricted to rubber-tired or low-pressured track equipment.

Commercial sales will likely be conducted for the purpose of land conversion. In most cases, projects on base are not large enough for commercial timber sales and fall under small-lot sales, which require that salvageable trees with a greater than 5-inch DBH be cut and hauled to established wood lots and made available for the personal-use firewood program. Designated firewood cutting areas are established in several training areas and several more have been located near recent project sites to reduce hauling costs. Each project is treated on a case-by-case basis. Where the wood is ultimately located depends on available/adequate spacing, hauling routes, proximity to the site, and access for woodcutters. Where possible, sales will be timed to coincide with improved market conditions.

Personal-Use Forest Product Sales Program

A personal-use woodcutting program began in the early 1970s. The removal of dead and downed wood from designated areas averaged less than 100 cords per year prior to 1987. In 1987, a fee schedule was initiated for the sale of personal-use forest products, including a personal-use holiday tree cutting program that sold 550 permits at \$5 a tree. Between 2010 and 2014, JBER did not collect fees for forest products, and thus, it did not contribute to the DAF reimbursable forestry account and was not eligible for reimbursable funds to support the program.

Much of the firewood sold has been generated by numerous development projects that resulted in forest clearing. Projects on base that include tree removal are required to cut and stack salvageable trees for firewood and make them available to the public. Specific areas are also opened to allow dead and downed wood to be salvaged by wood cutters. Opening specific areas for public woodcutting in these areas helps support stand management and forest health projects where limited personnel and funding has restricted forest management efforts. These areas are usually areas that typically have sustained damaged from high wind events or have been affected by beetle kill. Other areas where firewood collection is allowed include project areas where clearing, thinning, or other management strategies have been executed by JBER Forestry or 11 ABN DIV Range Management crews.

Holiday tree harvest is offered in designated lots. In 2018, holiday tree lots were designated in areas where small, replacement-level trees were abundant in otherwise mature spruce stands. Thinning the understory reduces crowding and improves growing conditions for maturing spruce, reducing stand vulnerability to disease and pests such as spruce beetles. Holiday tree cutting is typically allowed between Thanksgiving weekend and 31 December. Only 1 tree is allowed per user with a valid recreation permit. Holiday tree permits remain free under the current personal use harvest program. [Table 7-9](#) depicts the forest product permit sales from 2014 to 2023.

6036

Table 7-9. Joint Base Elmendorf-Richardson forest product permit sales

Year	Firewood	Holiday Trees
2014	609	374
2015	431	345
2016	629	206
2017	541	317
2018	586	155
2019*	420	128
2020	572	139
2021	295	168
2022	89	174*
2023	127**	93

*Approximate number of account validations issued.

**Change in services resulted in an approximately 1-month gap in permit data.

6037

6038 Not all authorized woodcutters harvest the total amount of wood that they are allowed to collect. An
 6039 accurate harvest record is not attainable through the RecAccess system since many recreators fail to sign
 6040 in, sign out, or complete the harvest record properly.

6041 **Forest Stand Management History**

6042 Prior to joint-basing, a Forestry and Wildland Fire Management Plan was developed as a component of the
 6043 Fort Richardson INRMP (US Army Garrison Alaska 2007). This plan covered the management,
 6044 maintenance, protection, and improvement of forest vegetation on US Army Garrison, Alaska-managed
 6045 lands, including Fort Richardson.

6046 Forest management aims to benefit both the military mission and native ecosystems. Activities may include
 6047 manipulation of forest structure (e.g., thinning, seedling, planting) for a specific mission (e.g., creation of
 6048 security buffers, visual screens, or noise buffers). Forest stand management incorporates annual silviculture
 6049 treatments, including thinning, seed tree cuts, and selective cutting of live or dead trees. Methods will
 6050 depend on site conditions and location. The ITAM program monitors training areas to identify hazardous
 6051 trees that must be removed so that the military use of the training areas is not jeopardized.

6052 JBER NRMs will continue to work with BLM, AKDOF, and WSM on a Forest Management Plan in
 6053 association with the BLM MOU.

6054 **Management for Spruce Beetles and other Forest Pests**

6055 Spruce beetle mitigation is a priority for the forestry program due to the long-term forest and wildland fire
 6056 impacts that result from beetle infestation. A major outbreak of spruce beetle began on JBER during 1991
 6057 to 1992 and spread to portions of Chugach State Park. Severe infestations can effectively girdle a tree,
 6058 killing it. More than 80% of the mature white spruce on JBER was killed by 2001. Several sawmill operators
 6059 requested permission to buy beetle-killed spruce and remove it. This mutually beneficial arrangement
 6060 resulted in the removal of many dead trees in a contracted portion of Elmendorf, north and west of the
 6061 airfield. Additionally, ITAM cleared other stands in the creation of new firing points. Other areas,
 6062 particularly along Poleline Road in Training Area 411 and 412 and on Clunie Lake Road and to the north

in Training Areas 402, 403, 404, and 405, were authorized for woodcutting to encourage removal of standing dead spruce. By 2017, most of the beetle-killed timber had been removed from the affected areas.

In 2016, the AKDOF observed a marked increase in the abundance of spruce beetles, including pockets of increased activity on JBER. By 2018, large tracts of spruce forest throughout the Matanuska-Susitna Borough, from Wasilla to Denali State Park, had been decimated. The 2017 forest health conditions report (US Forest Service and State of Alaska Department of Natural Resources 2018) noted that, by the end of 2017, more than 400,000 acres of spruce forest had been destroyed in Alaska since the previous year, which was more than twice the acreage destroyed between 2015 and 2016. JBER incurred a significant increase in spruce mortality in stands near Green and Spring Lake, as well as in several stands in Training Areas 401, 402, and 403. A trap tree study conducted in the Green/Spring Lake stand showed that spruce beetles, which typically have a 2- to 3-year life cycle, were producing callow adults within a year. This is likely due to sequential mild winters and wet summers that were prolonging the active development of larvae in spruce trees.

Spruce beetle activity is stimulated by vulnerable stands of spruce, including large (greater than 8- to 10-inch DBH), mature white and black spruce trees with slow or suppressed growth, which may result from overcrowding, climate conditions, or mechanical damage from storms, clearing, or other anthropogenic activities. Mechanized land clearing along utility corridors or clearing for training areas have direct and incidental effects on spruce trees, which are then highly attractive to beetles and less likely to survive an attack. Several large stands of spruce and spruce–birch forest had been cleared for flightline safety and expansion of Army training ranges. Spruce were stockpiled for firewood, but they were not collected and burned before emergence of the beetles occurred the following year.

Response was initiated in 2017 to minimize the further spread of spruce beetles on JBER; however, the infestation continued to intensify. Removal efforts of dead and infested trees were initiated and will be continued as needed to limit the proliferation of pests, manage affected stands, and minimize wildland fire risk and degradation of natural training areas and wildlife habitat. The rate of tree removal will be regularly reassessed based on changes in the rate of tree death and infestation or expected mission/land use changes. Forest areas with active infestations will not be opened for general firewood harvest or other activities unless strict BMPs are employed.

BMPs to limit the effect and spread of spruce beetles and other pests include the following:

- Sanitation or large-scale harvests of spruce should take place between 1 July and 31 December to maximize the drying/mortality of spruce outside of the beetle flight window. Trees that have been dead for a while are less attractive to beetles and can be removed without any issues. Fresh and recently cut spruce, even completely downed, are attractive to beetles and need to have their bark stripped. Selective cutting should occur following a larger harvest for trees that are still showing signs of infection.
- Sanitation cutting is implemented for affected trees that have a greater than 5-inch DBH.
- Harvested spruce of less than 6-inch DBH should be chipped and disposed of in place.
- Harvested large (>8-inch DBH) spruce using mechanized land clearing or hand-removal in or near (within 1 mile) heavily infested areas must be delimbed and debarked in place. Spruce stockpiled for firewood harvest must be segregated from other tree species.
- Firewood harvesters should be certain to split and burn all spruce firewood by May of the following year.

- 6105 • Mechanized land clearing, including for range activities, construction site preparation, and utility
6106 installation/maintenance, must be conducted conservatively to avoid incidental damage to trees to
6107 be left in place.
- 6108 • Harvested trees should be mulched or burned before the following spring to prevent future
6109 outbreaks resulting from beetles emerging from the downed material.
- 6110 • Preemptive management will be implemented where possible and may include sanitation harvests
6111 to reduce overcrowding and other potential sources of stress for JBER's forest communities.
- 6112 • Pesticide application will be used only for culturally valued trees where practicable due to the high
6113 financial and time cost of the treatment method.

6114 Stand management to improve habitat value and reduce vulnerability to forest pests will be implemented
6115 where possible. Selective harvest, small patch thinning, and understory clearing are options to create stand
6116 diversity and promote strong and healthy growth. Placement of insect traps or falling of trap trees can be
6117 effective in areas with small infestation to minimize spread. Infestations occurring in the cantonment area
6118 may be dealt with by insecticide use ([Section 7.7.7](#), [Section 7.11](#)).

6119 In response to the current outbreak, JBER will continue to monitor affected stands through roadside surveys
6120 and aerial surveys coordinated with AKDOF and the Alaska Army National Guard. Roadside and aerial
6121 surveys were conducted in 2017, 2018, and 2019. Between 2020 and 2023, the University of Alaska
6122 Anchorage's Applied Environmental Research Center (AERC) conducted additional surveys of spruce
6123 beetle-impacted stands, assessments, selective tree harvests, and processing of downed and hazard trees.
6124 These surveys occurred during summer field seasons and provided stand metrics and management
6125 recommendations for varying levels of spruce beetle infestation within forest tracts. Processing activities
6126 included hand-thinning with chainsaw (selectively felling and small patch harvests), bucking and stacking
6127 hazard trees, limbing felled trees, and cutting logs to sizes conducive to collection by woodcutters
6128 ([Appendix G](#)).

6129 Future surveys will be conducted annually in late May to early June, when newly matured beetles will be
6130 fleeing dead spruce in search of fresh, mature trees in which to lay eggs. This is the time period when spruce
6131 die very quickly, turning from green to bright yellow in a matter of weeks and to red shortly thereafter, just
6132 before all the needles fall, which is the final indication of mortality.

6133 Common local defoliating insects include the mourning cloak butterfly (*Nymphalis antiopa*), spear-marked
6134 black moth (*Rheumaptera hastata*), large aspen tortrix (*Choristoneura conflictana*), and the spruce
6135 budworm (*Choristoneura* spp.). Some minor insect defoliation problems exist, especially with aspen tortrix
6136 on the bluff area above the Port of Alaska facility. Fungal heart rot is common in birch over 80 years old.
6137 This is not entirely negative, however, as this process creates cavities for cavity-nesting wildlife species.
6138 Tomentosus root rot (caused by the fungus *Onnia tomentosa*) spreads through root contact of afflicted and
6139 healthy trees. Root rot centers may remain active in dead trees for years, and infected trees may exhibit
6140 growth reduction, decay, and mortality (AERC 2021a). Tomentosus root rot impacts spruce trees and can
6141 cause trees to become more susceptible to spruce beetle populations, further exacerbating the spread and
6142 impacts of the beetle epidemic.

6143 A geometrid moth (*Geometridae* spp.) outbreak, which peaked in 2011, defoliated a large expanse of forest
6144 near Arctic Valley Road. This outbreak affected 5 species of trees in the area. This area will be monitored
6145 for these moths and for recovery. In fall 2011, sawfly (Hymenoptera) larvae were found attacking several
6146 species of spruce around JBER. MWH Global, Inc. (2015b) conducted general forest health observations
6147 in 2014. These areas will continue to be monitored for management needs and recovery. A wildfire hazard

6148 assessment ([Section 7.9](#)) must also be performed regularly to determine where fuel reduction is most
6149 necessary and areas that are fire-prone.

6150 **Windthrow and other Disturbance Events**

6151 In September 2012, JBER experienced a 100-year wind event that significantly disturbed the forest. This
6152 wind event was coupled with multiple flood events and severely saturated soils around the same time. The
6153 combination of saturated soils and high winds prior to the freeze-up made this forest a prime candidate for
6154 severe wind-throw. This event impacted the entire base and varied in intensity, affecting up to 50% of the
6155 trees in some stands. Although it was not officially recorded, microbursts were suspected to have occurred,
6156 based on the patterns of windthrow observed in some stands. An event of this magnitude poses significant
6157 forest health concerns as trees die and become targets for forest pests, fallen and snagged trees serve as
6158 hazards in the natural training environment, and the stands become more vulnerable to wildfire.

6159 **Flightline Safety**

6160 Flightline safety projects to remove trees and water hazards near the flightline have required clearing of
6161 approximately 183 acres of spruce and mixed spruce–birch forest, particularly on the north end of the east-
6162 west runway. At the south end of Runway 34, approximately 146 acres were selectively cleared to reduce
6163 tree height in the area and the risk of accidental ignitions that may result from large amount of dry, standing
6164 fuels. Due to presence of Ship Creek and riparian areas, the area south of Runway 34 was not clearcut. In
6165 2021, approximately 2,016 paper birch seedlings were planted in the area to maintain forest habitat and
6166 minimize potential land conversion to open grassland that would encourage raptor hunting. In 2023, similar
6167 projects began on the west end of Runway 06, covering approximately 63 acres. An Airfield Forest
6168 Management Plan includes details on the rotational survey, cutting, and planting within the approach and
6169 departure corridors ([Appendix C](#)).

6170 At the time of this INRMP update, multiple artificial plantings are being programmed to support forested
6171 and riparian areas while regenerating areas that had recently experienced a large-scale die-off. Survey
6172 details will be added once these plantings have been implemented.

6173 Runway approach/departure corridor environments will continue to be managed as medium-growth forests,
6174 and their vegetation will be maintained so that it does not create flight safety hazards.

6175 **Forest Stand Management Practices**

6176 Snagged and downed birch and standing dead spruce pose specific hazards as ladder fuels that may spread
6177 ground fires into the tree canopy. These areas were targeted for cutting by JBER emergency services during
6178 annual training exercises and by forest management crews in the Natural Resources and ITAM programs.
6179 Once the snagged trees were downed, areas were opened up for public firewood collection.

6180 Holiday tree cutting areas will be prescribed in locations where thinning smaller (<20 feet tall) spruce will
6181 decrease the overall stem density and improve growing conditions for maturing spruce. This strategy may
6182 also be employed for small patch stand management, as was executed near Sixmile Lake (Talley Avenue)
6183 in 2016 and 2017.

6184 Forest management activities continue to be prioritized where spruce beetle-killed, wind-thrown, standing
6185 dead, or otherwise downed trees are a hazard to training troops or where wildlife habitat could be improved
6186 or ladder fuels reduced, especially near firing ranges. Silviculture treatments in withdrawn lands will not
6187 harvest more than 70 acres of live trees or more than 250 acres of dead or dying trees on an annual basis.
6188 Silviculture prescriptions will be prepared for each area prior to the field season that discuss forest

6189 management plans, such as thinning, harvesting, planting, and pruning. Personal-use firewood cutting and
 6190 holiday tree harvests also function as minor thinning operations that further support silviculture treatments
 6191 in designated areas.

6192 **Forest Management Planning**

6193 Unless federal standards (including those within this document) are stricter, forest management and harvest
 6194 activities will meet AKDOF standards, as specified in the Alaska Forest Resources and Practices Act.

6195 BMPs and Safety Practices

6196 JBER incorporates forestry BMPs from the Alaska Forest Resources and Practices Act to minimize impacts
 6197 to the environment resulting from forest management activities. The DoD, however, may be held to higher
 6198 federal standards (including those within this document) than those expected of private landowners. The
 6199 BMPs set forth by AKDOF include specific guidance for timber harvests.

6200 On JBER-R, a high percentage of the standing timber within the training lands is currently or has historically
 6201 been located within a range safety firing fan for several live fire ranges. Consequently, these trees have
 6202 accumulated a buildup of copper-jacketed or plain lead bullets or other unexploded ordnances through
 6203 weapon ricochets and in-line firing. Public safety should be of primary concern if these areas are considered
 6204 for any future harvest. This phenomenon is considered in the draft Forest Management Plan. However, such
 6205 areas would be targeted in the carbon sequestration research because of the land-use restrictions in place.

6206 The Range/ITAM community often fully uses trees that are contaminated with munitions residue during
 6207 training land and range project upgrades. These contaminated trees are mulched with a hydro axe machine
 6208 and the resulting wood chips are used for soil erosion control and stabilization. Identification of stormwater
 6209 BMPs is required within a project SWPPP, and this procedure enables good stewardship of on-site timber
 6210 resources that may be considered unsuitable to sell or give away to the public in light of safety concerns.

6211 Regeneration

6212 Artificial site regeneration should be conducted only on sites that have been properly prepared by
 6213 scarification or fire when possible. The Alaska Forest Resources and Practices Act requires that sites show
 6214 an adequate stem count within 7 years of harvest. For sites cleared by woodcutters or natural resources
 6215 personnel, a regeneration survey must be conducted 5 years after harvest. If it appears that the site will not
 6216 achieve required stem counts, artificial planting of white spruce seedlings or hydro-axing to encourage
 6217 sprouting will be considered, depending on regeneration objectives for that land management unit and sale
 6218 location.

6219 The 2 most recent commercial clearcuts on JBER required artificial site regeneration to bring stem counts
 6220 up to adequate levels. Current development/construction that results in land clearing operations requires no
 6221 regeneration efforts, primarily due to land-use conversion.

6222 Artificial regeneration was also used to compensate for spruce beetle damage between 1998 and 2003.
 6223 Boy/Girl Scouts planted approximately 20,000 white spruce seedlings during that time.

6224 Regeneration should be conducted with the following considerations:

- 6225 • Any new construction should consider using already disturbed areas.
- 6226 • Any disturbed areas not being used should be reforested, provided that this land use is appropriate.
- 6227 • New disturbances should ensure adequate wildlife corridor/habitat management considerations.

- Any gravel extraction sites will include adequate funding for reclamation of those sites back to forested habitat.
- New reforestation efforts should ensure BMPs are applied to minimize invasive species and disease introductions. Local seeds (certified weed-free), seedlings, planting sprigs, or cutting cultivation are recommended.

Reforestation plans will be developed for sites regenerated after harvest, disturbance, or large-scale die-offs. Plans will define site preparation, regeneration technique, seed/seedling source, planting technique, spacing, stand type, and composition to be achieved by the target year. Stand maintenance/improvement treatments will be outlined. The plans will meet 3 WGI 91-212 BASH standards to avoid conflicting with aircraft operations or attracting wildlife. Plans will emphasize replanting native trees in areas that are not designated for construction, range projects, or other mission-related use and will focus on natural regeneration or use of seedlings propagated from local seed sources where possible.

Natural resources personnel will periodically conduct site visits to ensure that minimal regeneration standards from the Alaska Forest Resources and Practices Act and objectives of reforestation plans are met. Land should be reforested as soon as possible or within 7 years after harvest.

Moose Browse

JBER monitors and manages multiple moose browse plots to encourage the growth of birch, aspen, and willow seedlings. Browse areas generally contain large amounts of woody vegetation that is used primarily during the winter to subsidize the lack of food throughout the forests. These areas are an essential management tool that minimizes moose-human conflicts on walking trails, ranges, and roads by drawing moose away from high-traffic areas. These areas are typically created a half-mile away from high-traffic areas and are planned in coordination with range control to limit impacts on the mission.

Prescribed fire is an important aspect of moose browse management, and JBER will pursue prescribed fire in low-conflict areas to limit the increasing browse cover in Fire Management Unit (FMU) 2 ([Section 7.9.1](#)). Prescribed fires for moose browse management are being implemented only on the McLaughlin Range Complex, but natural resources personnel have identified alternative areas that would benefit from a reduction in standing fuels and additional moose browse. When prescribed burns are not possible, selective cutting followed by scarification can promote the growth of preferred species. Management techniques that support moose browse are often similar to those used to manage and mitigate the impact of spruce beetles and will be implemented as needed for the respective forestry programs (AERC 2023).

Seed Collection

The base's extensive sanitation harvest and clearcutting projects provide an opportunity to collect native species seedlings for future use, instead of relying on program funds to buy seedlings from nurseries. JBER is looking into collection projects that will support future reforestation areas. The JBER forestry program can also coordinate with grounds maintenance personnel to identify unmanaged areas that can be used to grow seedlings in-house, further reducing the funds needed for reforestation projects.

7.9 Wildland Fire Management

Applicability Statement

This section applies to DAF installations with unimproved lands that present a wildfire hazard and/or installations that use prescribed burns as a land management tool. This section **IS** applicable to this installation.

6269 *Program Overview/Current Management Practices*

6270 *7.9.1 Policy and Background*

6271 The WFMP ([Appendix B](#)) is a supporting document for the INRMP, as outlined by DAFMAN 32-7003. It
 6272 also supports a coordinated approach to wildfire response and risk mitigation that includes Fire and
 6273 Emergency Services (FES), 11 ABN DIV Range Operations, 673 ABW natural and cultural resources
 6274 personnel, and the AFCEC Wildland Fire Branch (AFCEC/CZOF). The WFMP addresses the fire-related
 6275 goals and objectives identified in the INRMP, as well as those of the Wildland Fire Management Program,
 6276 Fire Chief Policy 313, and the JBER FES Standards of Cover for wildfire response. Implementation of the
 6277 WFMP will assist with the achievement of fire-related resource management and mission-support
 6278 objectives.

6279 The WFMP was developed to provide guidance for the suppression and prevention of wildfires on JBER
 6280 lands and to implement ecosystem management and fuels-reduction goals using mechanical fuel treatments
 6281 and prescribed fire. The FES Wildland Fire Program Coordinator, NRM, Range Control, and WSM update
 6282 the WFMP annually to ensure consistency with INRMP goals and objectives. The largest priorities
 6283 identified in the WFMP include implementing and constructing firebreaks and other mitigation measures,
 6284 reducing fuels on live-fire ranges that have a high risk of unplanned ignitions, and reducing fuels with
 6285 sanitation harvests.

6286 Additionally, planning for wildland fires must include consideration of effects on cultural resources and
 6287 resources of concern to Tribes. The WFMP should include protocols for responding to wildfires and
 6288 appropriate responses for protecting cultural resources when possible. The WFMP includes a cultural
 6289 resources checklist, which cultural resources personnel should use to evaluate cultural resource concerns
 6290 prior to implementation of wildfire projects. A wildfire/cultural resource planning matrix and map book are
 6291 in development for inclusion in the next ICRMP and WFMP. This includes analysis of the positive and
 6292 negative effects of preventative measures on specific resources or classes of resources (e.g., reducing the
 6293 probability of damaging fires through removal of biomass, increasing defensible space around structures
 6294 and archaeological sites, and maintaining cultural landscapes).

6295 The overarching goal of wildland fire management on JBER is to maintain the safety of the public and
 6296 firefighters. JBER FES is currently responsible for suppressing wildland fires, and the FES Fire Chief is
 6297 responsible for ensuring wildfire readiness and response for the installation and for ensuring that the WFMP
 6298 accurately reflects FES policies, roles, and responsibilities. Management of forest resources to reduce forest
 6299 fuel loads should be coordinated with the NRMs so that they can track management actions. The Incident
 6300 Commander will supervise wildfires and is responsible for all incident activities, including the development
 6301 of incident management strategies and tactics and the ordering, deployment, and release of resources. JBER
 6302 has a Mutual Aid Agreement with the Municipality of Anchorage for fire response. The JBER FES has an
 6303 interagency agreement with AKDOF for fire suppression activities on a cost reimbursement basis. In 2018,
 6304 AFCEC/CZOF established the JBER WSM to provide a high-quality, mobile, qualified, and experienced
 6305 resource for installations to implement the goals and objectives of the WFMP. The WSM will maintain
 6306 expertise to plan and conduct prescribed fire, accredited training delivery, and mechanical fuels reduction
 6307 services. The JBER WSM provides technical expertise in the areas of long-term planning, ignitions, holding
 6308 and suppression, prescribed fire preparation and implementation support, hazard fuels reduction, and fire
 6309 effects monitoring so that fire can fulfill its natural and historical role. The WSM will extensively coordinate
 6310 all activities with the installation natural and cultural resources staff and FES to ensure all actions are
 6311 aligned to a common goal.

6312 Prescribed fire can be a cost-effective tool to protect, maintain, and enhance military training environments.
 6313 However, wildfires are also a concern because of their impact on human activities, structures, and military
 6314 operations.

6315 Fire may have had a more important influence on ecosystem functions in the Anchorage area during pre-
 6316 colonial times. Wildfires were prevalent in the 1800s and early 1900s, as indicated by early to mid-
 6317 successional forest stages that have developed since then (Jorgenson et al. 2003). Forty-eight percent of
 6318 JBER-R over the past 200 years has been affected by fire (Jorgenson et al. 2003). Since 1939, the largest
 6319 wildfire in JBER's records burned 3,000 acres.

6320 Although wildfires are a concern at JBER, large fires are rarely a significant problem due to current risk
 6321 reduction and management activities. Numerous fires have been recorded in the Matanuska-Susitna Valley
 6322 to the north, but no major fires have occurred on FRA since 1950 (Jorgenson et al. 2002). However, severe
 6323 drought conditions occur about once every 20 years, which can increase wildfire risk (US Army Alaska
 6324 1998). The ongoing spruce beetle outbreak has also resulted in spruce mortality and higher dry fuel loads,
 6325 increasing potential for severe wildfire. From 2021 to 2023, an average of 28 wildfires has occurred
 6326 annually. These fires are usually mission-related, small, and easily contained. A number of firebreaks are
 6327 developed on JBER-R, which the ITAM GIS metadatabase includes as a data layer.

6328 The most likely location of a wildland fire is near the Grezelka Range, which is actively managed for
 6329 wildland fire. Grezelka Range is an example of a grass-dominated system that is bordered by forest, where
 6330 ignition from tracer (flare) rounds could ignite the grass and spread to the adjoining forest or ignite directly
 6331 into the surrounding forest. Wildland fire management practices in such areas include prescribed burning
 6332 to reduce grass fuels and thinning and clearing of ladder fuels in up to 200 feet around the edges of the
 6333 ranges, at their interface with the forest. A network of trails and firebreaks are also actively managed around
 6334 firing ranges and interfaces with the adjoining community to minimize risk of wildland fire escape.

6335 Since 2015, prescribed fire has been conducted throughout JBER in all active firing ranges, including
 6336 throughout the Richardson Training Area Small Arms Complex, Infantry Squad Battle Course, Biathlon
 6337 Range, Infantry Platoon Battle Course, Digital Multipurpose Training Range, and Malemute Drop Zone. In
 6338 addition to fuels reduction, JBER actively seeks opportunities to use prescribed fire within the Richardson
 6339 Training Area to enhance natural habitats. Opportunities include moose habitat enhancement, site
 6340 preparation for seeding or planting, restoration of natural plant communities, management of tree diseases
 6341 and pests, and invasive plant species control in conjunction with integrated pest management strategies.
 6342 Additionally, in a technique referred to as "fire-use-fire", unplanned ignitions may be turned into managed
 6343 wildfires to achieve fuel reduction and suppression goals, as well as natural and cultural resources
 6344 management objectives so that they are consistent with the WFMP, FMUs, and protective of sensitive
 6345 resources ([Figure 7-7](#) and [Figure 7-8](#)). The Incident Commander will assess and implement the use of this
 6346 and any other techniques as needed for mission and ecological goals.

6347

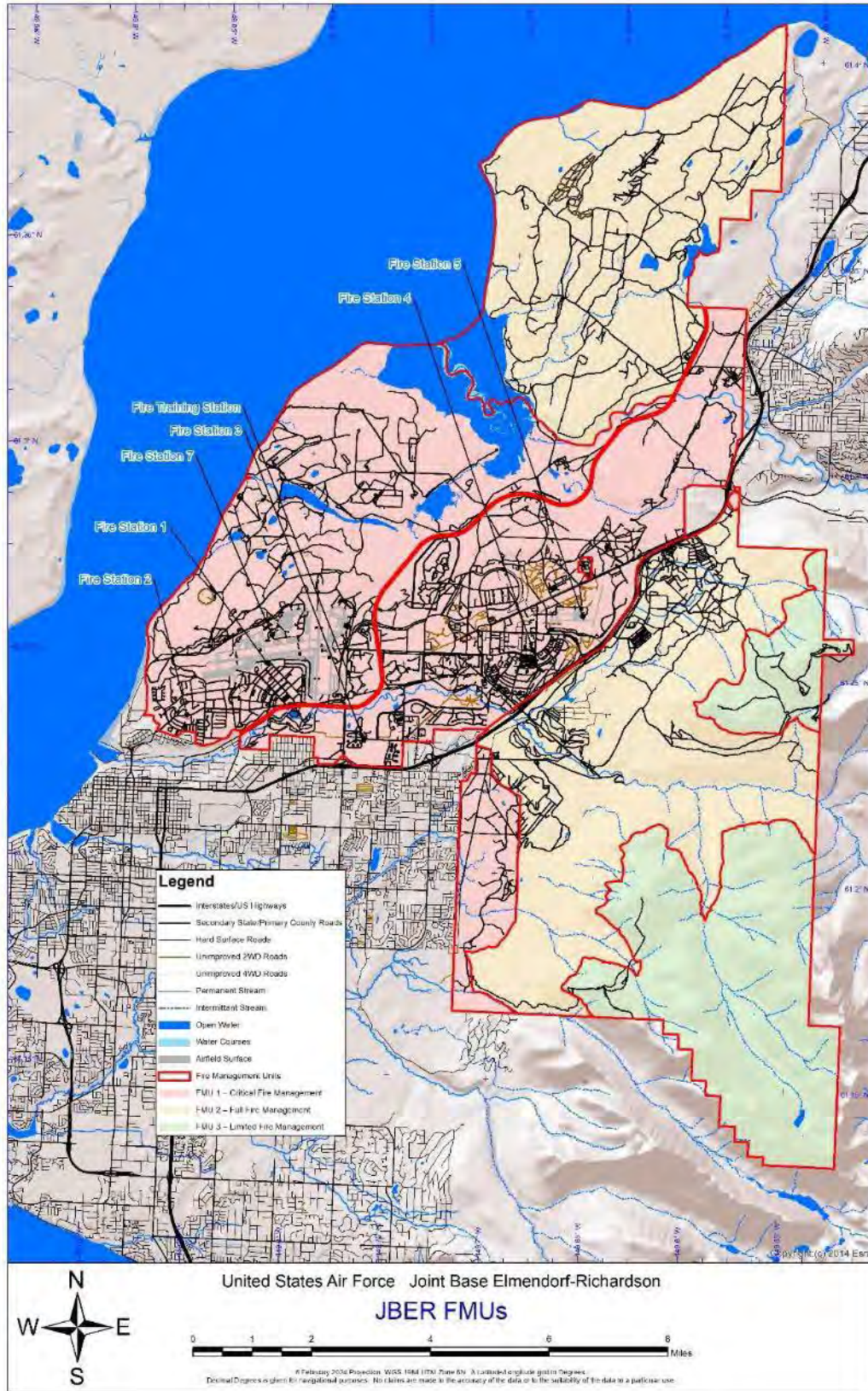


Figure 7-7. Map of Fire Management Units (FMUs) within Joint Base Elmendorf-Richardson

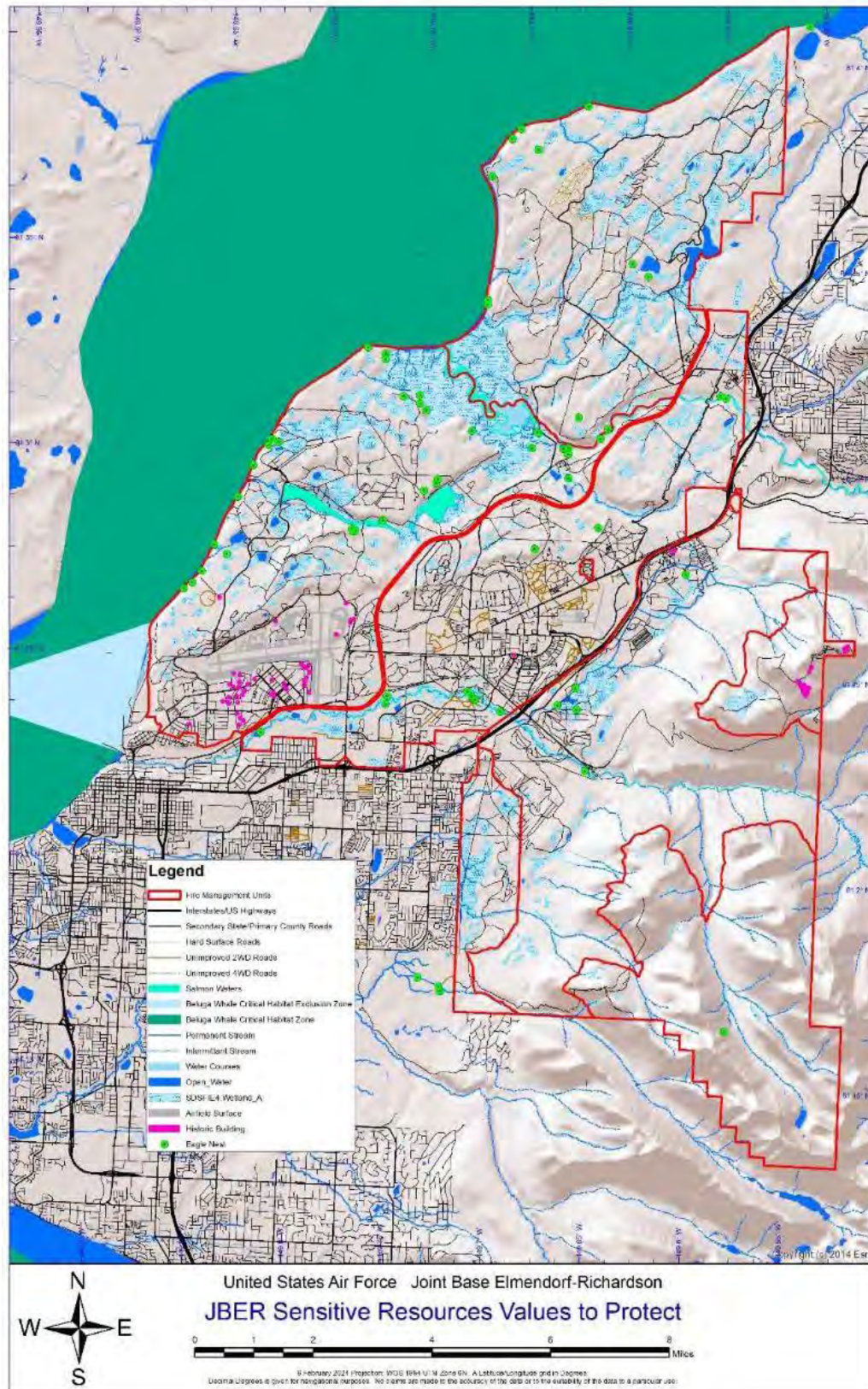


Figure 7-8. Map of sensitive resources within Joint Base Elmendorf-Richardson

FMU 1 is a critical management priority, and the primary response to all wildfires in this FMU is full suppression. Nearly 93% of this FMU is considered burnable. North of the Glenn Highway, FMU 1 encompasses the developed cantonment area with interspersed forests, natural and undeveloped areas of JBER-E, and all training areas and portions of the ERF Impact Area south of Eagle River. South of the Glenn Hwy, FMU 1 includes undeveloped and semi-improved lands in Training Areas 424, 425, and 429, adjacent to neighboring communities. Wildfire in FMU 1 poses risk to federally protected species (ESA and BGEPA), anadromous waters, wetlands, sensitive historic properties, and religious and culturally significant resources. Federally protected species such as Bald Eagles consistently nest along Ship Creek and Eagle River, around Otter and Sixmile Lakes, south of Eagle River Impact Area, and along the coast. While wildfire along Grady and Richardson highways could ultimately accelerate carbon cycling where spruce mortality is severe, fire could increase moose browse in areas that could worsen conflict with moose. Wildfire within the Ship Creek corridor could impact anadromous waters by altering their physical and chemical properties, increasing erosion, and degrading the ecohydrology of hardwood forests. While use of prescribed fire is not prohibited in this area, it will not be widely used for natural resource purposes, particularly around the cantonment.

FMU 2 is a full management priority, in which primary response may be full suppression or modified suppression strategies such as managed wildfire to achieve natural and cultural resource management goals. FMU 2 encompasses all training areas and portions of the ERF Impact Area north of Eagle River and lowland and subalpine zones outside of FMU 1, south of the Glenn Highway. Ninety-nine percent of this FMU is considered burnable. Resources at risk include federally protected species (ESA and BGEPA), anadromous waters, wetlands, and sensitive historic properties and resources of religious and cultural significance. Bald Eagles consistently nest along the coast and at Thompson and Waldon lakes, Eagle River, the Small Arms Complex, Ship Creek, and McVeigh Marsh. Severe wildfires within wetlands may degrade wetland function, and fires along creek or river corridors may increase erosion and alter the physical and chemical properties of anadromous waters. Where ladder fuels or dry fuels have accumulated, prescribed fire or managed wildfires may be used to remove those fuels and reduce risk of subsequent unplanned ignitions, with consideration given to natural and cultural resources at risk. Additionally, where fuels have accumulated, fire use may be beneficial in accelerating carbon cycling, stimulating growth of native species, or clearing dead debris and litter from sites that may benefit from replanting. The Small Arms Complex is the most likely area where unplanned ignitions may become wildfires.

FMU 3 is a limited fire management priority, in which a full range of suppression strategies may be used. FMU 3 encompasses all alpine areas. Nearly 100% of this FMU is considered burnable. No ESA-protected species occur in this area. Golden Eagles may occur in FMU 3; however, only 1 nest exists in the cliffs of Snowhawk Valley. Wetlands and streams occurring in alpine areas feed into anadromous systems. Nike Site Summit, a site nominated for National Historic Landmark status, is within the northern area of FMU 3 and will be protected as Wildland–Urban Interface.

Although natural wildfires were historically a part of the natural ecosystem, increased potential for unplanned ignitions from military activities and heavy dry-fuel loading due to the spruce beetle outbreak have increased the risk of more severe wildland fires. Suppression activities in conjunction with preventative prescriptive habitat management achieves INRMP Goals 1, 2, and 3 by reducing the risk of severe wildfires that could destroy natural habitats, public use opportunities, and cultural resources.

Cultural Resource Requirements and Tribal Coordination

As described in [Section 7.8.1](#), forest management activities have the potential to impact cultural resources and sacred sites. To comply with the requirements of NHPA Section 106, NAGPRA, ARPA, and AIRFA

6396 as outlined in DAFMAN 32-7003, all new wildland fire-related management activities should be reviewed
6397 to assess their impacts on these resources and sites.

6398 7.9.2 *Wildfire Prevention*

6399 JBER FES takes weather readings daily with the morning shift dispatcher. Fire weather stations are located
6400 at the Small Arms Complex and in the Multi-Purpose Training Range. Weather readings are reported as a
6401 fire weather index, which is available on a shared computer drive. The fire weather index is completed and
6402 emailed by 0630 daily. This index is used to calculate a fire danger rating.

6403 The fire weather index is used to establish the daily fire danger rating. This fire danger rating is provided
6404 to Range Control, which restricts the use of munitions and pyrotechnics as fire danger increases, according
6405 to their incendiary risk.

6406 Most of the fires are human-caused. Most military activity occurring on JBER-E in the wildland areas is
6407 non-combustible. Most of wildland fires on JBER-R have been small and confined to the Small Arms
6408 Complex. Since 1939, at least 310 wildland fires have occurred within JBER's current boundaries. This fire
6409 history is incomplete; data from 1959 to 1989 are missing and those through 2005 are sparse.

6410 All campfires associated with recreation are restricted to designated fire pits or barbecue. Fires caused by
6411 catalytic converters from some vehicles are occasionally a problem. Off-road restrictions reduce the
6412 potential of fires from ORVs. The railroad has reduced vegetation around the tracks to reduce the rate of
6413 spread should a fire occur.

6414 Increasing dry fuel loads from spruce beetle-killed trees on JBER may lead to severe wildfires that would
6415 be difficult to control. In some areas, dead and dying timber and a build-up of understory and associated
6416 litter have increased the wildfire potential. Hazardous fuels reduction of the understory vegetation is
6417 imperative to all natural resource operations at JBER. Additionally, the death of larger spruce trees has
6418 allowed areas to be taken over by bluejoint grass, another potential fire risk. Because of the extensive
6419 mortality of white spruce on JBER-R, fire prevention activities were conducted in 1999 and 2000 to reduce
6420 fuel loads adjacent to small arms ranges. Snagged trees, resulting from the wind storm in 2012, serve as
6421 dangerous ladder fuels that may increase the risk of a more readily controlled ground fire spreading into
6422 the forest canopy.

6423 Timber and sanitation harvesting, prescribed burns, and managed wildfires can help reduce the fuel load
6424 and prevent uncontrolled wildfires. However, planned burns are difficult to organize. The prescribed
6425 burning window (which occurs between the loss of snow cover and green-up) is very narrow and, in some
6426 years, does not occur. Burns can be accomplished in fall, but the burning window is narrow due to weather
6427 and personnel constraints. Another limiting factor is that winds must be low to prevent smoke from entering
6428 urban areas. Because of proximity to Anchorage and mission requirements, fire has been prevented and
6429 largely excluded from the forest ecosystem on JBER. Due to these narrow burning windows and stringent
6430 air quality standards, it is difficult to reestablish fire in this ecosystem. The ADEC issues burning permits
6431 for prescribed fire for agencies that have a fire management plan and have prepared burn plans that meet
6432 state and federal laws and regulations. Historically, the only burns that occurred on JBER were planned and
6433 executed by the Alaska Fire Service on behalf of Richardson Training Area Range Control. Currently, burns
6434 on JBER lands are executed by AFCEC/CZOF. Prescribed burns are subject to EIAP review and conform
6435 to all state and local permitting requirements. An EA was completed and a Finding of No Significant Impact
6436 was signed in 2015 for wildland fire prevention activities within the Richardson Training Area to reduce
6437 fuel loads (USAF 2015). Alternative 1, which was cited in the Finding of No Significant Impact, would
6438 implement prescribed burning on up to 2,000 acres within the Richardson Training Area, including open

and dense grassy areas and debris piles. Fire access roads and firebreaks would be maintained. Alternative 1 also includes the construction of 2 new fire access trails. The EA provides more details on the proposed alternatives.

7.9.3 Wildfire Suppression

Pre-suppression

In fire-prone areas, climate, human activity, and types of vegetation (or fuels) determine the level of wildland fire risk. Pre-suppression activities are those that reduce wildland fire risk. Pre-suppression actions are planning, prevention/education, fuels management, and prescribed burning. Wildland fire management operations, particularly prescribed fire, support mission considerations by reducing fuels, improving ecosystem health, and reducing the overall risk of wildfire.

Pre-suppression planning stresses safety, effective fire-response planning, and pre-suppression priority. Public and firefighter safety is the first and highest priority. Once personnel are committed to an incident, those resources become the highest value to be protected. Fire-response planning is a continuing process.

JBER's northern portion is classified for full and critical fire management priority due to the high value of resources at risk from fire, in addition to the proximity to Anchorage and Eagle River. Most of the area is classified for critical fire management due to the many military resources in the area. Training areas along Knik Arm are classified for full fire management. Cultural resources are an important concern for the JBER wildland fire program, and suppressive efforts often provide protection for identified areas and resources ([Section 7.14](#)). Cultural resources in the northern JBER area are primarily archaeological sites that are highly susceptible to damage by wildfire. These include 17 sites that are eligible for listing and 1 funerary site listed on the NRHP. The ICRMP ([Appendix E](#)) and WFMP ([Appendix B](#)) identify areas that would benefit from pre-treatment. This portion of JBER is bounded by private parcels, railroad lands, and Native Corporation lands.

The southern portion of JBER is classified under critical, full, and limited fire management priority. Most of the area is under full fire management because it is mainly used for military training and small arms ranges. Alpine zones are classified for limited fire management because of their remote location. Many military resources are at risk from wildland fire in this area, including the Small Arms Complex. Additional surveys by EOD personnel are needed to ascertain sites where ordnance has been used and disposed. Cultural resources in the southern JBER area include 3 archaeological sites and 1 historic district listed on the NRHP that are highly susceptible to damage by wildfire. All are in the alpine ecosystem. The historic district, in particular, would benefit from pre-treatment ([Appendix B](#), [Appendix E](#)). This southern portion of JBER is bounded by private parcels and state lands.

Prescribed fire projects will be implemented to attain the goals and objectives of the INRMP and support DAF and Army mission requirements. Implementation will follow state-prescribed fire regulations and a site-specific Prescribed Fire Plan using the National Wildfire Coordinating Group (2022) *Standards for Prescribed Fire Planning and Implementation*. The AFCEC/CZOF will primarily use the WSMs, in conjunction with National Wildfire Coordinating Group-qualified and available installation and cooperating-agency personnel, to assist the JBER FES with prescribed fire implementation. All prescribed fire planning will be facilitated through the WSM Lead, who will coordinate with all internal and external agency partners. Prescribed fire for the purpose of fuel reduction near ranges and impact zones will be implemented as needed, based on wildfire risk. It is expected that between 2,000 and 3,000 acres will be burned annually to meet this objective. Immediate notification is required to FES dispatch, natural resources

6481 personnel, the Wildland Fire Program Coordinator, and AFCEC/CZOF if a prescribed fire becomes a
6482 wildfire.

6483 Recommended mechanical fuels treatments on JBER include maintenance of all mineral fire breaks and
6484 fuel breaks, annual vegetation maintenance, logging operations, and firewood collection to reduce
6485 hazardous fuel loads. Planned mechanical fuels treatments include maintenance of all firebreaks and fuel
6486 breaks. Additional planned mechanical fuels treatments will focus on removal of spruce killed by spruce
6487 beetles.

6488 **Suppression**

6489 Primary fire suppression responsibility lies with the JBER FES. JBER FES provides initial response to
6490 wildland fires on JBER. However, wildland fire management in Alaska requires multi-agency cooperation.
6491 Fire management is a joint effort by JBER and AKDOF's Mat-Su District. If the fire exceeds the capabilities
6492 of JBER FES, the Fire Chief or a senior fire official can request assistance from these agencies. AKDOF
6493 ultimately has wildfire suppression responsibility for all areas in the southern part of the state, regardless
6494 of land ownership.

6495 The JBER FES and WSM maintain firefighting equipment, including portable pumps, hoses, shovels,
6496 chainsaws, water tanks with pumps, pulaskis, hoes, rakes, brush kits, Indian packs, and swatters. Planned
6497 firebreaks include shaded fuel breaks around ammunition storage areas (including Ammo Supply Point
6498 [Area A], Area B, and Sixmile Munitions [Area C]). A fuel break/firebreak system has been established on
6499 JBER-R at locations with the highest wildfire risk, particularly behind the Small Arms Complex, to
6500 minimize the spread of fires. If a wildfire escapes the initial attack, fuel breaks and other fuel-modification
6501 areas provide the most logical locations for fire containment lines. Well-maintained fuel breaks and fuel
6502 modifications provide defensible spaces that aid in wildfire containment. The many wetland areas, roads,
6503 and military facilities and the Cook Inlet help minimize the spread of most wildfires. The WFMP provides
6504 more details on JBER wildland fire management.

6505 *7.9.4 Future Considerations for Wildland Fire Management*

6506 Weather and specific natural hazard processes may alter fire regimes on JBER, especially those that result
6507 in prolonged periods of increased temperature, ecological drought, or expansion in the effective growing
6508 season. Warmer temperatures can reduce the winter mortality of forest pests including the spruce beetle,
6509 which has already caused large scale spruce tree damage and mortality on JBER. Many areas have been
6510 converted from a forest fuel model to a grass fuel model due to salvage cutting, increasing the dominance
6511 of highly flammable bluejoint and tundra grasses on the installation. Increased fuel loads due to spruce
6512 beetle damage and invasive species associated with a lengthened growing season have the potential to
6513 combine with warm winters and high precipitation to drive up ladder fuel growth rates. Monitoring of fuel
6514 loading, fuel condition, fire weather, and other aspects of ongoing risk assessment is critical to mitigate
6515 risks associated with adaptive wildland fire management. Implementation of the WFMP ([Appendix B](#)) is
6516 important to prevent wildfire ignitions, execute fire and non-fire fuels treatments, and create defensible
6517 areas on JBER in the case of worsening conditions.

6518 **7.10 Agricultural Outleasing**

6519 *Applicability Statement*

6520 This section applies to DAF installations that lease eligible DAF land for agricultural purposes. This section
6521 **IS NOT** applicable to this installation.

6522 *Program Overview/Current Management Practices*

6523 There are presently no areas on JBER used for agricultural leases. There are no plans to institute agricultural
 6524 leases on JBER since they are generally incompatible with the military mission, JBER security, or
 6525 ecosystem management strategies. However, if any JBER lands are evaluated in the future for this type of
 6526 outlease, outleasing will be conducted in such a manner to support mission operations, conservation
 6527 compliance, natural resources stewardship, healthy ecosystems, and biodiversity.

6528 **7.11 Integrated Pest Management Program**

6529 *Applicability Statement*

6530 This section applies to DAF installations that perform pest management activities in support of natural
 6531 resources management (e.g., invasive species, forest pests). This section **IS** applicable to this installation.

6532 *Program Overview/Current Management Practices*

6533 *7.11.1 Policy and Background*

6534 Per the USFWS (2010b) Integrated Pest Management Policy, pests are defined as living organisms,
 6535 including invasive plants and introduced native organisms, that may interfere with management goals and
 6536 objectives or that jeopardize human health or safety. With regard to a particular ecosystem, an invasive
 6537 species is defined as a nonnative organism whose introduction causes or is likely to cause economic or
 6538 environmental harm or harm to human, animal, or plant health (EO 13112, *Exotic and Invasive Species*).

6539 The DoD requires all installations to provide a well-planned and implemented pest management program
 6540 that maintains and safeguards the health, environmental quality, aesthetic values, and ecological balance of
 6541 the military community by protecting base property and resources from depreciation by pests, while
 6542 complying with environmental protection and improvement policies. IAW AFMAN 32-1053, the
 6543 installation IPMP ([Appendix F](#)) must meet the following requirements:

- 6544 • Address labor requirements and integrated pest management measures for each pest (AFMAN 32-
 6545 1053, Section 5.3)
- 6546 • Include all necessary attachments, including pesticide labels, safety data sheets, golf course
 6547 management plans, and agreements between state pesticide organizations and the DoD (AFMAN
 6548 32-1053, Section 5.3.1)
- 6549 • Ensure surveillance data are documented, recorded electronically, and coordinated with public
 6550 health (AFMAN 32-1053, Section 5.3.2)
- 6551 • Provide for coordination with the NRM and installation Environmental Manager to complete
 6552 consultation with the USFWS if T&E species are confirmed to be present or may be present in a
 6553 treatment area (AFMAN 32-1053, Section 5.3.3)

6554 *7.11.2 Program Overview/Current Management Practices*

6555 JBER uses the Integrated Pest Management approach, emphasizing the use of non-chemical corrective
 6556 measures (e.g., surveys, education, sanitation, harborage reduction, exclusion, and mechanical means
 6557 [including mowing]) when possible. When necessary, chemical control is used at the lowest and most
 6558 effective application level. Major pest control work for housing units is subcontracted to a local pest control
 6559 company by Aurora Housing. Pest management priorities on JBER are:

- 6560 • Disease vectors and other health related pests, such as mosquitoes
- 6561 • General household and nuisance pests, such as silverfish, fruit flies, and firebrats

- 6562 • Structural pests, such as carpenter ants
- 6563 • BASH pests, such as grasshoppers
- 6564 • Noxious and invasive weeds, such as dandelions, clover, and other lawn weeds, and non-lawn
- 6565 invasive plants, such as bird vetch, white sweetclover (syn., sweetclover, *Melilotus officinalis*),
- 6566 orange hawkweed, reed canary grass, thistle, elodea, and European bird cherry
- 6567 • Vertebrate pests, such as mice, voles, bats, shrews, and squirrels
- 6568 • Birds, such as Violet-Green Swallows, Cliff Swallows, European Starlings, and Rock Doves.

6569 The JBER IPMP was renewed on 10 October 2018 and complies with applicable DoD and individual
 6570 military department policies, in addition to the Insecticide, Fungicide, and Rodenticide Act. The IPMP is
 6571 reviewed annually and updated at least once every 5 years. The IPMP is implemented by the 773
 6572 CES/CEOIE, who coordinates with the 673 CES/CEIEC for plan updates and revisions. The IPMP includes
 6573 considerations for pest management in areas of special environmental concern, such as areas with T&E or
 6574 protected species (CIBW, Bald Eagle), wetlands, and waterways. The 673 CES Natural Resources office
 6575 will coordinate with 773 CES/CEOIE personnel to ensure that the IPMP and INRMP are mutually
 6576 supportive and not in conflict.

6577 Integrated Pest Management at JBER is the responsibility of the 773 CES/CEOIE. Its mission is to provide
 6578 effective control of pest species (insects, arthropods, mammals [primarily rodents], birds, weeds, and
 6579 deleterious invasive species) to ensure that they do not hinder the JBER mission. 773 CES/CEOIE
 6580 personnel are responsible for dealing with small vertebrate and invertebrate pests in facilities and open areas
 6581 within the cantonment area, especially on the airfield infield, as well as weed, invasive species, and insect
 6582 control throughout JBER.

6583 7.11.3 Pest Species

6584 The JBER IPMP ([Appendix F](#)) details monitoring and management protocols for various pests, including
 6585 thresholds and treatments for each species. Management for the most prominent species is described below.

6586 Mosquitoes

6587 *Culiseta alaskaensis*, *Aedes excrucians*, and *Aedes punctor* are mosquito species on JBER that can transmit
 6588 diseases and impact field operations. Mosquito populations and disease risks are evaluated IAW the JBER
 6589 IPMP. The DoD Insect Repellent System should be used by personnel in the field to prevent mosquito bites.
 6590 There are no known mosquito-borne diseases on JBER or in the surrounding area, but the potential for
 6591 disease and negative effects on outdoor recreation and operations requires regular monitoring and control.

6592 Stinging Insects

6593 Yellow jackets, bees, and hornets are a common nuisance around buildings and outdoor equipment,
 6594 although yellow jackets are the most commonly controlled stinging insect. Yellow jacket traps are used
 6595 near parks and playgrounds in the spring to capture queens and reduce the summer populations. The primary
 6596 methods of control for yellow jackets and hornets include the application of soapy water, Delta Dust,
 6597 Temprid SC, or WaspFreeze on their nests. Honeybees and bumblebees are rarely considered pests if found
 6598 and are controlled only when absolutely necessary. Honeybee swarms are very rare and are referred to a
 6599 beekeeper for removal if the swarms are causing issues with personnel or visitors.

6600 Bedbugs

6601 Bedbug infestations are relatively common on JBER, with the most heavily impacted areas including
 6602 billeting, dormitories, and barracks, all of which require immediate treatment due to how quickly personnel

and visitors can spread them. Housekeeping personnel are training to identify bedbugs, and bedbug dogs are also used for additional surveillance when necessary. The control of bedbugs requires the use of heat and chemical treatments and regular cleaning to reduce the chance of an infestation.

7.11.4 *Invasive or Deleterious Fish and Wildlife Species*

At least 4 species of nonnative/non-local fish and wildlife have been found or reported on JBER, and actions have been taken to reduce their presence. Exotic and invasive wildlife species are listed in [Appendix J](#).

Northern Pike

Invasive northern pike are extremely difficult to eradicate, short of poisoning a system, and this option does not guarantee the prevention of future illegal introductions or introductions via natural pathways. Otter Lake and Lower Sixmile Lake both had illegal introductions of northern pike. Northern pike were successfully removed from Otter Lake with a rotenone treatment in 2015, and gill netting suppression efforts were successful at Lower Sixmile Lake in 2022.

JBER is part of the Alaska Invasive Species Partnership—Invasive Northern Pike Committee. The committee has developed a new management plan for northern pike in southcentral Alaska (Dunker et al. 2022). Current management activities on JBER are to identify, prioritize, and implement outreach, management, and monitoring following the goals and objectives laid out in that plan. The JBER Fisheries Program Manager is currently working with ADF&G and USFWS to develop an early-detection monitoring program for base lakes. The monitoring plan will focus on monitoring for northern pike but will eventually include other aquatic invaders such as mussels, snails, and other invasive fish.

Rock Dove

The Rock Dove has long been established in the City of Anchorage, and it frequently roosts and nests within and around JBER facilities, including aircraft hangars. Its presence on JBER is a consistent BASH issue and presents challenges for building and equipment cleanliness and maintenance. The USDA–APHIS–WS aggressively removes these birds through trapping and shooting when necessary.

European Starling

The European Starling first became established in Anchorage in the early 2000s, and breeders were first observed on JBER in 2005. Starlings can become a nuisance to residents; pose a minor BASH risk, especially when flying in tight flocks; and can outcompete resident, hole-nesting species. IAW BASH regulations, European Starlings will be destroyed as they enter the airfield, but efforts to stop their spread also occur outside the airfield. USDA–APHIS–WS maintains European Starling traps on the Elmendorf Airfield and additional traps could be deployed elsewhere on base as needed. Rock Doves and European Starlings have not been documented on JBER training lands. Pest management personnel are responsible for control of these species in the cantonment areas.

House Mouse

The introduced house mouse was first confirmed on JBER in a 2001 small mammal survey on the south post, many miles from any Anchorage neighborhood. House mice commonly occur in Anchorage homes, but the capture of this mouse so far from any houses suggests its potential to coexist with native small mammal populations. House mice are identified by regular facility, trap, and potential nesting area inspections. When house mice are identified, physical controls include the removal of food sources, the sealing of potential entryways, and the inspection of incoming food. When physical controls have failed, live, snap, and glue traps are used to slow down the growth of local populations, and pesticides are applied

to eradicate any remaining individuals. The use of pesticides is highly controlled to limit the potential of pets and children encountering them. The management of food sources, waste areas, and inspection of incoming materials is essential in preventing infestations on the base and in the surrounding area.

Feral Animals

Feral cats are effective predators that periodically occur in small numbers on JBER, and they are considered invasive due to their ability to directly compete with native mammals. Stray dogs are also occasionally reported on JBER, and they are also controlled IAW all DAF requirements detailed in the IPMP. When reported, the Pest Management Shop will capture any stray animals and return them to their owners if possible. If an owner is not identified, the animal will be transported to the Anchorage Animal Control Shelter, where they will be scanned for micro-chips or registration information.

7.11.5 Noxious Plant/Invasive Species Management

The Alaska Invasive Species Partnership (2023) defines an invasive species as a species that is nonnative to the ecosystem and whose introduction causes or is likely to cause economic or environmental harm or harm to human, animal, or plant health. Noxious plant species are “any species of plants, whether annual, biennial, or perennial, reproduced by seed, root, underground stem, or bulblet, which when established is or may become destructive and difficult to control by ordinary means of cultivation or other farm practices” (11 AAC 34.400(13)).

Invasive weeds are relatively new to Alaska. Many of the invasive species problems on JBER are relatively small and local eradication is still possible. Integrated weed management is the best method to establish controls, and pesticides will be used as needed to support this program. If left unchecked, the problem will increase exponentially until eradication or even mitigation becomes impractical. Regulation and control of plant pests by the ADNR’s Division of Agriculture is authorized under Title 3 of the Alaska Statutes. The Division of Agriculture is charged with protection of the agricultural industry and public interests through preventing the importation and spread of these pests. The USDA–APHIS has authority to prohibit or restrict the importation, exportation, and interstate movement of plants through the Plant Protection Act (Comeau and Vandre 1997).

From data and rankings presented by the ADNR’s Division of Agriculture, the Alaska Center for Conservation Science, and plant lists for JBER, priority target species were identified and management strategies developed in the IPMP. Current rankings for Alaska can be referenced from the Alaska Exotic Plants Information Clearinghouse. There are 9 High Management Priority species on JBER that are ranked based on (1) whether they are currently present on JBER, (2) whether they are state-listed restricted and/or prohibited, and/or (3) whether they have an invasiveness ranking of 70 or higher. These species include reed canary grass, white sweetclover, orange hawkweed, cheatgrass (*Bromus tectorum*), Canada thistle, Siberian peashrub (*Caragana arborescens*), European bird cherry, chokecherry (*Prunus virginiana*), and bird vetch. Canadian waterweed (*Elodea canadensis*) is also a high-priority species that has been found in Lower Sixmile Lake (discussed further below). Other invasive plant species found on JBER include butter and eggs (*Linaria vulgaris*), European mountain ash, and narrowleaf hawkweed (*Hieracium umbellatum*) (US Army Engineer Research and Development Center 2017, AERC 2021b). Any vegetative surveys performed on JBER should include documentation of the presence, abundance, distribution, and condition of these high-priority species. Occurrences are reported to the 773 CES/CEOIE Pest Shop for treatment or incorporation into cooperative agreement efforts.

IAW Alaska Statutes 03.05.010, 03.05.030, and 44.37.030, the ADNR’s Division of Agriculture maintains a statewide list of prohibited and restricted noxious weeds (plants.alaska.gov/invasives/pdf/noxious-

weeds.pdf). JBER strives to prevent the introduction and spread of noxious and invasive species through equipment cleaning, especially for contractor equipment originating off of JBER. Biosecurity from foreign pests and/or invasive species is an aspect of noxious and invasive species prevention that JBER must address, especially with aircraft arriving from foreign countries. Airfield operations include a process for receiving support from US Customs and the USDA when aircraft are inbound from Wake Island and foreign locations.

The 773 CES/CEOIE is responsible for implementing and/or coordinating approaches for managing and monitoring invasive species on the installation, which are detailed in [Appendix F](#). A formal comprehensive inventory of invasive species on JBER-R was completed in 2011, and a management plan was submitted in 2012. The Range and Training Land Assessment program documents invasive vegetation on JBER-R training lands as part of land condition surveys. The program will monitor invasive plants only if they directly interfere with military training needs. Invasive weeds are monitored through recurring surveys conducted by ITAM, 673 CES/CEIEC, and 773 CES/CEOIE. Invasive weed management control activities include both mechanical and chemical control means, as necessary.

Vegetation control is required on the airfield, along shoulders of main roads, in storage areas, and in pavement cracks. Weeds such as dandelions, Japanese knotweed, and crabgrass (*Digitaria* sp.) are treated under recurring work orders. Chemical control is a last-resort option. Pesticide use in support of JBER natural resources management activities involves invasive plant, forest disease, and insect control. Any plant-control activities associated with withdrawn lands are managed under the BLM strategic noxious weed control plan. Spruce beetles are also a major pest concern for the installation, although their management falls under forestry-related projects and priorities ([Section 7.8](#)).

JBER golf courses maintain a separate pesticide and herbicide application program and are responsible for development and implementation of their own pest management plan. Golf course personnel should coordinate with the 773 CES/CEOIE Pest Shop for any pesticide use issues.

Focused projects occur as time and funding are available to supplement their efforts. Action items included in the 2012 Invasive Species Management Plan included targeted management of hawkweed near Sixmile Lake and of reed canary grass at Otter Lake, which has been ongoing since 2014. MWH Global, Inc., initiated these projects in 2014 and 2015 (MWH Global, Inc. 2015a). The 773 CES/CEOIE Pest Shop has taken on additional efforts to implement the monitoring plan. In 2014 and 2015, reed canary grass was documented in several locations around the outfall of Otter Lake, its eastern shore, and along the upper portions of Otter Creek. Passive treatments in 2014, including covering the patches in heavy black plastic, were not successful. Subsequent herbicide treatments in 2015 were successful, but additional occurrences have been observed in the area since, and follow-up treatments have been ongoing. Reed canary grass and Canada thistle were also identified at the Eagleglen Fitness Park in 2017 and persisted into 2018. Retreatment was recommended in 2019 and was coordinated with 773 CES/CEOIE. Additionally, yellow and orange hawkweed have been treated annually since 2014 around Sixmile Lake, Fairchild Drive, north of Airlifter Drive, and around the water reservoir. A dramatic reduction in herbicide-treated orange hawkweed has been observed at the Sixmile grass runway. Nevertheless, this species persists, as the seed bank remains to be exhausted. Treatments will be ongoing.

In 2016, an effort to begin treating European bird cherry along the Ship Creek Corridor was initiated and continued until 2018 up to the old Ship Creek Hatchery. In 2016 and 2017, 639 mature trees were treated with herbicide and several hundred additional small seedlings/saplings were treated or hand-pulled in the Eagleglen Fitness Park area. While 100% mortality was not achieved throughout this area, significant mortality of large trees and saplings was achieved, removing a large seed source from the area. What remain

are patches of small suckers that are difficult to identify and treat due to their abundance, which is exacerbated by the prolific seed source remaining in the area and will require follow-up treatment for years to come. One source of escaped European bird cherry, occurring along the Ship Creek corridor, likely includes trees planted in the JBER urban forest. Prioritized removal of these trees began in 2019, with the highest priority given to trees in the BASH zone, then trees in the WEZ, and finally trees within a half-mile of natural areas, especially near wetlands and streams. All European bird cherry, chokecherry, and European mountain ash in the BASH and WEZ were treated, except those occurring in lands under Aurora Housing management.

Natural resources project crews report field observations of invasive species to the JBER Ecologist, who coordinates treatment with the Pest Shop or incorporates treatment into funded project efforts executed under contract with cooperative agencies. Between 2015 and 2017, more than 50 occurrences of invasive weeds were documented by the Aquatic Ecology Streams crew in remote, streamside environments. Left unchecked, these relatively isolated occurrences may have spread. Observations were reported, and the Palmer Soil and Water Conservation District treated high-priority species and European mountain ash under contract in 2018 and 2019.

In 2023, the USFWS identified elodea in Lower Sixmile Lake. Additional surveys conducted in Upper Sixmile Lake and Sixmile Creek resulted in no positive detections. The size of the infestation within Lower Sixmile Lake suggests that elodea has been established there for multiple years. Previous attempts of monitoring via eDNA did not detect elodea. A 3-year elodea response project began in July 2024 in collaboration with the USFWS and ADNRR. Eradication requires 2 to 3 years of consecutive chemical treatment, which has been successful in treated other waterbodies in the state.

In 2020, the USFWS finalized the Programmatic EA of the *US Fish and Wildlife Service Management Strategy for Elodea and Other Submersed Aquatic Invasive Plants in the Alaska Region*, which JBER helped develop. The preferred methods for treatment and eradication are Integrated Pest Management strategies, including cultural, physical, and chemical components (USFWS 2020). JBER will coordinate with the Pesticide Shop to conduct elodea management in the future and determine the best timing of applications to ensure that there is no adverse impact on salmon or salmon spawning. JBER conducts outreach to prevent elodea from being introduced through recreational activities and floatplanes. Elodea response projects also include public outreach and educational signs on the methods of introduction and risks that this invasive species presents.

Periods of prolonged elevated temperatures stress native flora and fauna, creating opportunities for invasive and nonnative species. Allowing invasive species to proliferate during drought periods, long-term heat events, or following disturbances from storms or wildfire can lead to entrenchment of already difficult-to-manage species. Examples of these invasives include the northern pike and elodea in aquatic habitats and the High Management Priority vegetation species listed in [Section 7.11.4](#). Regular surveys for pests and invasive vegetation species will be critical for designing, implementing, and adapting an early-detection program to be used in future Integrated Pest Management activities.

7.12 Bird/Wildlife Aircraft Strike Hazard (BASH)

Applicability Statement

This section applies to DAF installations that maintain a BASH program to prevent and reduce wildlife-related hazards to aircraft operations. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

6773 7.12.1 *Policy and Background*

6774 The Elmendorf Airfield BASH Plan ([Appendix C](#)) implements DAF Policy Directive (DAFPD) 91-2,
 6775 *Safety Programs*, and is used in conjunction with DAFI 91-212; DAFI 91-202, *The Department of the Air*
 6776 *Force (DAF) Mishap Prevention Program* (6 March 2025); DAFI 91-204, *Safety Investigations and*
 6777 *Reports*; DAFMAN 91-223, *Aviation Safety Investigations and Reports*; Pacific Air Command Air Force
 6778 guidance; and 11th Air Force guidance. The instruction provides a program to minimize aircraft exposure
 6779 to potentially hazardous bird strikes and applies to all host, associate, tenant, and temporary duty
 6780 organizations on JBER. In addition, the Army National Guard unit stationed at Bryant Army Airfield has a
 6781 BASH Plan and USDA–APHIS–WS support to execute their on-site BASH program. The JBER BASH
 6782 program is managed by the 3 WG/SE, and the USDA–APHIS–WS serves as the primary BASH detection
 6783 and dispersal agency for all wildlife within and up to a quarter-mile outside of the airfield security fence.
 6784 Wildlife within these and other exclusion zones are managed according to the guidance established in the
 6785 wildlife hazard management protocol and the MOU between 3 WG/JBER and USDA–APHIS–WS. The
 6786 673 CES/CEIEC advises the BASH program on habitat and wildlife management projects and is
 6787 responsible for securing all necessary federal and state depredation and dispersal/hazing permits.

6788 Bird–aircraft strikes present the most serious human–wildlife conflict on JBER, with the most severe
 6789 example of this issue resulting from a September 1995 incident, in which an E-3 Airborne Warning Aircraft
 6790 crashed and burned on takeoff, resulting in the death of all 24 air crew members. Post-crash investigation
 6791 revealed that ingestion of 4 geese forced 2 engines to shut down, causing the crash. This incident resulted
 6792 in an immediate and substantial expansion of the installation’s BASH reduction program to minimize future
 6793 wildlife strikes.

6794 Several bird species present year-round hazards, but Canada Geese, Sandhill Cranes, gulls, raptors,
 6795 Common Ravens, and other densely flocking species are of particular concern. Terrestrial mammals that
 6796 also pose a threat to flight operations include moose, wolves, coyotes, foxes, bears, and small mammals.
 6797 However, conflicts with these mammals can be limited in the airfield complex through diligent fence,
 6798 habitat, and gate management ([Appendix C](#)).

6799 7.12.2 *Program Overview/Current Management Practices*

6800 The Elmendorf Airfield BASH Plan provides guidance on delineating WEZs, BEZs, and Vegetation
 6801 Management Zones that discourage wildlife from visiting critical mission areas. The program is divided
 6802 into Phase I and Phase II, the first of which focuses on wildlife control and habitat modification year-round
 6803 to limit the potential for conflict or short-notice obstructions to the mission. Phase II is focused on bird
 6804 avoidance protocols, operating restrictions, and increased dispersal efforts, which all are typically
 6805 implemented from 15 April to 31 May (spring migration period) and from 15 August to 31 October (fall
 6806 migration period). Further details can be found in 3 WGI 91-212 or by contacting the 3 WG Flight Safety
 6807 BASH Program Manager. Research and adjustment in management techniques for BASH reduction
 6808 continue to be and will remain high priorities for JBER.

6809 WEZs and BEZs are areas where wildlife presence is not tolerated, and habitat modification efforts in these
 6810 areas include reducing open water and making large, open areas as unattractive as possible to wildlife
 6811 ([Figure 7-9](#)). BASH vegetation management is implemented within exclusion zones and sets standards for
 6812 allowable grass, shrub, and tree height, depending on the specific areas. Generally, areas within the airfield
 6813 are limited to the growth of short grasses within 300 yards of the end of runways, and obstructions are
 6814 selectively cut as needed. The current priority in glideslopes is to encourage the growth of slower-growing,
 6815 mid-height trees, while discouraging the growth of cottonwoods or other fast-growing species. Clearcutting
 6816 is avoided to reduce the chance of treated areas transitioning into fens/wetlands, which would attract

wildlife and increase erosion. However, flightline safety projects have included the selective clearing of forest stands near the runways ([Section 7.8.2](#)). Aggressive hazing is used alongside habitat modification to further discourage wildlife presence, as required under Phase I. The hazing of Bald Eagles, Golden Eagles, and T&E species require approval from the USFWS, and unauthorized hazing of protected species could result in federal prosecution.

Bird avoidance and hazard management is supported by the installation's bird hazard warning system, which establishes methods for the communication of potential hazards between ground agencies and aircrews. Observed threats are reported to Airfield Management Operations, the Supervisor of Flying, and/or the Tower Supervisor via radio or telephone. Once hazards have been reported, they are assessed by Airfield Management Operations and USDA–APHIS–WS personnel, who then provide recommendations for current or planned flight operations. Recommendations may include the harassment and dispersal of ground-based wildlife, alteration of current flight patterns, or halting of planned activities, depending on the severity of the threat.



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Figure 7-9. Map of Bird/Wildlife Air Strike Hazard zones and waterfowl exclusion zones within Joint Base Elmendorf-Richardson

6834 **7.13 Coastal Zone and Marine Resources Management**

6835 *Applicability Statement*

6836 This section applies to DAF installations that are located along coasts and/or within coastal management
6837 zones. This section **IS** applicable to this installation.

6838 *Program Overview/Current Management Practices*

6839 **7.13.1 Policy and Background**

6840 JBER protects, preserves, and restores coastal ecosystems IAW applicable law, through the Environmental
6841 Compliance section for daily operations and through the Environmental Restoration section for cleanup and
6842 restoration of contaminated sites. JBER has worked closely with neighboring agencies, as exemplified by
6843 the recent cooperative effort with the Port of Alaska on port expansion projects.

6844 JBER falls within the coastal zone boundary of the Municipality of Anchorage. Federal lands are excluded
6845 from Alaska's coastal zone boundaries, as those lands are owned, leased, or held in trust by the federal
6846 government or whose use is otherwise, by law, subject solely to the discretion of the federal government,
6847 its officers, or agents (15 CFR 923.33). However, activities on these lands are subject to consistency
6848 provisions of Section 307 of the Coastal Zone Management Act of 1972, as amended. The Alaska Coastal
6849 Management Program ended in 2011. Consistency determinations were accomplished during the EIAP. If
6850 JBER determined that an activity, operation, project, or program may affect the coastal zone, a
6851 Determination for Federal Activities questionnaire was prepared and submitted for review, and the response
6852 became part of the EIAP documentation.

6853 **Cultural Resource Requirements and Tribal Coordination**

6854 Preservation of JBER's coastal environments is a priority for the installation's natural and cultural resource
6855 programs due to the potential impact on the biological and cultural resources found in and around them. In
6856 addition to the environmental laws and regulations, efforts to preserve these ecosystems aim to ensure
6857 compliance with the requirements of NHPA Section 106, NAGPRA, ARPA, and AIRFA. This is
6858 accomplished by limiting the loss of identified and unidentified cultural resources, sacred sites, and
6859 historically significant areas. Any new restoration efforts must be reviewed for the potential to trigger the
6860 NHPA Section 106 consultation process. The review of any preservation or restoration activities will be
6861 coordinated with Tribal stakeholders to ensure that these actions are mutually beneficial and expand access
6862 to cultural resources wherever possible.

6863 **7.13.2 Consistency with State Coastal Zone Management Program**

6864 The Alaska coastal management program was discontinued on 30 June 2011, as the Alaska House defeated
6865 a measure that would have extended the state's participation in the national program. The National Coastal
6866 Zone Management program requirements no longer apply to the State of Alaska.

6867 **7.14 Cultural Resources Protection**

6868 *Applicability Statement*

6869 This section applies to DAF installations that have cultural resources that may be impacted by natural
6870 resource management activities. This section **IS** applicable to this installation.

6871 *Program Overview/Current Management Practices*

6872 7.14.1 Policy and Background

6873 Cultural resources management at JBER is provided IAW the NHPA (54 USC § 300101, 306101, 306102,
6874 306108, as amended); ARPA; AIRFA; NAGPRA; EO 11593, *Protection and Enhancement of Cultural*
6875 *Environment*; DAFI 32-7001; and DAFMAN 32-7003. Means to achieve compliance with these laws and
6876 policies are outlined in the 2023 JBER ICRMP ([Appendix E](#)). The ICRMP is updated and approved every
6877 5 years. The JBER cultural resources program falls within the 673 CES/CEIEC.

6878 JBER cultural resources include archaeological sites, historic sites, cultural landscapes and traditional
6879 cultural properties of importance to Alaska Natives, and historic landscapes. Cultural resource management
6880 efforts at JBER have accomplished or documented the completion of archaeological surveys in the training
6881 areas, including areas along the beach and bluff, inland areas of high relief, and some portions of JBER-E.
6882 Sites identified in the surveys are pre-colonial sites, cabin ruins and associated features from the
6883 homesteading era, and sites associated with military activity. There is a National Historic Landmark on
6884 JBER and 18 archaeological sites that have been determined to be eligible for the NRHP. Overall, known
6885 cultural resources on JBER include 163 archaeological sites, consisting of pre-colonial, homestead- and
6886 military-era sites; 35 World War II-era eligible historic properties, grouped into 3 historic districts; 3
6887 individually eligible Cold War-era buildings and structures; 24 historic properties in the listed Nike Site
6888 Summit Historic District; 15 individually eligible Cold War-era historic properties; portions of the Iditarod
6889 National Historic Trail, the only congressionally designated National Historic Trail in Alaska; and the Fort
6890 Richardson National Cemetery. The Nike Site Summit Historic District and Fort Richardson National
6891 Cemetery have been listed on the NRHP. The Fort Richardson National Cemetery is owned and operated
6892 by the Department of Veterans Affairs. Large areas of JBER remain unsurveyed. Of the 78,608 surveyable
6893 acres, 30,971 acres still need an archaeological survey. JBER's goal is to survey at least 1,000 acres per
6894 year. Projects are programed in upcoming years to increase the amount of surveyed land.

6895 In addition to these identified sites and areas, culturally modified and collected trees and plants are
6896 important foci of the JBER cultural resources program. These include ferns, berries, mushrooms, and
6897 various tree species that have been cut into, scarred, or manipulated for a wide array of uses that are still
6898 well understood by regional Tribes. The 2015 Alaska State Wildlife Action Plan identified many species
6899 that are important to regional cultural groups, although JBER recognizes the importance of additional
6900 species, including mountain hemlock, chocolate lily (*Fritillaria camschatcensis*), and alpine sweetvetch
6901 (*Hedysarum alpinum*).

6902 The Nike Hercules Missile Battery on Site Summit is the only remaining Nike site of the 8 built in Alaska
6903 that still retains its historic character as a functional missile battery. It was the last Nike Battery in the nation
6904 to be deactivated, which occurred in 1979. JBER has continued its relationship with the Friends of Nike
6905 Site Summit, and it has restored 6 buildings and is continuing additional restoration activities outlined in
6906 the Site Summit Retention Plan of February 2022. Trespassing at the Nike site is an ongoing problem. JBER
6907 law enforcement personnel periodically check the site and other known archeological sites on the
6908 installation. Guidelines for maintenance and preservation activities for individually eligible buildings and
6909 the 3 World War II historic districts are detailed in the 2018 JBER Historic Facilities Maintenance and
6910 Repair Plan (673 ABW 2018).

6911 Paleontological resources on JBER are covered in the ARPA of 1979 and discussed in the ICRMP. JBER
6912 curates eligible items at the University of Alaska Fairbanks Museum of the North.

6913 JBER operates under the *Programmatic Agreement Among 673d Air Base Wing, the Alaska State Historic*
6914 *Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Operation,*
6915 *Maintenance, and Development Active at Joint Base Elmendorf-Richardson and Associated Training*

Lands, Alaska (executed July 2022). The Programmatic Agreement established stipulations for streamlined reviews of undertakings, guidance for management of historic properties, and procedures for consultation. The following undertakings (relevant to natural resource management) are excluded from external review:

- Undertakings concerning vegetation management practices and landscaping including removal or replacement of trees and other shrubs with similar (in type, height, and mass) plantings, excluding culturally modified trees and earthworks
- Undertakings concerning the removal of pests and the material associated with their presence while keeping to the Secretary of the Interior's Standards for the Treatment of Historic Properties
- Undertakings concerning routine environmental management and mitigation, including or pertaining to wetlands, fisheries, avian, marine mammal, small mammal, wildlife game/stock, wildlife nuisance, LTEM, and the removal of beetle-killed spruce trees *where avoidance of cultural resources is implemented* (emphasis added)
- Undertakings concerning the temporary use (no more than 1 annual cycle or that does not require a permanent structure) of objects such as signage, road blocks, and jersey barriers to ensure public safety or to support large events
- Undertakings concerning the installation of temporary use (no more than 1 annual cycle or that does not require a permanent structure or ground disturbance) of wildlife management devices for scientific or health and welfare purposes

The purpose of this programmatic agreement is to consult on repetitive undertakings subject to Section 106 of the NHPA. For projects that fall outside of the parameters in the agreement, any project that has the potential to affect cultural resources must be coordinated under the standard Section 106 process. For projects that are streamlined or excluded from external review under the agreement, they must still be reviewed and documented by the Cultural Resource Manager for inclusion in an annual report.

The overarching goals of the 2023 are as follows:

- Protect historically significant resources
- Comply with federal laws and regulations governing the treatment of cultural resources, while causing the least disturbance to the military mission
- Complete inventory of real property assets
- Inventory and evaluate cultural resources for NRHP eligibility
- Conduct education and outreach
- Establish recordkeeping, documentation, and curation systems
- Facilitate and maintain government-to-government relationships with Federally Recognized Tribes

These goals are often mutually supportive with natural resource goals, and their implementation often provides additional support and financial incentive for natural resource management on JBER. The direct relationship between cultural and natural resource management is described in [Section 7.14.2](#).

Education and outreach is an essential aspect of the JBER cultural resources program, not only because it helps communicate cultural resource concerns and policies, but also because of how engaged surrounding communities and Tribes are with the conservation, survey, and management of cultural resources. Regional Tribes often provide feedback and input on new policies and surveys and have their own conservation and construction organizations that are involved with projects and surveys on base and in the surrounding area. When possible, JBER will pursue opportunities to share survey and monitoring data with Federally Recognized Tribes. JBER will also communicate any management or policy changes with the Tribes when the information is provided to federal and state agencies.

6959 **7.14.2 Cultural Resources Implications for Natural Resources Management**

6960 Natural resources management generally complements the preservation of archaeological sites and other
6961 cultural resources by limiting disturbance activities. These activities include the removal of dead or dying
6962 trees that have the potential to fall on and damage cultural resources or create a wildland fire hazard. BASH
6963 and vegetation management activities also frequently remove and replace fast-growing trees such as
6964 cottonwoods, which further reduces the chance of cultural resources being impacted by falling trees.

6965 It is important to ensure that provisions of this INRMP are consistent with the protection of cultural
6966 resources. Natural resources management activities on JBER such as timber cutting, vegetation restoration,
6967 and erosion control projects have the greatest potential to disturb archeological sites. Natural resources
6968 projects that involve excavation, earth moving, and/or fill deposition can damage or bury archaeological
6969 sites. Activities such as training land restoration and development of recreation and training areas can also
6970 be potentially damaging to cultural resources. Prior to any ground-disturbing, vegetation removal, or
6971 otherwise natural resource-related activity, the Cultural Resources Manager will evaluate proposed
6972 activities for compliance with all appropriate cultural resources laws and regulations. Significant projects
6973 will also be coordinated with the cultural resources program to identify areas where cultural resource goals
6974 may be mutually supportive within the respective project. Cultural resource staff will also survey for and
6975 mark any resources that may be disturbed by a new activity or development to limit potential negative
6976 impacts.

6977 Outdoor recreation is another important shared concern for natural and cultural resources because it can
6978 increase the risk of vandalism at important sites and may degrade the habitat unless there is effective and
6979 proactive management. The close relationship between natural and cultural resources on JBER would be
6980 supported by additional integration of fisheries management and prescribed burn management in future
6981 ICRMPs. This integration would also help explain the connection and mutual support that can be provided
6982 by all programs involved.

6983 Assessment of effect and consultation guidelines provided in the NHPA (54 USC § 306108) or JBER
6984 Programmatic Agreement will be followed during review of projects. The Cultural Resources Manager will
6985 coordinate any project that is assessed as having an effect on cultural resources or historic property will be
6986 coordinated with the Alaska State Historic Preservation Officer, Alaska Native entities, and the Anchorage
6987 Historical Commission. If cultural resources may be impacted, steps must be taken to avoid or mitigate
6988 damage.

6989 Coordination with the Native Village of Eklutna and other Tribes has helped JBER identify sensitive
6990 cultural sites. Consultation with appropriate Federally Recognized Tribes will continue through FY27 to
6991 identify new sites and determine if identified sites should be elevated as Traditional Cultural Property. A
6992 kiosk describing the salmon life cycle and the importance of salmon to Native culture was completed in
6993 2018. A study of culturally significant plants was completed in 2022.

6994 **7.15 Public Outreach**

6995 *Applicability Statement*

6996 This section applies to all DAF installations that maintain an INRMP. The installation is required to
6997 implement this element.

6998 *Program Overview/Current Management Practices*

6999 *7.15.1 Policy and Background*

7000 Public relations are a very important but often neglected aspect of natural resources management.
7001 Increasingly, public agencies are finding that they must educate and persuade the public before they can
7002 conduct effective management of natural resources.

7003 JBER's active environmental education program provides much of the positive public relations for the
7004 Natural Resources program. Additionally, CLEOs, MCAs, and natural resources volunteers serve as
7005 positive representatives of the Natural Resources program at JBER through regular field contacts and visits.
7006 Environmental personnel develop informational materials, conduct briefings, and attend public meetings
7007 and events to improve public awareness about the diverse and unique natural and cultural resources found
7008 on military lands in Alaska. The Sustainable Range Awareness component of the ITAM program also
7009 provides a means to educate other land users on their environmental stewardship responsibilities by
7010 providing outreach materials such as desktop calendars, pocket planners, and playing cards.

7011 The JBER Natural Resources program coordinates closely with the 673 ABW Public Affairs Office in
7012 communicating with the media or the general public. Special programs or interviews are set up through that
7013 office. In the past, this has included coverage on JBER's ongoing BASH program, spring and fall wildlife
7014 safety awareness, and Arbor Day activities.

7015 Public outreach is also an essential tool in informing the public and surrounding stakeholders of mission
7016 changes and policies regarding outdoor recreation and public access to JBER's natural resources. For
7017 example, in 2024, the public was informed of the base's transition to RecAccess as the primary system for
7018 obtaining and tracking outdoor recreation permits on the installation. This change was also supported by
7019 signs and kiosks that inform visitors of the RecAccess requirement.

7020 **Tribal Coordination and Outreach**

7021 Coordination and outreach with Tribal stakeholders is a significant priority for the JBER natural and cultural
7022 resource programs because of how interrelated these programs are and the benefits of coordination.
7023 Communication with Tribal stakeholders provides opportunities for JBER to inform the communities about
7024 the resources and management actions on JBER and to learn from those communities about the
7025 installation's environments and resources. Coordination with the Tribes also provides opportunities to
7026 assess and improve the base's cultural resources trainings and education programs. These outreach efforts
7027 promote stewardship throughout the surrounding area, which can directly support the natural resource
7028 management efforts that are implemented on base.

7029 *7.15.2 Environmental Education and Interpretive Programs*

7030 The Boy Scouts of America and Girl Scouts of America are active on JBER. The Natural Resources office
7031 has involved scout troops in Arbor Day events and provided support and projects to prospective Eagle
7032 Scouts, including trail maintenance and improvement projects and the construction of informational kiosks
7033 at the old Wildlife Education Center and the bridge at the Otter Lake outlet. Other environmental education
7034 efforts include articles on natural and cultural resources topics on the JBER website, occasional interviews
7035 with local media, and special events such as Arbor Day tree planting. Natural and cultural resources staff
7036 conduct Newcomer's Briefings and ad hoc wildlife safety briefings.

7037 Kiosks and interpretive signage installed at strategic locations also enhance outdoor experiences for
7038 Watchable Wildlife viewing and photographers on JBER. An upgrade to the Knik Bluff Trail and
7039 development of an interpretive trail and Watchable Wildlife site at Upper Sixmile Lake would also enhance
7040 outdoor education on JBER. The Knik Bluff Trail currently bisects several NRHP-eligible sites and needs

to be rerouted to reduce impacts to cultural resources. The installation of signage throughout commonly used outdoor areas also provides important information on base policies and hazards that may be presented in restricted areas. Base representatives and Tribal liaisons also regularly engage with local Tribes and homeowners associations and participate in town halls to communicate updated policies and discuss the impacts of mission or recreation changes.

An outreach effort to reduce conflicts with bears began in 2022. The JBER wildlife program placed stickers on JBER dumpsters, including 3,260 stickers on all tipsters (curbside trash receptacles) in the JBER housing portions. Bear-resistant tipsters were installed in 2023 by Aurora Housing in certain neighborhoods. After tipsters were installed, the number of calls about black bears was compared to previous call records to determine the effectiveness of the tipsters. Installation of the tipsters resulted in no black bear-related calls at General Officer Quarters housing in 2021 and 2022. Birch Hill did not have black bear-related calls in 2021 or 2022. Dayton housing and Cherry Hill had fewer black bear-related calls in 2023. A 10-year study comparing bear-related calls 5 years before and 5 years after bear-resistant tipster installation is recommended.

In 2023, stickers were placed on 379 dumpsters on the main cantonment, in JBER-E recreation areas, and on some JBER-R training areas. Fewer dumpsters were left open (from 27 to 9) following the application of stickers on JBER-R between June 2022 and December 2023. However, sticker application on JBER-E made no difference in the annual average number of dumpsters left open between 2022 and 2023 (CEMML 2023).

7.15.3 Public Involvement and Community Outreach Opportunities

Public involvement is a key component to JBER's commitment to community outreach. Implementation of this plan requires keeping the public informed of firewood and holiday tree cutting areas, providing permits, and other items of interest. Arbor Day and Tree City USA activities are centered on a public tree planting ceremony and increasing public awareness. In addition, a chainsaw instruction and safety course has been made available to the public to improve chainsaw safety while operating on JBER.

Outdoor education and outreach opportunities to explore the vast natural areas of JBER in a safe and structured format could improve awareness of the installation's ecosystems and recreational opportunities. The cooperative management of resources, development of outreach materials, and study of shared resources with the Tribes provide important opportunities to improve JBER's outreach program. These efforts can create strong relationships, facilitate the integration of generations of data and observations into management decisions, and provide new avenues for resolving natural resource management challenges. Additionally, structured formats for scientific recreation (e.g., National Geographic's "BioBlitz", Citizen Science lake and stream monitoring, Audubon Christmas and Summer Bird Counts) could provide unique opportunities for public outreach and scientific data collection for program use.

7.16 Natural Hazards

Applicability Statement

This section applies to DAF installations that have identified natural hazards, risks, vulnerabilities, and adaptation strategies using authoritative region-specific climate science, climate projections, and existing tools. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

JBER natural resources and management activities may be affected by many significant extreme weather and natural hazard phenomena. These include the following:

- **Earthquakes**—JBER and the surrounding area are located in a highly seismically active region, with 5 active volcanoes located on the western side of the Cook Inlet and several nearby fault lines with potential for major seismic events. Major earthquakes have occurred in the region and can occur at any time. When they occur, soil liquefaction, landslides, ground failure, infrastructure damage, building collapses, utility failures, and related outcomes are all possible. Tsunami (tidal wave) events may also occur following seismic events.
- **Drought**—Hydrological and ecological drought severity is generally rare due to the overall consistent precipitation regime in the JBER region. However, recent steady rises in temperature have heightened the intensity of impacts associated with dry periods and years with well-below-average precipitation. These impacts include reduced water levels in reservoirs, low flows in creeks and streams, stress on vegetation, unusual wildlife behavior, and increased risk of wildfire ignition.
- **Wildfire**—JBER and the City of Anchorage are exposed to wildfire risk, both locally through wildland-urban interface zones and regionally via extensive forest cover in the surrounding mountains and valleys. Risks are highest during the drier part of the year, beginning in the spring and extending into early fall. Drought conditions can rapidly elevate wildfire ignition risk. While extended wet periods can mitigate ignition risk, they can also increase fuel loads, especially when paired with unseasonably warm spring and fall conditions. High-intensity fires can alter local surface hydrology, hastening runoff and resulting in erosion and flood risk.
- **Extreme snowfall events**—The Anchorage area normally sees 60 or more inches of snowfall per year, which is usually deposited in multiple relatively light snowfall events. However, multiple feet of snow can fall over the course of a few days in the region, as was seen in January 2022. These types of events can lead to significant structural damage, block transportation channels, damage utility infrastructure, and isolate nearby communities.
- **Ice Storms**—Freezing rain events regularly occur between the onset of fall and well into spring. When they occur, rainfall quickly freezes on contact with the ground and other surfaces, leading to the rapid buildup of ice. These events can lead to significant wildlife mortality, dangerous travel conditions, serious infrastructure damage, and the formation of ice dams in nearby streams, which can lead to downstream flooding and rapid erosion of stream banks.
- **Windstorms**—While average windspeeds at JBER’s main facilities are generally moderate, extreme wind events have occurred in the region, particularly as part of Chinook Wind events travelling up Cook Inlet. These events can bring strong sustained winds with gusts of up to 100 miles per hour, damaging trees, buildings, and power infrastructure and making most flight activities extremely dangerous. In 2012, a windstorm event in the region resulted in gusts of over 130 miles per hour.
- **Extreme rainfall events**—Heavy rainfall events have occurred in the region, particularly during spring and summer, when the potential for strong Pacific storm systems can enter the region, or during perturbations of the Aleutian Gyre.
- **Flooding**—Floods can occur in the Anchorage and JBER area due to a number of factors, the most obvious being extreme rainfall either locally or in upper watersheds, failure of stormwater infrastructure, or the release of waters stored behind upstream glaciated rivers. Particularly cold conditions in some years can also cause *aufeis* events, where freezing of riverbeds effectively raises the water level of streams, causing riverine flooding. Flood events can threaten infrastructure and human life and may significantly alter wildlife habitat via erosion and temporary inundation.

The multiple mission-based activities at JBER require a greater range of natural resources than do many other DAF or Army installations. Due to the ground-based nature of Army training, terrestrial habitats and species have a greater importance at JBER than at most DAF-only installations. External encroachment can also have a major impact on mission operations at JBER, and these effects could be intensified by ongoing changes in weather and natural hazard exposure. As the potential for ice-free conditions in the northern Arctic become more likely (Overland and Wang 2013, Arthun et al. 2020, Jahn et al. 2024), the strategic and logistical importance of Cook Inlet, the City of Anchorage, the Port of Alaska, and JBER itself may dramatically change over the coming century, further complicating efforts to plan for future natural resource conditions. For example, such conditions could hypothetically expand the mission of the Alaskan North American Aerospace Defense Command Region and increase the importance of JBER to this vital command. The ability of JBER to meet the current and a potentially expanded mission will require proactive and adaptive management to ensure that the required natural resources remain available.

The CIBW has been found to be highly vulnerable to water temperature and related secondary effects (e.g., prey availability, habitat loss) (NMFS 2016b). Current protections for the CIBW at JBER have been deemed adequate enough to not place any substantial limitations on military training. However, increased temperatures extending into the winter months could extend seasonal restrictions and limit the use of the ERF Impact Area for mortar and artillery training. Additionally, if CIBW population numbers substantially decline due to sustained increased temperatures or a combination of factors in the broader Cook Inlet ecosystem, potential future training needs in the vicinity of Cook Inlet may be limited. This would affect flight operations that include airspace over CIBW critical habitat, as well as artillery training at the ERF Impact Area. Proactive mitigation, management, and monitoring are essential to limiting future impacts on the mission.

Recent decades have seen multiple occurrences of early spring and/or false spring events, in which temperatures in the meteorological winter period (December through February) rise well above historically normal levels, even above freezing at times. These events have a variety of impacts, including the potential for rain on snow events that lead to the rapid thawing of snowpack and subsequent refreezing as temperatures fall. These events can also cause wildlife and certain plant life to initiate certain behaviors (e.g., bud formation in fruiting plants, wildlife emergence from hibernation) that can lead to reduced ecosystem function when freezing temperatures return later in the season. Heavy snow events that are out of step with normal seasonal cycles may directly limit access to forage for many species. This may have a pronounced effect on moose, which have been known to eat European bird cherry and chokecherry when suitable forage is not available, and it can be fatal in some instances. JBER has eradicated these plant species on base, but changing environmental conditions may allow for their reintroduction. Early spring events could also alter prey emergence and behavior, which may drive bears to spend more time searching for food around high human-activity areas, increasing the potential for conflict and harm on both sides. False springs may also drive foraging behaviors that increase risks of human-wildlife conflict.

Numerous buildings, roads, and other structures on the installation may face rising vulnerability to flooding if current precipitation and storm intensity trends do not abate. In the Ship Creek Watershed, several roads (e.g., Grady Highway, Stephenson Lane, Campos Avenue, Sockeye Avenue) providing access to and from family housing could be inundated during large rain events. Transmitter Site Access Road, which provides access to the transmitter site between the cantonment and family housing (south of Davis Highway), could also become inundated. Vandenberg Road, a major north-south road connecting several sites could be flooded during storm events in the future. Other vulnerable infrastructure that could be affected and impact the military mission at JBER include the water treatment building and the ADF&G Hatchery water well. This could affect the mission at JBER if mission-critical personnel cannot reach their duty stations. In the

Eagle River Watershed, Route Bravo and Route Sweat could be vulnerable to flooding. Route Bravo connects several firing sites, including Landing Zone 13, Landing Zone 15, a fixed artillery site, and a munition waste disposal site (Military Munitions Response Program Site 02781-166). Route Sweat connects Neibar Drop Zone and Firing Point with an open area on the right bank of the Eagle River, possibly used for riverine operations training. These 2 routes are vital infrastructure to the mission at JBER, and even temporary closures due to flooding would negatively impact military training. Limited movement to and from housing could also reduce morale. As a result, flood risk mitigation is and should remain a major priority for managers, especially work that enhances the function of riparian systems and wetlands.

More information on key weather- and natural hazard-related information pertinent to planning and action in the JBER region is available in the latest version of the Anchorage All Hazards Mitigation Plan (Municipality of Anchorage 2022) and the State of Alaska Hazard Mitigation Plan (State of Alaska 2023).

7.17 Geographic Information Systems (GIS)

Applicability Statement

This section applies to all DAF installations that maintain an INRMP, since all geospatial information must be maintained within the DAF GeoBase system. The installation is required to implement this element.

Program Overview/Current Management Practices

Too often, due to inefficient data storage, retrieval, and analysis systems, biological data are collected and stored without being used. A data management system is critical to ecosystem management since it relies heavily on data to make and evaluate ecosystem-based management decisions. GIS is a vital tool that assists land managers with decision-making and monitoring of management and mission activities. GIS also plays a critical role in planning actions for current and future years and maps out useful information for everyday work plans.

GIS is a powerful tool to assist NRMs in conflict resolution and mission enhancement and sustainment. GIS is capable of assembling, storing, manipulating, and displaying geographically referenced information (i.e., data identified according to their locations). GIS can analyze and model (manipulate, overlay, measure, compute, and retrieve) digital spatial data and display maps and tabular resources showing results of spatial analyses. GIS technology integrates common database operations, such as query and statistical analysis, with the unique visualization and geographic analysis benefits offered by maps, which distinguishes GIS from other information management systems.

The DAF implements GIS through the GeoBase program, which specifies geo-digital collection and display protocols. The 673 CES is responsible for maintaining the JBER GeoBase system. Data gathered through inventory and monitoring at JBER are stored as digital data within a computer database and on paper as hard copies.

Natural Resources Spatial Database

GIS data management is critical to successful implementation of this INRMP. Spatial data for various elements of the Natural Resources program are used to create maps that help facilitate planning activities that have the potential to impact management programs. GIS is a powerful tool for studying natural resources and aids in locating topographic features, determining the aerial extent of coverage of a certain resource or problem area, monitoring those resources or problems, and modeling probable scenarios, all of which optimize resource utilization.

7211 GIS takes into consideration many natural resource elements, including land use/cover, soil, hydro-
7212 morphology, terrain, slope, drainage, and wildlife habitats and population parameters. It combines these
7213 with built features (structures, recreation facilities, transportation features, etc.) and mission aspirations to
7214 provide various options for sustainable development or land/water use after scientific analysis of spatial
7215 and non-spatial data.

7216 JBER's natural resources database is stored in the JBER GeoBase enterprise geodatabase. Layers that have
7217 been developed from scientifically collected datasets include ecological land classifications
7218 (geomorphology, surface form class, vegetation class, disturbance class, and ecotype; Pullman et al. 2003),
7219 Ship Creek flood hazards (USACE 1975), and loon and raptor nesting territories (Anderson et al. 2008).
7220 Additional INRMP-related values entered into GeoBase include recreational trails and other facilities,
7221 BASH BEZs and vegetation management, wetlands, moose hunt areas, timber harvest areas, and habitat
7222 mitigation areas.

7223 JBER uses GeoBase data and information to support numerous mission objectives, including improvement
7224 of land and resource management decisions. It incorporates field locations and data for various inventory
7225 and monitoring activities to make data more accessible to NRMs. GeoBase is providing and will continue
7226 to provide a variety of maps for managing and monitoring impacts of military use, recreational use planning,
7227 and natural resources projects. GeoBase will be used to produce maps that include such features as military
7228 facilities, transportation networks, drainage, cultural sites, vegetation, wetlands, elevation, and soils. All
7229 future JBER Environmental data layers will be developed and maintained IAW direction from the
7230 Headquarters Pacific Air Forces Directorate of Installations and Mission Support.

7231 GeoBase supports natural resources management by enabling evaluation of development and use impacts
7232 on natural resources and documenting and tracking resource management actions. This type of analysis will
7233 help prioritize projects for natural resources management. The maps available through the GeoBase
7234 program provide a readily available resource for field activities that provide relevant ecological,
7235 geomorphic, and development details to field crews.

7236 **Remote Sensing and GIS Monitoring and Assessment Program**

7237 The use of remote sensing and GIS allows a thorough assessment of vegetation health, forest productivity,
7238 wetland area and changes, and insect and fire damage on JBER (and similar areas outside of JBER for
7239 comparison, if desired). Historical imagery can also be georeferenced and used to monitor environmental
7240 changes and trends, including coastal and riverine erosion.

7241 Management tools using remote and GIS monitoring provide information regarding current and past
7242 ecosystem performance. Collecting systematic measurements across spatial and temporal scales allows
7243 JBER managers to compare multiple sites and provides long-term monitoring capability. This provides
7244 JBER planners with synoptic and temporal dynamics of installation ecosystems to facilitate informed
7245 management and remediation, optimizing the JBER training mission and ecosystem sustainability.

7246 Forest resource and ecotype studies by Alaska Pacific University in 2013 to 2015 (Dial et al. 2015), as well
7247 as ecological monitoring conducted by HDR, Alaska Pacific University, MWH Global, Inc., Colorado State
7248 University, and JBER staff since the 1990s, provide detailed data of the ground-level environment,
7249 including the vegetation assemblage at all layers (canopy, shrub, herb, and ground), surface and subsurface
7250 hydrology, and soils composition. These data may be matched to aerial imagery taken around the same time
7251 to establish aerial signatures, which can then be used to conduct tabletop assessments of ecotypes
7252 throughout JBER. Updates of installation digital aerial imagery and ground-truthing to monitor vegetation
7253 and land-use change are scheduled to repeat on a 3-year cycle.

7254 **GIS Maintenance and Use**

7255 The 673 CES Natural Resources office will continue to coordinate and exchange data through the GeoBase
 7256 program and the AFCEC Environmental Operations Division (AFCEC/CZ) Environmental GIS Support.
 7257 New contracts that go to outside agencies or contractors include a clause that requires any spatial data
 7258 developed from the study to be incorporated into a compatible GIS format and furnished to the Natural
 7259 Resources office in a digital format that is compatible with current JBER GeoBase software and as hard
 7260 copies. The potential also exists for outsourcing or contracting for additional data layers. Additional nature
 7261 resource data layers should be solicited from partnering agencies.

7262 The GeoBase program is a DAF program created to centralize mapping for a given installation. The
 7263 GeoBase program is run by the Geo Integration office, a fused environment of enlisted personnel, civilians,
 7264 and contractors that work together to best meet the requirements of DAFI 32-10112, *Installation Geospatial*
 7265 *Information and Services* (21 February 2023).

7266 The JBER Geo Integration office uses a diverse collection of hardware for information collection and
 7267 analysis. The enterprise geodatabase is administered directly by the Geo Integration office staff, with
 7268 assistance from 673 CES and 673d Contracting Squadron system administrators. Software updates, patches,
 7269 and time compliance network order directives are maintained by the GeoBase administrator. A service level
 7270 agreement between the 673d Communications Squadron Network Control Center and 673 CES defines the
 7271 roles that each organization plays in the administration and support for the servers.

7272 The 673 CES GeoBase program has multiple software holdings. Mapping software, raster enhancement,
 7273 and remote sensing software are held and maintained by the GeoBase administrator. The Environmental
 7274 Systems Research Institute is the core software vendor used by the Geo Integration office; these GIS
 7275 products provide advanced spatial analysis, displays, and storage of geographically referenced information.
 7276 The 611th Geo Integration office also shares a license for Earth Resources Data Analysis System imagine
 7277 software package across the network for advanced raster processing.

8.0 MANAGEMENT GOALS AND OBJECTIVES

The installation establishes long-term, expansive goals and supporting objectives to manage and protect natural resources while supporting the military mission. Goals express a vision for a desired condition for the installation's natural resources and are the primary focal points for INRMP implementation. Objectives indicate a management initiative or strategy for specific long or medium range outcomes and are supported by projects. Projects are specific actions that can be accomplished within a single year. In cases where off-installation land uses may jeopardize DAF missions, this section may list specific goals and objectives aimed at eliminating, reducing, or mitigating the effects of encroachment on military missions. These natural resources management goals for the future have been formulated by the preparers of the INRMP from an assessment of the natural resources, current condition of those resources, mission requirements, and management issues previously identified. Below are the integrated goals for the entire Natural Resources program.

The installation goals and objectives are displayed in the Installation Supplement section below in a format that facilitates an integrated approach to natural resource management. By using this approach, measurable objectives can be used to assess the attainment of goals. Individual work tasks support INRMP objectives. The projects are key elements of the annual work plans and are programmed into the conservation budget, as applicable.

Installation Supplement

The installation goals and objectives support the 673 CES/CEIEC's Mission Statement, which is to "support the military mission and enhance readiness by providing natural environments on JBER for training, minimizing conflicts between mission requirements and land and natural resources uses and wildlife" and serve as "stewards of the land by maintaining natural landscape features and ecosystem integrity at a broad landscape scale."

Individual JBER Natural Resources program projects are included below the main INRMP Goal and Objective they support. Projects and tasks are also included in [Section 10.0](#).

GOAL 1 MINIMIZE CONFLICTS BETWEEN THE MILITARY MISSION, WILDLIFE, NATURAL RESOURCES, AND LAND USE.

Objective 1.1 Achieve no net loss of military training through coordination and management of federally protected species (e.g., Endangered Species Act, Marine Mammal Protection Act, Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act), their habitats, and state-protected species and sensitive resources when practicable.

Project 1.1.1 Mgt, Species, Eagles/Bird Survey; and American Goshawk Baseline Data Collection

Project 1.1.2 Mgt, Species, Eagle River Flats (ERF) Impact Area Unmanned Aerial System (UAS) Avian spp. Detection

Project 1.1.3 Mgt, Species, Northern Goshawk Baseline Data Collection

Project 1.1.4 Coordinate with the Joint Base Elmendorf-Richardson (JBER) Wildland Support Module (WSM) to execute protective activities (i.e., wildland fire prevention and suppression) where unplanned ignitions and wildland fire may pose a risk to federally protected species and their habitats, native rare plants, and sensitive historic properties and resources of religious and cultural significance to Tribes.

- 7320 Project 1.1.5 Implement long-term monitoring of little brown bat maternity roosts and
7321 hibernacula, and build and deploy alternative roosting habitat to minimize
7322 mission-related impacts.
- 7323 ***Objective 1.2 Advise the Bird Airstrike Strike Hazard (BASH) program, evaluate***
7324 ***management activities required by 3d Wing Instruction 91-212. Provide habitat or management***
7325 ***modification recommendations annually, if needed, to JBER airfields and surrounding airfield***
7326 ***environment, and appropriate drop zones.***
- 7327 Project 1.2.1 Annually provide guidelines and management plans for planting densities
7328 within BASH and Wildlife Exclusion Zones (Mgt, Habitat, Urban Forest).
- 7329 Project 1.2.2 Update depredation permit to include basewide coverage of training areas due
7330 to Canada Geese observations on Malemute Drop Zone in October 2017. A
7331 2018 mission was canceled due to presence of birds on Malemute Drop Zone.
7332 A coordinated BASH strategy to address the avian risk associated with this
7333 drop zone is needed.
- 7334 ***Objective 1.3 Identify areas with high risk of wildlife conflict based on wildlife response***
7335 ***calls, and use this information to effectively monitor and mitigate wildlife conflict.***
- 7336 Project 1.3.1 Mgt, Nuisance Wildlife
- 7337 Project 1.3.2 Work with the Alaska Department of Fish and Game (ADF&G) to assess
7338 black and brown bear population status on JBER, emphasizing a resurvey of
7339 the 2005 to 2007 efforts (Mgt, Species, Black and Brown Bear Study).
- 7340 Project 1.3.3 Coordinate with Aurora Housing; 673d Civil Engineer Squadron
7341 Environmental Element, Compliance/Conservation; 773d Civil Engineer
7342 Squadron, Force Support Squadron (FSS); and 673d Contracting Squadron
7343 (through meetings with all parties) to monitor solid waste containers as they
7344 relate to nuisance wildlife calls.
- 7345 Project 1.3.4 Create a GeoBase map annually, depicting all wildlife conflict responses.
- 7346 Project 1.3.5 Work with FSS to minimize wildlife conflict around Otter Lake and
7347 Campgrounds.
- 7348 Project 1.3.6 Identify and prioritize areas with increased and ongoing beaver conflicts and
7349 reduce beaver activity in those areas through trapping support or a depredation
7350 permit.
- 7351 ***Objective 1.4 Utilize the principles of adaptive management; work with Integrated Training***
7352 ***Area Management (ITAM) and Range Control to integrate land management efforts and***
7353 ***monitor results of management and military activities. Ensure the Integrated Natural Resources***
7354 ***Management Plan and ITAM management plans are complementary.***
- 7355 Project 1.4.1 Facilitate a fee-based personal use woodcutting program and holiday tree
7356 harvest in designated areas. Coordinate with the Bureau of Land Management
7357 (BLM) for selective tree thinning and sustained production of commercially
7358 valuable forest products (Mgt, Habitat, Forest Resources).
- 7359 Project 1.4.2 Coordinate with the Alaska Department of Natural Resource's Division of
7360 Forestry and University of Alaska Fairbanks' Cooperative Extension to
7361 monitor insect infestations on JBER. Draft and coordinate the required
7362 Prescription Plans in the BLM-JBER Memorandum of Understanding.
7363 Coordinate with ITAM to develop silvicultural prescriptions for each training
7364 area based on anticipated future military needs. Perform hazard tree
7365 assessment surveys in cantonment and heavy-traffic training areas, especially
7366 around firing points and landing zones.

Objective 1.5 Provide environmental education and outreach. Work to establish better working relationships with neighboring communities and Federally Recognized Tribes.

Project 1.5.1 Present at the JBER Newcomers Briefings, Safety Days, AK101 introductory events, and the Exceptional Families Weekend, and work with 673d Air Base Wing's Public Affairs Office to provide environmental outreach and awareness.

Project 1.5.2 Participate in Tree City USA, Arbor Day, and other urban forest initiatives (Mgt, Habitat, Urban Forest).

Project 1.5.3 Contribute to scientific knowledge by publishing results from studies, when appropriate, at scientific conferences or in peer-reviewed journals.

Objective 1.6 Enhance the long-term sustainability of the military mission and natural resources through implementation of an adaptive wildland fire program that minimizes risks while meeting ecological and land management objectives.

Project 1.6.1 Maintain utilization of wildfire suppression tactics consistent with the JBER Wildland Fire Management Plan (WFMP) to minimize impacts to natural resources and the military mission while controlling potential damages from all wildfire to the maximum extent possible.

Project 1.6.2 Coordinate with the JBER WSM to support planned mechanical fuel treatments, including construction and maintenance of all firebreaks and fuel breaks and removal of spruce killed by spruce beetles.

Project 1.6.3 Support the WFMP by coordinating with other entities responsible for fire prevention and environmental conservation to include natural resource and cultural resource management.

Project 1.6.4 Coordinate with the JBER WSM to burn between 2,000 and 3,000 acres annually to reduce fuels near ranges and impact zones, as needed, based on wildfire risk, in accordance with the WFMP.

GOAL 2 MANAGE JBER NATURAL RESOURCES UNDER THE GUIDELINES AND PRINCIPLES OF ADAPTIVE ECOSYSTEM MANAGEMENT, WHICH AIM TO MAINTAIN FUNCTIONAL ECOSYSTEMS AND NATURAL DIVERSITY, INCLUDING SUSTAINABLE POPULATIONS, NATIVE SPECIES, AND ECOLOGICAL COMMUNITIES.

Objective 2.1 Inventory and monitor JBER's natural resources, including soil, water, wetlands, flora, and fauna, to provide baseline information on ecosystem integrity and health, status of renewable resources, and status of threatened or sensitive species or communities.

Project 2.1.1 Survey Long-Term Ecological Monitoring (LTEM) plots for vegetation and wildlife diversity, abundance, and occupancy of habitats (Mgt, Habitat, Long-Term Ecological Monitoring).

Project 2.1.2 Mgt, Species, Winter Track Surveys

Project 2.1.3 Mgt, Species Harbor Porpoise Monitor In Knik Arm/Eagle River

Project 2.1.4 Mgt, Wetlands/Floodplain

Project 2.1.5 Perform urban forest inventories to document and catalogue tree characteristics, status, recommendations for maintenance, and assessment of potential conflicts with the military mission (Mgt, Habitat, Urban Forest).

Project 2.1.6 Conduct salmon spawning surveys along JBER's anadromous systems.

Project 2.1.7 Using volunteers, conduct monitoring of presence and abundance of multiple bird species.

7413	Project 2.1.8	Investigate harbor seal use of Eagle River and waters adjacent to JBER.
7414	Project 2.1.9	Conduct pilot study on harbor seal photo-identification in Eagle River/Bay.
7415	Project 2.1.10	Finalize the JBER Forest Management Plan. Plan will include establishing a
7416		stand-level GIS layer to facilitate forestry management, collecting mapping
7417		data from ITAM, and establishing baseline maps.
7418	Project 2.1.11	Manage the aerial signature compilation for all available imagery years using
7419		historical and current vegetation monitoring data and historical aerial
7420		photographs to increase the analytical integrity of ecosystem changes over
7421		time.
7422	Project 2.1.12	Maintain regular updates to the JBER Wetland Functional Assessment.
7423	Objective 2.2 Maintain or improve native vegetation patterns, ecological successional stages,	
7424	and ecosystem integrity and function.	
7425	Project 2.2.1	Annually implement silviculture treatments such as thinning, hazard tree
7426		removal, seed tree cuts, and selective cutting of snag trees (Mgt, Habitat,
7427		Forest Resources).
7428	Project 2.2.2	Mgt, Habitat, Winter Moose Browse Utilization Inventory
7429	Project 2.2.3	Mgt, Habitat, Fishery Restoration/Enhancement
7430	Project 2.2.4	Walk and check Sixmile and Otter creeks at least once a year to ensure that
7431		large debris is not blocking the channels.
7432	Project 2.2.5	Coordinate with the JBER WSM to implement prescribed burns and
7433		mechanical treatments to enhance moose browse and other natural habitats.
7434	Objective 2.3 Prevent the introduction and spread of invasive species, provide for their	
7435	control, validate effectiveness of control methods, and minimize their mission, ecological, and	
7436	economic impacts.	
7437	Project 2.3.1	Mgt, Invasive Species, Multi Plant Species
7438	Project 2.3.2	Mgt, Invasive Species, eDNA Multi Species
7439	Project 2.3.3	Establish an early-detection program for aquatic invasive species in JBER
7440		lakes.
7441	Project 2.3.4	Map JBER invasive vegetation and control efforts.
7442	Project 2.3.5	Coordinate with the JBER WSM to implement prescribed burns in
7443		conjunction with Integrated Pest Management strategies to control invasive
7444		plant species. Where practicable, highly invasive species may be stimulated
7445		by fire, followed by chemical control to exhaust the seed bank.
7446	Objective 2.4 Identify and map essential/critical habitats for species at risk and species of	
7447	special concern that are most likely to become candidate species.	
7448	Project 2.4.1	Mgt, Species, Interagency Collaboration, SOSC Collared Pika Survey
7449	Project 2.4.2	Mgt, Species, Bat Survey
7450	Project 2.4.3	Mgt, Species, Pollinators, Western Bumblebee
7451	Project 2.4.4	Monitor for occurrences of Alaskan douglasia and other federally and state-
7452		listed plant species of concern, and catalogue their occurrences in GIS (Mgt,
7453		Species, Rare Plant Inventory).

Objective 2.5 *Identify risks to biodiversity and ecosystem health from habitat fragmentation and reduced connectivity.*

- Project 2.5.1 Annually monitor 10% of established LTEM plots for on-the-ground vegetation and wildlife trends (Mgt, Habitat, Long Term Ecological Monitoring).

Objective 2.6 *Establish/sustain functional partnerships with land management agencies, non-governmental organizations, universities, and the public to fulfill JBER natural resource objectives.*

- Project 2.6.1 Mgt, Species, Winter Track Surveys
- Project 2.6.2 Work with the US Fish and Wildlife Service (USFWS) National Wetlands Inventory to provide data and support during update efforts for wetland maps in Alaska (Mgt, Habitat, Wetland/Floodplains).
- Project 2.6.3 Reduce human–wildlife conflicts, specifically with bears, through development of a collaborative effort in conjunction with the Anchorage Bear Committee and base leadership. The program will strive to establish a uniform base policy with a focus on public education/outreach, enforcement, and minimizing bear attractants.
- Project 2.6.4 Complete and coordinate forest management prescription plan(s), as outlined in the forestry stewardship agreement with BLM.

GOAL 3 MANAGE HUMAN USE OF RESOURCES FOR LONG-TERM SUSTAINABILITY BY OFFERING PRODUCTS AND SERVICES AT LEVELS COMPATIBLE WITH THE MILITARY MISSION AND ECOSYSTEM DIVERSITY, HEALTH, AND PRODUCTIVITY, PLACING EQUAL EMPHASIS ON CONSUMPTIVE AND NON-CONSUMPTIVE USE AND CONSERVATION AND PRESERVATION OF NATURAL RESOURCES ON JBER, CONSISTENT WITH SIKES ACT REQUIREMENTS.

Objective 3.1 *Evaluate JBER forest, wildlife, and fisheries resources and develop recommendations for sustained yield.*

- Project 3.1.1 Mgt, Habitat, Winter Moose Browse Utilization Inventory
- Project 3.1.2 Develop a long-term dataset of dissolved oxygen and water temperature for JBER lakes.
- Project 3.1.3 Conduct evaluations of over-winter growth, health, and survival of stocked fish populations in JBER lakes.
- Project 3.1.4 Assess RecAccess Hunting and Fishing reports and determine fishing pressures.

Objective 3.2 *Monitor and evaluate outdoor recreation activities and develop recommendations for providing quality and sustainable outdoor recreation opportunities.*

- Project 3.2.1 RecAccess support—provided by reimbursable United States Fish and Wildlife funds.
- Project 3.2.2 Review and comment on ADF&G annual stocking plan.
- Project 3.2.3 Review RecAccess creel surveys and provide annual report of fishing efforts to ADF&G Sport Fish Division.
- Project 3.2.4 Monitor existing trails and improve identified outdoor recreational opportunities.
- Project 3.2.5 Coordinate with ADF&G to issue hunting permits for moose and black bear.

Objective 3.3 *Provide consistent and effective enforcement of all federal, state, and local natural resource laws and regulations.*

- Project 3.3.1 Update or revise 673d Air Base Wing Instruction 32-7001.
- Project 3.3.2 Manage the Military Conservation Agent (MCA) program to maximize assistance in enforcement of JBER installation policies, and public education of natural and cultural resources laws and regulations.

GOAL 4 CONTRIBUTE TO THE RECOVERY OF THE COOK INLET BELUGA WHALE (CIBW).

Objective 4.1 *Study/monitor CIBW usage of waters on and adjacent to JBER.*

- Project 4.1.1 Mgt, Species, Beluga Whale Prey (Marine)
- Project 4.1.2 Mgt, Species, Beluga Acoustical Monitoring
- Project 4.1.3 Mgt, Species, Cook Inlet Beluga Whale/Ice Conditions
- Project 4.1.4 Mgt, Species, Beluga EOD Escort

Objective 4.2 *Monitor the quality and quantity of CIBW habitat on and adjacent to JBER, especially of features included as primary constituent elements in the CIBW Critical Habitat designation*

- Project 4.2.1 Mgt, Species, CIBW Prey—Salmon Monitoring (Weirs)

Objective 4.3 *Study/monitor, protect, and enhance (where appropriate) prey species for the CIBW.*

- Project 4.3.1 Mgt, Species, Beluga Prey—Salmon Productivity

Objective 4.4 *Monitor in-water anthropogenic noise from JBER activities and assess the potential impact on CIBWs.*

- Project 4.4.1 Mgt, Species, Cook Inlet Beluga Whale, Training Noise Impacts

Objective 4.5 *Assist other researchers (e.g., from National Marine Fisheries Service [NMFS], USFWS, ADF&G) with CIBW studies and conservation efforts in Cook Inlet, when practicable.*

- Project 4.5.1 Contribute to Knik Arm portion of photo-identification project, in cooperation with NMFS.
- Project 4.5.2 Work with NMFS and the Native Village of Eklutna (or other Alaska Native Entities) to study CIBW usage of upper Knik Arm.
- Project 4.5.3 Work with NMFS, ADF&G, and the Native Village of Tyonek (or other Alaska Native Entities) to tag CIBWs in Upper Cook Inlet.

9.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

9.1 Natural Resources Management Staffing and Implementation

9.1.1 Natural Resources Management Staffing

The creation of JBER through joint-basing, as well as other requirements and issues, have magnified the need for on-site Subject Matter Experts. These requirements and issues include program incorporation, overcoming the loss of shared 11 ABN DIV subject matter support, requirements for supportive data collection for resumption of all season firing into ERF Impact Area, endangered CIBW, and salmon, a prey species that is considered a primary constituent element necessary for CIBW recovery.

Personnel requirements for the JBER Natural Resources program are delineated in the table below.

Table 9-1. Current Joint Base Elmendorf-Richardson Natural Resources program staffing

Title	Type	Series/Grade	Status
Chief, Conservation Section	DoD Civilian	0401/GS-13	Filled
Biological Scientist (4)	DoD Civilian	0401/GS-12	Filled
Senior Conservation Law Enforcement Officer (2)	DoD Civilian	1801/GS-12	Filled (1) Vacant (1)
Conservation Law Enforcement Officer (3)	DoD Civilian	1801/GS-7/9/11	Filled
Junior Conservation Law Enforcement Officer	DoD Civilian	1801/GS-7/9	Vacant

Volunteer Program

The 673 ABW has an active volunteer program. Individuals and groups donate labor and occasionally materials to specific projects. Volunteers receive training, are issued equipment, are covered for liability and workman's compensation, and assist with various natural resources projects. Many groups, including Boy and Girl Scout troops, school groups, clubs, and military organizations, are enlisted for various special projects. Volunteers work on projects in the following areas:

- Fisheries and wildlife monitoring
- Monitoring bird species presence and abundance
- Monitoring of loons and grebes through Alaska Loon Watch
- Forest inventory
- Tree planting or cutting
- Wildlife habitat surveys and improvement projects
- Construction, upgrades, and repairs of Watchable Wildlife areas
- Trail maintenance and construction

Military Conservation Agent Program

The MCA additional duty program has annually provided approximately 3 person-years of time since 1995. This program greatly enhances available coverage for enforcement of JBER installation policies, patrol, public contact, and wildlife response activities. [Section 7.3.3](#) further discusses this program.

Technical Support and Outside Assistance

Major projects, such as natural and cultural resources plans and inventories, are often contracted to various public and private agencies such as the USFWS, ADF&G, Air Force Center for Environmental Excellence, University of Alaska Anchorage, and CEMML. Some research has been conducted locally by graduate students, primarily from the University of Alaska. The Natural Resources office intends to pursue assistance with some aspects of forestry management through an agreement with the US Forest Service. Technical support is sometimes available from agencies such as the ADF&G, which has provided technical advice and training on several issues.

9.1.2 Natural Resources Management Implementation and NEPA

The NEPA is implemented by the JBER EPF representative, pursuant to the *DoD Implementation of the NEPA*, which provides guidance on NEPA implementation on federal lands. To ensure that the DAF achieves and maintains compliance with NEPA, all natural and cultural resources on an installation must be considered, a process that begins with an Air Force (AF) Form 813 (Request for Environmental Impact Analysis). In addition to the goals listed on AF Form 813, effective environmental analysis requires consideration of the human environment and cross-jurisdictional training goals, an example of which is provided by the ecological assessment of JBER's alpine training areas (Johnson et al. 2022). Both the project proponent and the EPF have certain roles and responsibilities as part of the NEPA process. The 673 CES/CEI is the designated EPF for JBER. In general, the NEPA process begins at the earliest time possible, often following the initial review of AF Form 332 (Base Civil Engineer Work Request), which project proponents submit to the JBER 773d Customer Service Unit.

The DAF uses AF Form 813 to document the need for further environmental analysis (e.g., EA or EIS) or for the use of a certain Categorical Exclusion (CATEX). Often, a CATEX will not require an AF Form 813. When an AF Form 813 is not required, AF Form 332 may be signed by the representative of the EPF (673 CES, Installation Support, EIAP Planner), indicating the specific CATEX that applies. The Staff Judge Advocate advises the proponent and environmental planning personnel on CATEX determinations and the legal sufficiency of environmental documents. The EPF assists the proponent throughout the NEPA process. Effective environmental planning requires comprehensive planning documents, which are supported by Area Development Platforms and Comprehensive Planning Platforms. JBER should pursue the development of these platforms, where applicable, to support new project planning efforts.

With regard to natural resources, AF Form 813 facilitates an integrated approach to planning and decision-making by allowing environmental Subject Matter Experts within the 673 CES/CEI, AFCEC Restoration, the JBER Tribal Liaison Officer, Bioenvironmental, and the JBER Installation Planning offices the opportunity to review a proposed action and provide comments to the EPF representative. These comments can identify potential impacts to assist in the environmental analysis determination, which assists with the final determination as to whether a CATEX is proper or if an EA or EIS is required. The EPF may decide to prepare an AF Form 813 to take a harder look at a proposed action to ensure that it does not present any extraordinary or unique circumstances that would make a CATEX inapplicable. For example, the presence of T&E species, archeological remains, or historical sites may present such circumstance. Therefore, AF Form 813 serves to both document the NEPA process and engage environmental Subject Matter Experts in the review of proposed actions to ensure the proper application of CATEX and assist in the determination of further environmental analysis.

Typically, EAs and EISs are prepared by consulting firms for large projects such as the Runway Extension Project, F-22A Beddown, and the construction of a new water treatment plant. At JBER, the DAF will typically serve as the lead federal agency for most projects, even if the proponent may be another tenant or tenant service (e.g., 11 ABN DIV). Occasionally, the DAF may function as a cooperating agency with

another federal agency, or a specific unit may serve as the cooperating agency. In the Proposed Mortar and Artillery Training Project at the Richardson Training Area, the DAF was the lead federal agency but the 11 ABN DIV of the Army was the proponent, and thus served as a cooperating agency. Since the major environmental contingency was related to impacts to marine mammals, including the CIBW, NMFS was also invited to participate as a cooperating agency. In the Anchorage Terminal Area Airspace Procedures Study project, the Federal Aviation Administration was the lead agency, but the DAF was the proponent and thus was invited to participate as the cooperating agency.

The Sikes Act Improvement Act (Section 2905(c) of the National Defense Authorization Act for FY98) required the preparation and implementation of an INRMP on appropriate military installations by November 2001. An INRMP has been in place at EAFB since 2001 and at FRA since 1998. This plan will be implemented by actions to achieve the goals and objectives listed in [Section 8.0](#). Projects and Tasks to accomplish these goals and objectives will form the foundation for funding. Each goal will be accomplished to the maximum extent possible when and if funding is available. Projects may be accomplished by in-house staff, contractors, and/or volunteers, or through cooperative agreements with state and federal agencies or other private organizations.

The INRMP is considered fully implemented if all high-priority projects are funded and executed, there are sufficient numbers of trained natural resources personnel, and those personnel have sufficient supplies and equipment to carry out these projects. JBER will follow DAF programming procedures to request funding for these projects.

9.1.3 Work Plans

Work plans and projects are integral to successful implementation of this INRMP. Annual requirements for funding through the Natural Resources program have been identified through FY29 ([Section 10.0](#)). Work plans may change with time, as work requirements change and projects are completed on time, ahead of schedule, or behind schedule (or they significantly change due to mission changes). All work plans and subsequent projects will revolve around BMPs to support the mission and ensure ecosystem management. Work plans will be updated annually and reviewed and approved per DAFMAN 32-7003.

9.1.4 Implementation Funding Options

Natural resources management relies on a variety of funding mechanisms, some of which are self-generating and all of which have different application rules. DAFMAN 32-7003 outlines funding sources, funding priorities, and levels of effort for DAF natural resources programs. Funding sources include the operations and maintenance appropriation, reimbursable Natural Resources program accounts, DoD Legacy Resource Management Program, Strategic Environmental Research and Development Program, and funds that may be obtained through cooperative agreement under authority of the Sikes Act.

Operations and Maintenance

The Natural Resources program normally has an annual operations and maintenance budget, which is allocated through the CES, that covers day-to-day operational costs such as employee salaries, vehicles, gas, office and field supplies, and basic operating needs. In addition to this general funding source, funding is received for special projects, and some natural resources programs generate funds which are, by regulation, used to support the programs that generated them.

Reimbursable Conservation Program Funds

Funds generated from the sale of forest or agricultural products, grazing and cropland outgrants, and fees from hunting, fishing, trapping, and other outdoor recreation activities may be reimbursed to commands and installations for natural resources programs under certain conditions set forth by law. [Section 7.8](#) and [Section 7.2](#) further discuss reimbursable conservation program funds.

Forest Products and Timber Sales

Production and sale of forest products are conducted under a reimbursable forestry program. 10 USC § 2665 authorizes reimbursement of costs directly related to the production of forest products with proceeds derived from the sale of the forest products. Eligible forestry program reimbursements include those that are directly related to the economic production and sale of timber, logs, pulpwood, holiday trees, posts and poles, pine straw, stump wood, bark and other mulch, cones, seeds, firewood, and wood chips. Proceeds from the sale of forest products produced on an installation are used to reimburse forestry program operating costs. The highest priority for funds is related to the production and sale of harvest products. Other authorized expenses include forest management, forestry equipment, forest fire protection, forest access roads, reforestation, and forestry support.

Forty percent of the installation's net proceeds are then distributed as an entitlement to the state in which the military installation is located to be used for local roads and schools. Remaining net funds are transferred to a holding account (DoD Forestry Reserve Account). Balances in the account are made available to Military Departments for improvements of forest lands, unanticipated contingencies in the administration of forest lands, and natural resources management that implements approved plans and agreements. Timber receipts have varied from year to year and will be monitored and reported in future INRMP updates.

Agricultural Outleasing

Lands used to support the military mission may also be outleased for agricultural and grazing purposes. 10 USC § 2667(d)(4) authorizes the use of proceeds from agricultural leases and sales of agricultural products to cover the administrative expenses of agricultural leasing and to finance natural resources management activities that implement an approved INRMP, including improvements of lands currently or not currently leased for agricultural and grazing purposes, wildlife habitat improvement, and erosion control. These are the broadest-use funds available exclusively to NRMs.

Agricultural funds are treated as normal operations and maintenance funds and must be obligated in the fiscal year in which they were issued. There are no agricultural leases on JBER and no plans to institute such leases in the future.

Alternative Funding Sources

Other funding sources may be available to support implementation of INRMP actions and initiatives. Some alternative sources of funding available to JBER are described below, but not all of these are used by JBER.

DoD Legacy Resources Management Program

The Legacy Resources Management Program provides funding for projects that identify means to improve natural and cultural resources management on DoD lands in general. Legacy may fund natural resource projects that address integrated natural resource management, regional ecosystem management initiatives, invasive species control, and cooperative conservation. Projects receiving Legacy Resources Management Program funding cannot be installation-specific.

In the past, some special projects have been funded through this program, the most recent being the study of Rusty Blackbird habitat use on JBER (Matsuoka et al. 2010).

7686 BASH Funding

7687 Since the fatal air crash in 1995, numerous projects have been funded under BASH funding. Past and future
7688 projects to change vegetation around the flightline, as well as the costs of bird dispersal operations, are
7689 funded from this source. In many cases, funds are Wing-level funds that are diverted from other programs.

7690 Readiness and Environmental Protection Initiative

7691 DoD established the Readiness and Environmental Protection Initiative to provide funding for the military
7692 to work with state and local governments, non-governmental organizations, and willing landowners to limit
7693 incompatible development and protect valuable open space and habitat around key testing and training
7694 areas. The funding leverages public/private partnerships and additional financial commitments to promote
7695 innovative land conservation solutions that meet mutual interests. Projects are selected for this funding
7696 based on military needs and partnering opportunities.

7697 Strategic Environmental Research and Development Program

7698 The Strategic Environmental Research and Development Program is a joint DoD, Department of Energy,
7699 and US EPA program. The program can be used to fund conservation research on DoD installations. The
7700 program can pay for certain research and development projects that involve the development of new
7701 technologies for natural and cultural resources management.

7702 **9.2 Monitoring INRMP Implementation**

7703 Monitoring and evaluation are the heart of adaptive management and act as checks for INRMP
7704 implementation. Although this INRMP establishes the direction for 2024 to 2029, it may take much longer
7705 to adequately address some goals and desired future conditions. Monitoring determines whether:

- 7706 • Projects are implemented in compliance with INRMP, DAF, and DoD requirements
- 7707 • Standards and guidelines are followed
- 7708 • Standards and guidelines are effective
- 7709 • Goals and objectives are met
- 7710 • Assumptions, relationships, and decisions are valid, considering new information or changing
- 7711 conditions

7712 Implementation monitoring is pertinent to this INRMP. Implementation monitoring determines whether the
7713 installation did what it set out to do and whether projects and activities are designed and conducted in
7714 compliance with the INRMP and other directives. Implementation work plans and EA documents will track
7715 whether projects comply with the INRMP, whether they have been completed, and whether the reports are
7716 completed and made publicly available.

7717 Because of the dynamic nature of natural resources and the mission, needs may vary during the course of a
7718 normal year. Some projects may attain a higher-priority status than originally planned; other projects must
7719 be dropped as systems or work priorities change. The INRMP implementation and monitoring effort will
7720 include these and other changes, ensure they are reviewed and documented, and alter INRMP planning, if
7721 necessary, to fit current ecosystem and military mission needs.

7722 During the annual review, the Conservation Chief, in cooperation with representatives from the USFWS,
7723 ADF&G, and NMFS, will review all accomplishments outlined in the previous year's approved work plans.
7724 The Conservation Chief will verify results of INRMP implementation, analyze results, and prepare specific
7725 reports on what has and has not been accomplished. The Conservation Chief will then work with various

program managers on upcoming annual work plan submittal to ensure all appropriate needs are addressed in that year's work plans.

9.3 Annual INRMP Review and Update Requirements

9.3.1 Implementation and Review

Implementation of this INRMP is a coordinated effort by all parties of the 673 ABW and its partners. Coordination of the separate and shared roles for implementation lies with the 673d Civil Engineer Group Commander, as delegated to 673 CES Natural Resources office. Initiating the required annual reviews and revisions is also the responsibility of 673 CES Natural Resources office. Invited annual reviewers will include (asterisks indicate JBER INRMP signatory agencies):

- AFCEC Natural Resources
- Region II Sport Fishery Division, ADF&G*
- Region II Wildlife Conservation Division, ADF&G*
- Anchorage Area Field Office, Region 7, USFWS*
- Anchorage Field Office, BLM
- Anchorage Field Office, NMFS*
- Federally Recognized Tribes with Tribal interests on JBER
- Chugach State Park

IAW the Sikes Act, DoDI 4715.03, and DAFMAN 32-7003, this INRMP must be reviewed annually by JBER and its signatory partners. Yearly reviews and updates will allow managers to consider the following:

- Changes to funding and staffing resources
- Integration of new information from inventories, monitoring, and research
- Changes in military mission
- Changes in laws and mandates
- Changes in the status of abiotic or/and biotic components of the ecosystem
- Additional issues from stakeholders

A major INRMP review is required every 5 years at a minimum. If significant changes are required, the INRMP must be revised. Major revisions to an INRMP are not required unless (1) changes in the installation military mission significantly change land uses or (2) new natural resources issues (e.g., new listed species) require changes to INRMP goals and objectives. In most cases, the annual INRMP review and update will keep the plan current and avoid a costly major revision.

9.3.2 Five-Year Review and Revisions

Revisions or updates to this INRMP are required at least once every 5 years, or more frequently in cases of changes to the military mission, environmental compliance requirements, or other new information that significantly affects the ability of the installation to implement the INRMP. Other federal and state agencies and non-governmental organizations were afforded opportunities to review and comment on this INRMP.

INRMP updates consist of minor edits (e.g., to provide current information or adjust implementation timelines) that would not result in changes to management goals and objectives that are substantially different than those previously agreed to by the cooperating agencies and would not result in environmental consequences different from those in the existing INRMP.

7765 INRMP revisions are completed if changes in the installation mission or land use occur that would alter the
7766 biogeophysical environment such that significant edits need to be made to ensure that the INRMP reflects
7767 the current natural resources management requirement and appropriate program goals and objectives.

7768 The INRMP is a planning document and is not to be considered a substitute for appropriate EIAP
7769 assessment. The projects described herein are concepts offered for installation leadership consideration, but
7770 no management decision will be made without full NEPA compliance.

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7771 **10.0 ANNUAL WORK PLANS**

7772 The INRMP annual work plans are included in the tables below. These projects are listed by fiscal year,
7773 including the current year and 4 succeeding years. For each project and activity, a specific timeframe for
7774 implementation is provided (as applicable), as well as the appropriate funding source and priority for
7775 implementation. The work plans provide all the necessary information for building a budget within the DAF
7776 framework. Priorities are defined as follows:

- 7777 • **High**—The INRMP signatories assert that if the project is not funded the INRMP is not being
7778 implemented and the DAF is non-compliant with the Sikes Act; or that the project is specifically
7779 tied to an INRMP goal and objective and is part of a “Benefit of the Species” determination
7780 necessary for ESA Section 4(a)(3)(B)(i) critical habitat exemption.
- 7781 • **Medium**—Project supports a specific INRMP goal and objective and is deemed by INRMP
7782 signatories to be important for preventing non-compliance with a specific requirement within a
7783 natural resources law or by EO 13112. However, the INRMP signatories would not contend that
7784 the INRMP is not being implemented if not accomplished within the programmed year due to other
7785 priorities.
- 7786 • **Low**—Project supports a specific INRMP goal and objective, enhances conservation resources or
7787 the integrity of the installation mission, and/or supports long-term compliance with specific
7788 requirements within natural resources law; but it is not directly tied to specific compliance within
7789 the proposed year of execution.

7790 Reports for completed projects can be obtained by contacting the Conservation Chief, or specific resource
7791 area manager ([Table 10-1](#)). Programmed projects for 2024 through 2028 are listed in the tables below ([Table](#)
7792 [10-2](#), [Table 10-3](#), [Table 10-4](#), [Table 10-5](#), [Table 10-6](#), and [Table 10-7](#)).

7793

Table 10-1. Natural Resources Managers contact information

Resource Area	Phone	Email
Conservation Chief	(907) 384-2440	Kylene.lang.1@us.af.mil
Wildlife, Hunting	(907) 384-3380	Colette.brandt@us.af.mil
Fisheries	(907) 384-0276	Andrea.gilstad.1@us.af.mil
INRMP Editor, Forestry, Vegetation, Avian, Pollinators, Bats	(907) 384-0276	Cayley.elsik@us.af.mil
Marine Mammals	(907) 384-2479	Christopher.garner.9@us.af.mil

7794

Table 10-2. FY26 Programmed Projects

Project Name	Priority
Mgt, Species Harbor Porpoise Monitor In Knik Arm/Eagle River	High
Mgt, Species, Beluga Acoustical Monitoring; Training Noise Impacts; and Ice Conditions	High
Mgt, Species, Beluga EOD Escort	High
Mgt, Nuisance Wildlife	High
Mgt, Species, Beluga Whale Prey (Salmon Weirs)	High
Mgt, Species, Beluga Whale Prey (Salmon Productivity)	High
Mgt, Species, Eagles/Bird Survey	High
Mgt, Species, Black and Brown Bear Study	High

Table 10-2. FY26 Programmed Projects

Project Name	Priority
Mgt, Species, Elodea Response	High
Mgt, Species, Bat Survey	Medium
Mgt, Invasive Species, Multi Plant Species	Medium
Mgt, Invasive Species, eDNA Multi Species	Medium
Mgt, Wetlands / Floodplain	Medium
Mgt, Habitat, Long Term Ecological Monitoring	Medium
Mgt, Habitat, Forest Resources; Moose Browse; and Urban Forest	Medium
Mgt, Species, Rare Plant Inventory	Medium
Mgt Species, Winter Track Surveys	Medium

7795

Table 10-3. FY27 Programmed Projects

Project Name	Priority
Mgt, Species Harbor Porpoise Monitor In Knik Arm/Eagle River	High
Mgt, Species, Beluga Acoustical Monitoring; Training Noise Impacts; and Ice Conditions	High
Mgt, Species, Beluga Real Time Passive Acoustic Monitoring	High
Mgt, Species, Beluga EOD Escort	High
Mgt, Species, Beluga Real Time Passive Acoustic Monitoring	High
Mgt, Nuisance Wildlife	High
Mgt, Species, Beluga Whale Prey (Salmon Weirs)	High
Mgt, Species, Beluga Whale Prey (Salmon Productivity)	High
Mgt, Species, Eagles/Bird Survey	High
Mgt, Species, Black and Brown Bear Study	High
Mgt, Species, Beluga Whale Prey Abundance	High
Mgt, Species, Bat Survey	Medium
Mgt, Invasive Species, Multi Plant Species	Medium
Mgt, Species, Rare Plant Inventory	Medium
Mgt, Invasive Species, eDNA Multi Species	Medium
Mgt, Wetlands / Floodplain	Medium
Mgt, Habitat, Long Term Ecological Monitoring	Medium
Mgt, Habitat, Forest Resources; Moose Browse; and Urban Forest	Medium
Mgt, Habitat, Climate Adaptation-Mission Vulnerability	Medium
Mgt, Habitat, Wildland Fire Risk Assessment	Medium
Mgt, Species, Update Vegetation Mapping and Fuel Modeling	Low
Mgt Species, Winter Track Surveys	Medium

7796

Table 10-4. FY28 Programmed Projects

Project Name	Priority
Mgt, Species Harbor Porpoise Monitor In Knik Arm/Eagle River	High
Mgt, Species, Beluga Acoustical Monitoring; Training Noise Impacts; and Ice Conditions	High
Mgt, Species, Beluga EOD Escort	High

Table 10-4. FY28 Programmed Projects

Project Name	Priority
Mgt, Species, Beluga Real Time Passive Acoustic Monitoring	High
Mgt, Nuisance Wildlife	High
Mgt, Species, Beluga Whale Prey (Salmon Weirs)	High
Mgt, Species, Eagles/Bird Survey	High
Mgt, Species, Black and Brown Bear Study	High
Mgt, Species, Bat Survey	Medium
Mgt, Invasive Species, Multi Plant Species	Medium
Mgt, Wetlands / Floodplain	Medium
Mgt, Habitat, Long Term Ecological Monitoring	Medium
Mgt, Habitat, Forest Resources; Moose Browse; and Urban Forest	Medium
Mgt, Species, Rare Plant Inventory	Low
Mgt Species, Winter Track Surveys	Medium

7797

Table 10-5. FY29 Programmed Projects

Project Name	Priority
Mgt, Species Harbor Porpoise Monitor In Knik Arm/Eagle River	High
Mgt, Species, Beluga Acoustical Monitoring; Training Noise Impacts; and Ice Conditions	High
Mgt, Species, Beluga EOD Escort	High
Mgt, Species, Beluga Real Time Passive Acoustic Monitoring	High
Mgt, Nuisance Wildlife	High
Mgt, Species, Beluga Whale Prey (Salmon Weirs)	High
Mgt, Species, Eagles/Bird Survey	High
Mgt, Species, Black and Brown Bear Study	High
Mgt, Species, Bat Survey	Medium
Mgt, Invasive Species, Multi Plant Species	Medium
Mgt, Wetlands / Floodplain	Medium
Mgt, Habitat, Long Term Ecological Monitoring	Medium
Mgt, Habitat, Forest Resources; Moose Browse; and Urban Forest	Medium
Mgt Species, Winter Track Surveys	Medium

7798

Table 10-6. FY30 Programmed Projects

Project Name	Priority
Mgt, Species Harbor Porpoise Monitor In Knik Arm/Eagle River	High
Mgt, Species, Beluga Acoustical Monitoring; Training Noise Impacts; and Ice Conditions	High
Mgt, Species, Beluga EOD Escort	High
Mgt, Species, Beluga Real Time Passive Acoustic Monitoring	High
Mgt, Nuisance Wildlife	High
Mgt, Species, Beluga Whale Prey (Salmon Weirs)	High
Mgt, Species, Eagles/Bird Survey	High
Mgt, Species, Black and Brown Bear Study	High

Table 10-6. FY30 Programmed Projects

Project Name	Priority
Mgt, Species, Bat Survey	Medium
Mgt, Invasive Species, Multi Plant Species	Medium
Mgt, Wetlands / Floodplain	Medium
Mgt, Habitat, Long Term Ecological Monitoring	Medium
Mgt, Habitat, Forest Resources; Moose Browse; and Urban Forest	Medium
Mgt Species, Winter Track Surveys	Medium

7799

Table 10-7. FY31 Programmed Projects

Project Name	Priority
Mgt, Species Harbor Porpoise Monitor In Knik Arm/Eagle River	High
Mgt, Species, Beluga Acoustical Monitoring; Training Noise Impacts; and Ice Conditions	High
Mgt, Species, Beluga EOD Escort	High
Mgt, Species, Beluga Real Time Passive Acoustic Monitoring	High
Mgt, Nuisance Wildlife	High
Mgt, Species, Beluga Whale Prey (Salmon Weirs)	High
Mgt, Species, Eagles/Bird Survey	High
Mgt, Species, Black and Brown Bear Study	High
Mgt, Species, Bat Survey	Medium
Mgt, Invasive Species, Multi Plant Species	Medium
Mgt, Wetlands / Floodplain	Medium
Mgt, Habitat, Long Term Ecological Monitoring	Medium
Mgt, Habitat, Forest Resources; Moose Browse; and Urban Forest	Medium
Mgt Species, Winter Track Surveys	Medium

7800

Table 10-8. Natural Resources standard titles by PB28 code (excluding CZT/CZC titles)

INRP	MMA	T&E	MNRA	WTLD
P&F, CN	Mgt, Species	Mgt, Habitat	Compliance Public Notification	Mgt, Wetlands/ Floodplains
Interagency/ Intraagency, Government, Sikes Act	Interagency/Intraagency, Government, Sikes Act	Mgt, Species	Plan Update, Other	Monitor Wetlands
Interagency/ Intraagency, Government, Sikes Act, Conservation Law Enforcement Officer (CLEO)	Outsourced Environmental Services, CN	Mgt, Invasive Species	Record- keeping, Other	Interagency/ Intraagency, Government, Sikes Act

Table 10-8. Natural Resources standard titles by PB28 code (excluding CZT/CZC titles)

INRP	MMA	T&E	MNRA	WTLD
Outsourced Environmental Services, CN	Supplies, CN	Mgt, Nuisance Wildlife	Outreach	Outsourced Environmental Services, CN
Supplies, CN	Supplies, CN, CLEO	Interagency/Intraagency, Government, Sikes Act	—	—
Supplies, CN, CLEO	Vehicle Leasing, CN	Interagency/Intraagency, Government, Sikes Act, CLEO	—	—
Equipment Purchase/ Maintain, CN	—	Outsourced Environmental Services, CN	—	—
Vehicle Leasing, CN	—	Supplies, CN	—	—
Vehicle Fuel & Maintenance, CN	—	Supplies, CN, CLEO	—	—
Mgt, Wildland Fire	—	Equipment Purchase/ Maintain, CN	—	—
Plan Update, Integrated Natural Resources Management Plan (INRMP)	—	Vehicle Leasing, CN	—	—
Plan Update, Other	—	Vehicle Fuel & Maintenance, CN	—	—
Mgt, Habitat	—	Plan Update, Other	—	—
Mgt, Species	—	Environmental Services, CN	—	—
Mgt, Invasive Species	—	—	—	—
Mgt, Nuisance Wildlife	—	—	—	—
Recordkeeping, Other	—	—	—	—
Environmental Services, CN	—	—	—	—

11.0 REFERENCES

11.1 Standard References (Applicable to all DAF installations)

- [DAFMAN 32-7003, Environmental Conservation](#)
- [Sikes Act](#)
- [eDASH Natural Resources Program Page](#)
- [Natural Resources Playbook](#)
- [DoDI 4715.03, Natural Resources Management](#)
- [DAFI 32-1015, Integrated Installation Planning](#)
- [DAFI 32-10112, Installation Geospatial Information and Services \(IGI&S\)](#)

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8269 **12.0 ACRONYMS**

8270 **12.1 Standard Acronyms (Applicable to all DAF installations)**

- 8271 • [eDASH Acronym Library](#)
- 8272 • [Natural Resources Playbook—Acronym Section](#)
- 8273 • [US EPA Terms & Acronyms](#)

8274 **12.2 Installation Acronyms**

11 ABN DIV	11th Airborne Division (Arctic)
673 ABW	673d Air Base Wing
673 CES	673d Civil Engineering Squadron
673 CES/CEIEC	673d Civil Engineering Squadron, Environmental Element, Compliance/Conservation
773 CES/CEOIE	773d Civil Engineering Squadron Pest Management section
ABWI	Air Base Wing Instruction
ACMI	Air Combat Maneuver Instrument
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
AERC	University of Alaska Anchorage's Applied Environmental Research Center
AFCEC	Air Force Civil Engineer Center
AFCEC/CZOF	AFCEC Wildland Fire Branch
AFI	Air Force Instruction
AIRFA	American Indian Religious Freedom Act
AKDOF	Alaska Department of Natural Resources, Division of Forestry
AMSL	Above Mean Sea Level
ARPA	Archaeological Resources Protection Act
BASH	Bird Aircraft Strike Hazard
BEZ	Bird Exclusion Zone
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practice

BO	Biological Opinion
CATEX	Categorical Exclusion
CEMML	Center for Environmental Management of Military Lands
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CIBW	Cook Inlet Beluga Whale
CLEO	Conservation Law Enforcement Officer
CLEP	Conservation Law Enforcement Program
CWA	Clean Water Act
DAFI	Department of Air Force Instruction
DAF	Department of the Air Force
DAFMAN	Department of Air Force Manual
DBH	Diameter at Breast Height
DoDI	Department of Defense Instruction
DoDM	Department of Defense Manual
DPS	Distinct Population Segment
EAFB	Elmendorf Air Force Base
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPF	EIAP Planning Function
ERF	Eagle River Flats
ESA	Endangered Species Act
FES	Fire Emergency Services
FRA	Fort Richardson, Alaska
FSS	Force Support Squadron
FY	Fiscal Year
GIS	Geographic Information System

GMU	Game Management Unit
HE	High explosive
HUC	Hydrologic Unit Code
IAW	In Accordance With
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IPMP	Integrated Pest Management Plan
ITAM	Integrated Training Area Management
JBER	Joint Base Elmendorf-Richardson
JBER-E	Joint Base Elmendorf-Richardson–Elmendorf
JBER-R	Joint Base Elmendorf-Richardson–Richardson
LRAM	Land Rehabilitation and Maintenance
LTEM	Long-Term Ecological Monitoring
MBTA	Migratory Bird Treaty Act
MCA	Military Conservation Agent
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSGP	Multi-Sector General Permit
MWR	Morale, Welfare, and Recreation
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service (also known as NOAA Fisheries)
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
NRM	Natural Resources Manager
NWI	National Wetlands Inventory
ORV	Off-road Vehicle
PL	Public Law

PTS	Permanent Threshold Shift
ROD	Record of Decision
SEL	Sound Exposure Level
SGCN	Species of Greatest Conservation Need
SPL	Sound Pressure Level
SWPPP	Storm Water Pollution Prevention Plan
T&E	Threatened and Endangered
TTS	Temporary Threshold Shift
USACE	US Army Corps of Engineers
USAF	US Air Force
USARAK	US Army Alaska
USC	US Code
USDA	US Department of Agriculture
USDA–APHIS–WS	USDA Animal Plant Health Inspection Service–Wildlife Services
USDA NRCS	USDA National Resources Conservation Service
US EPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
WEZ	Wildlife Exclusion Zone
WFMP	Wildland Fire Management Plan
WSM	Wildland Support Module
WOTUS	Waters of the United States

8275 **13.0 DEFINITIONS**

8276 **13.1 Standard Definitions (Applicable to all DAF installations)**

- 8277 • [Natural Resources Playbook—Definitions Section](#)

8278 **13.2 Installation Definitions**

8279 **Adaptive Ecosystem Management:** A systematic process for continually improving natural resources
8280 management policy and practices by continually monitoring current operations and applying lessons
8281 learned to modify these programs as warranted.

8282 **Agricultural Outgrant:** The use of DoD lands under a lease, license or permit to an agency, organization,
8283 or person for growing crops or grazing animals.

8284 **Agricultural Land Improvements:** Improvements that add potential value to an agricultural outgrant such
8285 as irrigation features, fences, cattle guards, water developments, livestock enclosures and other structural
8286 improvements, as well as non-structural improvements such as seeding, fertilizing, and vegetation
8287 management.

8288 **Airfield:** The area comprised of runways, taxiways, aprons, and other adjacent land areas of an airport
8289 which are dedicated to aircraft operations.

8290 **Biodiversity:** Also known as biological diversity, the variety of life forms, the ecological roles they
8291 perform, the genetic variability among them, and their interactions in the communities and ecosystems in
8292 which they live. Biodiversity Conservation is a land management practice whereby maintaining and
8293 establishing viable populations of all native species is a primary goal.

8294 **Candidate Species:** Any species where there is sufficient information on the biological status and threats
8295 to propose them as endangered or threatened under the Endangered Species Act (ESA), but for which
8296 development of a proposed listing regulation is precluded by other higher priority listing activities.

8297 **Commercial Forest Land:** Land under management that is capable of producing at least 20 cubic feet of
8298 merchantable timber per acre a year.

8299 **Compliant INRMP:** An INRMP that has been both reviewed and approved by signature or written
8300 correspondence within the past 5 years by authorized officials of the DoD, Department of Interior, and
8301 appropriate state fish and wildlife agency.

8302 **Conservation Law Enforcement Program:** DoD program that, as described in DoDI 5525.17, provides
8303 for the enforcement of laws for the protection of natural and cultural resources on military installations.

8304 **Cooperating Agency:** IAW the Sikes Act, and for the purpose of INRMP coordination, the cooperating
8305 agencies are the United States Fish and Wildlife Service, state fish and wildlife management agency, and
8306 the NMFS for installations that include or border marine environments.

8307 **Cooperative Agreement:** A written agreement between a DAF organization and one or more outside
8308 agencies (federal, state, or local), conservation organizations, or individual for the planning and
8309 implementation of Natural Resources program requirements.

8310 **Critical Habitat:** Any air, land, or water area and constituents thereof that the USFWS or NMFS has
8311 designated as critical habitat IAW the ESA. The ESA, Section 3, defines critical habitat as: (i) the specific
8312 area within the geographical area occupied by the species, at the time it is listed IAW the provisions of

8313 section 4 of this act, on which are found those physical or biological features (I) essential to the conservation
8314 of the species and (II) which may require special management considerations or protection; and (ii) specific
8315 areas outside the geographical area occupied by the species at the time it is listed IAW the provisions of
8316 section 4 of this act, upon a determination by the Secretary that such areas are essential for the conservation
8317 of the species.

8318 **Cropland:** Land primarily suitable for producing farm crops, including grain, hay, and truck crops.

8319 **Dispersed Outdoor Recreation:** Outdoor recreation activities not related to a sports facility and conducted
8320 outside of a designated recreation area that provides built recreation facilities and services such as
8321 restrooms, potable water, camping pads, tables, fire pits, and garbage removal.

8322 **Ecosystem Management:** An approach to natural resources management that focuses on the
8323 interrelationships of ecological processes linking soils, plants, animals, minerals, climate, water, and
8324 topography.

8325 **Endangered Species:** Any species which is in danger of extinction throughout all or a significant portion
8326 of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose
8327 protection under the provisions of this act would present an overwhelming and overriding risk to man [ESA,
8328 Section 3]. For the purposes of this instruction, the term “endangered species” refers to a species that has
8329 been designated for special protection and management by the federal government pursuant to the ESA.

8330 **Exotic Species:** Any plant or animal not native or indigenous to a region, state, or country.

8331 **Floodplains:** Lowland and relatively flat areas adjoining inland and coastal waters including flood prone
8332 areas of offshore islands, including at a minimum, that area subject to a 1% or greater chance of flooding
8333 in any given year (EO 11988).

8334 **Forest Land:** Land on which forest trees of various sizes constitute at least 10 percent of the area. This
8335 category includes open land that is capable of supporting trees and is planned for forest regeneration and
8336 management.

8337 **Forest Products:** Plant materials in wooded areas that have commercial value, such as sawlogs, veneer
8338 (peeler) logs, poles, pilings, pine needles, cordwood (for pulp, paper, or firewood), fence posts, mine timber,
8339 holiday trees (from unsheared trees cut during intermediate harvests), and similar wood or chemical
8340 products.

8341 **Game:** Any species of fish or wildlife for which state or federal laws and regulations prescribe hunting
8342 seasons and bag or creel limits.

8343 **Geographically Separated Unit:** Air Force real property under the command and control of a parent
8344 installation that is geographically separated and non-contiguous with the supporting installation.

8345 **Habitat:** An area that provides the environmental elements of air, water, food, cover, and space necessary
8346 for a given species to survive and reproduce.

8347 **Improved Grounds:** A grounds maintenance land use category used to indicate scope and intensity of land
8348 management ([Section 2.4.2](#)). Includes land occupied by buildings and other permanent structures, as well
8349 as lawns and landscape plantings on which personnel annually plan and perform intensive maintenance
8350 activities. Improved Grounds include the cantonment area, parade grounds, drill fields, athletic areas, golf
8351 courses (excluding roughs), cemeteries, and housing areas. Grass in these areas is normally maintained by
8352 regular mowing during the growing season.

- 8353 **Integrated Natural Resources Management Plan (INRMP):** A plan based on ecosystem management
 8354 that describes and delineates the interrelationships of the individual natural resources elements in concert
 8355 with the mission and land use activities affecting the basic land management plans. Defines the natural
 8356 resources elements and the activities required to implement stated goals and objectives for those resources.
- 8357 **Integrated Pest Management:** A planned program incorporating continuous monitoring, education,
 8358 recordkeeping, and communication to prevent pests and disease vectors from causing unacceptable damage
 8359 to operations, people, property, materiel, or the environment. Integrated Pest Management includes methods
 8360 such as habitat modification, biological control, genetic control, cultural methods, mechanical control,
 8361 physical control, regulatory control, and the judicious use of least-hazardous pesticides.
- 8362 **Invasive Species:** An alien animal or plant species whose introduction does, or is likely to cause, economic
 8363 or environmental harm, or harm to human health (EO 13112).
- 8364 **Land Management Unit:** The smallest land management division that natural resources managers use in
 8365 developing specific strategies to accomplish natural resources management goals. Land management units
 8366 may correspond to grazing units on agricultural outgranted lands, stands or compartments on commercial
 8367 forest lands, various types of improved grounds (for example, athletic fields, parks, yards in family housing,
 8368 or landscaped areas around administrative buildings), or identifiable semi-improved grounds (for example,
 8369 airfield areas, utility rights-of-way, or roadside areas).
- 8370 **Livestock:** Domestic animals kept or raised for food, by-products, work, transportation, or recreation.
- 8371 **Natural Resources Management Professional:** A person with a bachelor's, master's, or doctoral degree
 8372 in the natural sciences from an accredited college or university who manages natural resources and receives
 8373 periodic training to maintain proficiency in that job.
- 8374 **Natural Resources Manager:** The natural resources management professional who is delegated
 8375 responsibility for the management of the Natural Resources program on an installation.
- 8376 **Noxious Weed:** Any plant or plant product that can directly or indirectly injure or cause damage to crops
 8377 (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation,
 8378 navigation, the natural resources of the United States, the public health, or the environment.
- 8379 **Nuisance Wildlife:** Wildlife that damages property, impedes installation operations, or endangers public
 8380 health and safety to the point where control measures are required. This category excludes wildlife species
 8381 protected under the auspice of the ESA or Migratory Bird Treaty Act.
- 8382 **Outdoor Recreation:** Recreation that relates directly to and occurs in natural, outdoor environments.
- 8383 **Outdoor Recreation Resources:** Land and water areas and associated natural resources that provide, or
 8384 have the potential to provide, opportunities for outdoor recreation for present and future generations.
- 8385 **Reforestation:** The renewal or regeneration of a forest by natural or artificial means.
- 8386 **Semi-Improved Grounds:** A grounds maintenance category used to indicate scope and intensity of land
 8387 management ([Section 2.4.2](#)). Grounds where periodic maintenance is performed primarily for operational
 8388 reasons (such as erosion and dust control, bird control, and visual clear zones). This land use classification
 8389 includes areas adjacent to runways, taxiways, aprons, runway clear zones, lateral safety zones, rifle and
 8390 pistol ranges, weapons firing and bombing ranges, picnic areas, ammunition storage areas, antenna
 8391 facilities, and golf course roughs. Semi-improved grounds areas are mowed less often than the maintained
 8392 turf grass on improved grounds.

- 8393 **Stewardship:** The management of a resources base with the goal of maintaining or increasing the
8394 resources' value indefinitely into the future.
- 8395 **Threatened Species:** Any species which is likely to become an endangered species within the foreseeable
8396 future throughout all or a significant portion of its range [ESA, Section 3]. For the purposes of this
8397 instruction, the term threatened species refers to a species that has been designated for special protection
8398 and management by the federal government pursuant to the ESA.
- 8399 **Unimproved Grounds:** A grounds maintenance land use category used to indicate scope and intensity of
8400 land management ([Section 2.4.2](#)). Unimproved grounds are areas not classified as improved or semi-
8401 improved. Unimproved grounds include forest lands, croplands and grazing lands, lakes, ponds, and
8402 wetlands, and any areas where natural vegetation is allowed to grow unimpeded by maintenance activities.
- 8403 **Urban Forests:** Planted or remnant native tree species existing within urbanized areas such as parks, tree-
8404 lined residential streets, scattered tracts of undisturbed woodlands, and cantonment areas.
- 8405 **Watchable Wildlife Areas:** Areas identified under the Watchable Wildlife Program as suitable for passive
8406 recreational uses such as birdwatching, nature study, and other nonconsumptive uses of wildlife resources.
- 8407 **Waters of the United States:** Waters subject to the regulatory jurisdiction of the United States under the
8408 Clean Water Act, and defined as traditional navigable waters, impoundments of traditional navigable
8409 waters, interstate waters, territorial seas, and adjacent waters; including adjacent wetlands.
- 8410 **Wetlands:** Areas that are inundated by surface water or groundwater with a frequency sufficient to support
8411 and under normal circumstances does or would support a prevalence of vegetative or aquatic life that
8412 requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally
8413 include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows,
8414 mud flats, and natural ponds (EO 11990).
- 8415 **Wildland Fire:** Any non-structure fire that occurs in the wildland. Three distinct types of wildland fire
8416 have been defined and include wildfire, wildland fire use, and prescribed fire.

8417 **14.0 APPENDICES**8418 **Appendix A. Annotated Summary of Key Legislation Related to Design and Implementation of the**
8419 **INRMP**

8420

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Federal Public Laws and Executive Orders	
National Defense Authorization Act of 1989. Public Law (PL) 101-189; Volunteer Partnership Cost-Share Program	Amends two acts and establishes volunteer and partnership programs for natural and cultural resources management on DoD lands.
Defense Appropriations Act of 1991, PL 101-511; Legacy Resource Management Program	Establishes the Legacy Resource Management Program for natural and cultural resources. Program emphasis is on inventory and stewardship responsibilities of biological, geophysical, cultural, and historic resources on DoD lands, including restoration of degraded or altered habitats.
Executive Order (EO) 11514, <i>Protection and Enhancement of Environmental Quality</i>	Federal agencies shall initiate measures needed to direct their policies, plans, and programs to meet national environmental goals. They shall monitor, evaluate, and control agency activities to protect and enhance the quality of the environment.
EO 11593, <i>Protection and Enhancement of the Cultural Environment</i>	All federal agencies are required to locate, identify, and record all cultural resources. Cultural resources include sites of archaeological, historical, or architectural significance.
EO 11988, <i>Floodplain Management</i>	Provides direction regarding actions of federal agencies in floodplains, and requires permits from state, territory, and federal review agencies for any construction within a 100-year floodplain and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for acquiring, managing, and disposing of federal lands and facilities.
EO 11989, <i>Off-Road Vehicles on Public Lands</i>	Installations permitting off-road vehicles to designate and mark specific areas/trails to minimize damage and conflicts, publish information including maps, and monitor the effects of their use. Installations may close areas if adverse effects on natural, cultural, or historic resources are observed.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
EO 11990, <i>Protection of Wetlands</i>	Requires federal agencies to avoid undertaking or providing assistance for new construction in wetlands unless there is no practicable alternative and all practicable measures to minimize harm to wetlands have been implemented and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of federal lands and facilities; (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.
EO 12088, <i>Federal Compliance with Pollution Control Standards</i>	This EO delegates responsibility to the head of each executive agency for ensuring all necessary actions are taken for the prevention, control, and abatement of environmental pollution. This order gives the US Environmental Protection Agency (US EPA) authority to conduct reviews and inspections to monitor federal facility compliance with pollution control standards.
EO 13112, <i>Invasive Species</i>	This EO prevents the introduction of invasive species and provides for their control to minimize the economic, ecological, and human health impacts that invasive species cause.
EO 13186, <i>Responsibilities of Federal Agencies to Protect Migratory Birds</i>	The US Fish and Wildlife Service (USFWS) has the responsibility to administer, oversee, and enforce the conservation provisions of the Migratory Bird Treaty Act, which includes responsibility for population management (e.g., monitoring), habitat protection (e.g., acquisition, enhancement, and modification), international coordination, and regulations development and enforcement.
United States Code	
Animal Damage Control Act (7 United States Code [USC] § 426–426b, 47 Stat. 1468)	Provides authority to the Secretary of Agriculture for investigation and control of mammalian predators, rodents, and birds. DoD installations may enter into cooperative agreements to conduct animal control projects.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Bald and Golden Eagle Protection Act of 1940, as amended (16 USC § 668–668c)	This law provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the act.
Clean Air Act (42 USC § 7401–7671q, 14 July 1955, as amended)	This act, as amended, is known as the Clean Air Act of 1970. The amendments made in 1970 established the core of the clean air program. The primary objective is to establish federal standards for air pollutants. It is designed to improve air quality in areas of the country that do not meet federal standards and to prevent significant deterioration in areas where air quality exceeds those standards.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (Superfund) (26 USC § 4611–4682, PL 96-510, 94 Stat. 2797), as amended	Authorizes and administers a program to assess damage, respond to releases of hazardous substances, fund cleanup, establish cleanup standards, assign liability, and other efforts to address environmental contaminants. Installation Restoration Program guides cleanups at DoD installations.
Endangered Species Act (ESA) of 1973, as amended (PL 93-205, 16 USC § 1531 et seq.)	Protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. Under this law, no federal action is allowed to jeopardize the continued existence of an endangered or threatened species. The ESA requires consultation with the USFWS and National Oceanic and Atmospheric Administration (NOAA) Fisheries (National Marine Fisheries Service) and the preparation of a biological evaluation or a biological assessment may be required when such species are present in an area affected by government activities.
Federal Aid in Wildlife Restoration Act of 1937 (16 USC § 669–669i; 50 Stat. 917) (Pittman-Robertson Act)	Provides federal aid to states and territories for management and restoration of wildlife. Fund derives from sports tax on arms and ammunition. Projects include acquisition of wildlife habitat, wildlife research surveys, development of access facilities, and hunter education.
Federal Environmental Pesticide Act of 1972	Requires installations to ensure pesticides are used only in accordance with their label registrations and restricted-use pesticides are applied only by certified applicators.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Federal Land Use Policy and Management Act (43 USC § 1701–1782)	Requires management of public lands to protect the quality of scientific, scenic, historical, ecological, environmental, and archaeological resources and values; as well as to preserve and protect certain lands in their natural condition for fish and wildlife habitat. This act also requires consideration of commodity production such as timbering.
Federal Noxious Weed Act of 1974 (7 USC § 2801–2814)	The act provides for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health.
Federal Water Pollution Control Act (Clean Water Act [CWA]) (33 USC §1251–1387)	The CWA is a comprehensive statute aimed at restoring and maintaining the chemical, physical, and biological integrity of the nation’s waters. Primary authority for implementation and enforcement rests with the US EPA.
Fish and Wildlife Conservation Act (16 USC § 2901–2911; 94 Stat. 1322, PL 96-366)	Encourages installations to use their authority to conserve and promote conservation of nongame fish and wildlife in their habitats.
Fish and Wildlife Coordination Act (16 USC § 661 et seq.)	Directs installations to consult with the USFWS or state or territorial agencies to ascertain means to protect fish and wildlife resources related to actions resulting in the control or structural modification of any natural stream or body of water. Includes provisions for mitigation and reporting.
Lacey Act of 1900 (16 USC § 701, 702, 32 Stat. 187, 32 Stat. 285)	Prohibits the importation of wild animals or birds or parts thereof, taken, possessed, or exported in violation of the laws of the country or territory of origin. Provides enforcement and penalties for violation of wildlife-related acts or regulations.
Leases: Non-excess Property of Military Departments (10 USC § 2667), as amended	Authorizes DoD to lease to commercial enterprises federal land not currently needed for public use. Covers agricultural outleasing program.
Migratory Bird Treaty Act (16 USC § 703–712)	The act implements various treaties for the protection of migratory birds. Under the act, taking, killing, or possessing migratory birds is unlawful without a valid permit.
National Environmental Policy Act of 1969 (NEPA), as amended (PL 91-190, 42 USC § 4321 et seq.)	Requires federal agencies to utilize a systematic approach when assessing environmental impacts of government activities. Establishes the use of environmental impact statements. NEPA proposes an interdisciplinary approach in a decision-making process designed to identify unacceptable or unnecessary impacts on the environment.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
National Historic Preservation Act (16 USC § 470 et seq.)	Requires federal agencies to take account of the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). Provides for the nomination, identification (through listing on the NRHP), and protection of historical and cultural properties of significance.
National Trails Systems Act (16 USC § 1241–1249)	Provides for the establishment of recreation and scenic trails.
National Wildlife Refuge Acts	Provides for establishment of National Wildlife Refuges through purchase, land transfer, donation, cooperative agreements, and other means.
National Wildlife Refuge System Administration Act of 1966 (16 USC § 668dd-ee)	Provides guidelines and instructions for the administration of Wildlife Refuges and other conservation areas.
Native American Graves Protection and Repatriation Act of 1990 (25 USC § 3001–13; 104 Stat. 3042), as amended	Established requirements for the treatment of Native American human remains and sacred or cultural objects found on federal lands. Includes requirements on inventory and notification.
Rivers and Harbors Act of 1899 (33 USC § 401 et seq.)	Makes it unlawful for the Department of the Air Force (DAF) to conduct any work or activity in navigable waters of the United States without a federal permit. Installations should coordinate with the US Army Corps of Engineers (USACE) to obtain permits for the discharge of refuse affecting navigable waters under the National Pollutant Discharge Elimination System (NPDES) and should coordinate with the USFWS to review effects on fish and wildlife of work and activities to be undertaken as permitted by the USACE.
Sale of certain interests in land (10 USC § 2665)	Authorizes sale of forest products and reimbursement of the costs of management of forest resources.
Soil and Water Conservation Act (16 USC § 2001, PL 95-193)	Installations shall coordinate with the Secretary of Agriculture to appraise, on a continual basis, soil/water-related resources. Installations will develop and update a program for furthering the conservation, protection, and enhancement of these resources consistent with other federal and local programs.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Sikes Act (16 USC § 670a-1, 74 Stat. 1052), as amended	Provides for the cooperation of DoD, the Department of the Interior (USFWS), and the state fish and game department in planning, developing, and maintaining fish and wildlife resources on a military installation. Requires development of an INRMP and public access to natural resources and allows collection of nominal hunting and fishing fees. NOTE: Department of Air Force Manual (DAFMAN) 32-7003, Section 3.11, <i>INRMP Implementation</i>: As defined in DoD Instruction (DoDI) 4715.03, use professionally trained natural resources management personnel with a degree in the natural sciences to develop and implement the installation INRMP. Per Section 3.11.1, <i>Outsourcing Natural Resources Management</i>, as stipulated in the Sikes Act, 16 USC § 670 et seq., the Office of Management and Budget Circular No. A-76, <i>Performance of Commercial Activities</i>, 4 August 1983 (Revised 29 May 2003), does not apply to the development, implementation, and enforcement of INRMPs. Activities that require the exercise of discretion in making decisions regarding the management and disposition of government owned natural resources are inherently governmental. When it is not practicable to utilize DoD personnel to perform inherently governmental natural resources management duties, obtain these services from federal agencies having responsibilities for the conservation and management of natural resources.
DoD Policies, Directives, and Instructions	
DoDI 4150.07, <i>DoD Pest Management Program</i> , dated 29 May 2008	Implements policy, assigns responsibilities, and prescribes procedures for the DoD Integrated Pest Management Program.
DoDI 4715.1, <i>Environmental Security</i>	Establishes policy for protecting, preserving, and (when required) restoring and enhancing the quality of the environment. This instruction also ensures environmental factors are integrated into DoD decision-making processes that could impact the environment and are given appropriate consideration along with other relevant factors.
DoDI 4715.03, <i>Natural Resources Management</i>	Implements policy, assigns responsibility, and prescribes procedures under DoDI 4715.1 for the integrated management of natural and cultural resources on property under DoD control.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Office of the Secretary of Defense (OSD) Policy Memorandum, 17 May 2005— <i>Implementation of Sikes Act Improvement Amendments: Supplemental Guidance Concerning Leased Lands</i>	Provides supplemental guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD. The guidance covers lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission. INRMPs must address the resource management on all lands for which the subject installation has real property accountability, including leased lands. Installation commanders may require tenants to accept responsibility for performing appropriate natural resource management actions as a condition of their occupancy or use, but this does not preclude the requirement to address the natural resource management needs of these lands in the installation INRMP.
OSD Policy Memorandum, 1 November 2004— <i>Implementation of Sikes Act Improvement Act Amendments: Supplemental Guidance Concerning INRMP Reviews</i>	Emphasizes implementing and improving the overall INRMP coordination process. Provides policy on scope of INRMP review and public comment on INRMP review.
OSD Policy Memorandum, 10 October 2002— <i>Implementation of Sikes Act Improvement Act: Updated Guidance</i>	Provides guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD and replaces the 21 September 1998 guidance <i>Implementation of the Sikes Act Improvement</i> amendments. Emphasizes implementing and improving the overall INRMP coordination process and focuses on coordinating with stakeholders, reporting requirements and metrics, budgeting for INRMP projects, using the INRMP as a substitute for critical habitat designation, supporting military training and testing needs, and facilitating the INRMP review process.
90 Federal Register 27857, <i>Department of Defense Implementation of the National Environmental Policy Act</i>	This document provides information, guidance, and requirements to DoD agencies to implement NEPA.
DAF Instructions and Directives	
Air Force Instruction (AFI) 32-7061, <i>Environmental Impact Analysis Process (EIAP)</i>	Provides guidance and responsibilities in the EIAP for implementing INRMPs. Implementation of an INRMP constitutes a major federal action and therefore is subject to evaluation through an Environmental Assessment or an Environmental Impact Statement.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Department of Air Force Instruction (DAFI) 32-1015, <i>Integrated Installation Planning</i>	This publication establishes a comprehensive and integrated planning framework for development/redevelopment of Air Force installations.
Air Force Policy Directive (AFPD) 32-70, <i>Environmental Considerations in Air Force Programs and Activities</i>	Outlines the DAF mission to achieve and maintain environmental quality on all DAF lands by cleaning up environmental damage resulting from past activities, meeting all environmental standards applicable to present operations, planning its future activities to minimize environmental impacts, managing responsibly the irreplaceable natural and cultural resources it holds in public trust and eliminating pollution from its activities wherever possible. AFPD 32-70 also establishes policies to carry out these objectives.
DAFMAN 32-7002, <i>Environmental Compliance</i>	Implements AFPD 32-70, <i>Environmental Considerations in Air Force Programs and Activities</i> ; DoDI 4715.03, <i>Natural Resources Management</i> ; and DoDI 7310.5, <i>Accounting for Sale of Forest Products</i> . It explains how to manage natural resources on DAF property in compliance with federal, state, territorial, and local standards.
DAFMAN 32-7003, <i>Environmental Conservation</i>	This manual implements AFPD 32-70 and DoDI 4710.1, <i>Archaeological and Historic Resources Management</i> . It explains how to manage cultural resources on DAF property in compliance with federal, state, territorial, and local standards.
DAFI 32-10112, <i>Installation Geospatial Information and Services (IGI&S)</i>	This instruction implements DoDI 8130.01, <i>Installation Geospatial Information and Services (IGI&S)</i> , by identifying the requirements to implement and maintain an Air Force Installation Geospatial Information and Services program and AFPD 32-10, <i>Installations and Facilities</i> .
Policy Memo for Implementation of Sikes Act Improvement Amendments, HQ US Air Force Environmental Office (USAF/ILEV) on 29 January 1999	Outlines the DAF interpretation and explanation of the Sikes Act and Improvement Act of 1997.

8422 **Appendix B. Wildland Fire Management Plan (WFMP)**

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8424 **Appendix C. Bird/Wildlife Aircraft Strike Hazard (BASH) Plan**

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8426 **Appendix D. Golf Environmental Management Plan (GEM) Plan**

8427 Not applicable.

8428

8429 **Appendix E. Integrated Cultural Resources Management Plan (ICRMP)**

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8431 **Appendix F. Integrated Pest Management Plan (IPMP)**

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8433 **Appendix G. Urban Forest Inventory**

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8435 **Appendix H. US Air Force Memorandum of Policy Change to Recreational Access to JBER**

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8437 **Appendix I. Flora of Joint Base Elmendorf-Richardson**

8438

Table 14-2. Floral species identified on Joint Base Elmendorf-Richardson

Common Name	Scientific Name
Alaska Indian paintbrush	<i>Castilleja unalaschcensis</i>
Alaska mountain-heather	<i>Cassiope stelleriana</i>
Alaskan blueberry	<i>Vaccinium alaskaense</i>
Alaskan violet	<i>Viola langsdorffii</i>
Alder (green alder)	<i>Alnus viridis</i>
Alkali grass	<i>Puccinellia nutkaensis</i>
Alpine clubmoss	<i>Diphasiastrum alpinum</i>
Alsike clover	<i>Trifolium hybridum</i>
American red raspberry	<i>Rubus idaeus</i>
Arctic lupin	<i>Lupinus arcticus</i>
Arctic starflower	<i>Trientalis europaea</i>
Arrowgrass	<i>Triglochin maritima</i>
Balsam poplar	<i>Populus balsamifera</i>
Baneberry	<i>Actaea rubra</i>
Bearberry	<i>Arctostaphylos uva-ursi</i>
Big-leaf/Nootka lupine hybrid	<i>Lupinus polyphyllus/nootkatensis hybrid</i>

Table 14-2. Floral species identified on Joint Base Elmendorf-Richardson

Common Name	Scientific Name
Bird vetch	<i>Vicia cracca</i>
Black cottonwood	<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>
Black spruce	<i>Picea mariana</i>
Bluejoint reedgrass (Canada bluejoint grass, bluejoint)	<i>Calamagrostis canadensis</i>
Bluntleaf sandwort	<i>Moehringia lateriflora</i>
Blunt-leaf Sandwort	<i>Moehringia Lateriflora</i>
Bog blueberry	<i>Vaccinium uliginosum</i>
Bog labrador tea	<i>Rhododendron groenlandicum</i>
Bog stitchwort	<i>Stellaria alsine</i>
Broadleaf plantain	<i>Plantago major</i>
Bulrush	<i>Scirpus paludosus</i>
Bunchberry dogwood (creeping dogwood)	<i>Cornus canadensis</i>
Canada thistle	<i>Cirsium arvense</i>
Common chickweed	<i>Cerastium triviale</i>
Common dandelion	<i>Taraxacum officinale</i>
Common hemp nettle	<i>Galeopsis tetrahit</i>
Common moonwort	<i>Botrychium lunaria</i>
Common woodrush	<i>Luzula multiflora</i>
Common yarrow	<i>Achillea millefolium</i>
Corn lily	<i>Veratrum viride</i>
Cow parsnip	<i>Heracleum maximum</i>
Crowberry	<i>Empetrum nigrum</i>
Cutleaf anemone	<i>Anemone multifida</i>
Devil's club	<i>Oplopanax horridus</i>
Dewey's sedge	<i>Carex deweyana</i> *
Diamondleaf willow	<i>Salix planifolia</i>
Drummond's anemone	<i>Anemone drummondii</i>
Dryas (eightpetal mountain-avens)	<i>Dryas octopetala</i>
Dwarf bilberry	<i>Vaccinium cespitosum</i>
Dwarf birch	<i>Betula nana</i>
Dwarf raspberry	<i>Rubus pubescens</i>
Dwarf willow	<i>Salix arctica</i>
Early goldenrod	<i>Solidago juncea</i>
European bird cherry	<i>Prunus padus</i>
False mayweed	<i>Matricaria maritima</i>
Field horsetail	<i>Equisetum arvense</i>
Field horsetail	<i>Equisetum arvense</i>
Fireweed	<i>Chamerion angustifolium</i>
Foxtail barley	<i>Hordeum jubatum</i>
Goose tongue	<i>Plantago maritima</i>
Green alder	<i>Alnus crispa</i>

Table 14-2. Floral species identified on Joint Base Elmendorf-Richardson

Common Name	Scientific Name
Green alder	<i>Alnus viridis</i>
Greene's mountain ash	<i>Sorbus scopulina</i>
Green-flowered pyrola	<i>Pyrola chlorantha</i>
Groundcedar	<i>Lycopodium complanatum</i>
Hawkweed	<i>Hieracium spp.</i>
Highbush cranberry	<i>Viburnum edule</i>
Kentucky bluegrass	<i>Poa pratensis</i>
Kinnikinnick	<i>Arctostaphylos uva-ursi</i>
Labrador lousewort	<i>Pedicularis labradorica</i>
Large-leaved Avens	<i>Geum macrophyllum</i>
Large-leaved Lupine	<i>Lupinus polyphyllus</i>
Larkspur	<i>Delphinium glaucum</i>
Lesser wintergreen	<i>Pyrola minor</i>
Lingbye's sedge	<i>Carex lyngbyei</i>
Long tube twinflower	<i>Linnaea borealis ssp. longiflora</i>
Lutkea	<i>Luetkea pectinate</i>
Mare's tail	<i>Hippuris tetraphylla</i>
Meadow hawkweed	<i>Hieracium caespitosum</i>
Mountain alder	<i>Alnus incana ssp. tenuifolia</i>
Mountain cranberry (lingonberry)	<i>Vaccinium vitis-idaea</i>
Mountain harebell	<i>Campanula rotundifolia</i>
Mountain hemlock	<i>Tsuga mertensiana</i>
Narcissus-flowered anemone	<i>Anemone narcissiflora</i>
Northern anemone	<i>Anemone parviflora</i>
Northern bedstraw	<i>Galium boreale</i>
Northern bluebell	<i>Polemonium acutifolia</i>
Northern monkshood	<i>Aconitum delphinifolium</i>
Northern oakfern	<i>Gymnocarpium Dryopteris</i>
Northern redcurrant	<i>Ribes triste</i>
Northern tall bluebell	<i>Mertensia paniculata*</i>
Oak fern	<i>Gymnocarpium dryopteris</i>
One-sided wintergreen	<i>Pyrola secunda</i>
Oxeye daisy	<i>Leucanthemum vulgare</i>
Paper birch	<i>Betula papyrifera</i>
Pink wintergreen	<i>Pyrola asarifolia</i>
Prickly rose	<i>Rosa acicularis</i>
Purplestem aster	<i>Aster puniceus</i>
Quaking aspen	<i>Populus tremuloides</i>
Rattlebox	<i>Rhinanthus minor</i>
Red baneberry	<i>Actaea rubra</i>
Red birch	<i>Betula occidentalis</i>
Red elderberry	<i>Sambucus racemosa</i>

Table 14-2. Floral species identified on Joint Base Elmendorf-Richardson

Common Name	Scientific Name
Red fescue	<i>Festuca rubra</i>
Redshank	<i>Persicaria maculosa</i>
Red-stemmed feather moss	<i>Pleurozium schreberi</i>
Reed canary grass	<i>Phalaris arundinacea</i>
Resin birch	<i>Betula neoalaskana</i>
Rough bentgrass	<i>Agrostis scabra</i>
Shrubby cinquefoil	<i>Dasiphora fruticosa</i>
Sitka alder	<i>Alnus viridis</i> ssp. <i>sinuata</i>
Sitka valerian	<i>Valeriana sitchensis</i>
Softstem bulrush	<i>Schoenoplectus tabernaemontani</i>
Spinulose wood fern	<i>Dryopteris carthusiana</i>
Starflower	<i>Trientalis borealis</i>
Sweet bedstraw	<i>Galium Triflorum</i>
Sweetgale	<i>Myrica gale</i>
Sweetgrass	<i>Hierochloe alpine</i>
Sweet-scented bedstraw	<i>Galium triflorum</i>
Tall Jacob's-ladder	<i>Polemonium acutifolium</i>
Thin-leaf alder	<i>Alnus tenuifolia</i>
Timberberry	<i>Geocaulon lividum</i>
Timothy	<i>Phleum pratense</i>
Tufted hairgrass	<i>Deschampsia cespitosa</i>
Tufted hairgrass	<i>Deschampsia cespitosa</i>
Twinflower	<i>Linnaea borealis</i>
Watermelon berry	<i>Streptopus amplexifolius</i>
Western mountain ash	<i>Sorbus sitchensis</i>
White arctic mountain-heather	<i>Cassiope tetragona</i>
White burnet	<i>Sanguisorba canadensis</i>
White clover	<i>Trifolium repens</i>
White goosefoot	<i>Chenopodium album</i>
White meadowsweet	<i>Spiraea alba</i>
White spruce	<i>Picea glauca</i>
White sweetclover (sweetclover)	<i>Melilotus officinalis</i>
Wild geranium	<i>Geranium erianthum</i>
Wood horsetail	<i>Equisetum sylvaticum</i>
Yarrow	<i>Achillea milefolium</i>
Yellow rattle	<i>Rhinanthus minor</i>
Yellow toadflax	<i>Linaria vulgaris</i>
Unknown Species	
Unknown aster	<i>Aster</i> sp.
Unknown clubmoss	<i>Lycopodium</i> sp.
Unknown cudweed	<i>Gnaphalium</i> sp.
Unknown dock	<i>Rumex</i> sp.

Table 14-2. Floral species identified on Joint Base Elmendorf-Richardson

Common Name	Scientific Name
Unknown rye	<i>Elymus</i> sp.
Unknown fescue	<i>Festuca</i> sp.
Unknown grass	<i>Poa</i> sp.
Unknown lupine	<i>Lupinus</i> sp.
Unknown sedge	<i>Carex</i> sp.
Unknown willow	<i>Salix</i> sp.
Unknown wintergreen	<i>Pyrola</i> sp.

*Rare Plant Species

Source: McWilliams et al. 2022

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8440 **Appendix J. Fauna of Joint Base Elmendorf-Richardson**

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Table 14-3. Fauna species identified on or adjacent to Joint Base Elmendorf-Richardson

Common Name	Scientific Name
Mammals	
Alaska vole	<i>Microtus miurus</i>
American pygmy shrew	<i>Sorex hoyi</i>
Arctic ground squirrel	<i>Spermophilus parryi</i>
Beaver	<i>Castor canadensis</i>
Black bear	<i>Ursus americanus</i>
Brown bear	<i>Ursus arctos</i>
Canada lynx	<i>Lynx canadensis</i>
Collared pika	<i>Ochotona collaris</i>
Common shrew	<i>Sorex cinereus</i>
Cook Inlet beluga whale	<i>Delphinapterus leucas</i>
Coyote	<i>Canis latrans</i>
Dall sheep	<i>Ovis dalli</i>
Dusky shrew	<i>Sorex monticola</i>
Ermine or short-tailed weasel	<i>Mustela erminea</i>
Fin whale	<i>Balaenoptera physalus</i>
Gray whale	<i>Eschrichtius robustus</i>
Gray wolf	<i>Canis lupus</i>
Harbor porpoise	<i>Phocoena phocoena</i>
Harbor seal	<i>Phoca vitulina</i>
Hoary marmot	<i>Marmota caligata</i>
House mouse	<i>Mus musculus</i> (nonnative)
Humpback whale	<i>Megaptera novaeangliae</i>
Least weasel	<i>Mustela nivalis</i>
Little brown bat	<i>Myotis lucifugus</i>
Marten (American marten)	<i>Martes americana</i>
Masked shrew	<i>Sorex cinereus</i>
Meadow jumping mouse	<i>Zapus hudsonius</i>
Meadow vole	<i>Microtus pennsylvanicus</i>
Mink	<i>Mustela vison</i>
Montane shrew	<i>Sorex monticolus</i>
Moose	<i>Alces alces</i>
Muskrat	<i>Ondatra zibethicus</i>
Northern bog lemming	<i>Synaptomys borealis</i>
Northern flying squirrel	<i>Glaucomys sabrinus</i>
Northern red-back vole	<i>Myodes rutilus</i>
Northern water shrew	<i>Sorex palustris</i>
Killer whale	<i>Orcinus orca</i>
Porcupine	<i>Erethizon dorsatum</i>

Table 14-3. Fauna species identified on or adjacent to Joint Base Elmendorf-Richardson

Common Name	Scientific Name
Red fox	<i>Vulpes vulpes</i>
Red squirrel	<i>Tamiasciurus hudsonicus</i>
River otter	<i>Lontra canadensis</i>
Steller sea lion	<i>Eumetopias jubatus</i>
Steller's eider	<i>Polysticta stelleri</i>
Tundra shrew	<i>Sorex tundrensis</i>
Tundra vole	<i>Microtus oeconomus</i>
Vagrant shrew	<i>Sorex vagrans</i>
Wolverine	<i>Gulo gulo</i>
Fish	
Arctic char	<i>Salvelinus alpinus</i>
Arctic grayling	<i>Thymallus arcticus</i>
Bering cisco	<i>Coregonus laurettae</i>
Chinook salmon	<i>Oncorhynchus tshawytscha</i>
Chum salmon	<i>Oncorhynchus keta</i>
Coho salmon	<i>Oncorhynchus kisutch</i>
Dolly Varden	<i>Salvelinus malma</i>
Eulachon	<i>Thaleichthys pacificus</i>
Kokanee salmon	<i>Oncorhynchus spp.</i>
Lake trout	<i>Salvelinus namaycush</i>
Longfin smelt	<i>Spirinchus thaleichthys</i>
Nine-spine stickleback	<i>Pungitius pungitius</i>
Pacific herring	<i>Clupea pallasii</i>
Pacific staghorn sculpin	<i>Leptocottus armatus</i>
Pacific tomcod	<i>Microgadus proximus</i>
Pink (humpback) salmon	<i>Oncorhynchus gorbuscha</i>
Rainbow trout	<i>Oncorhynchus mykiss</i>
Saffron cod	<i>Eleginus gracilis</i>
Slimy sculpin	<i>Cottus cognatus</i>
Snailfish	<i>Careproctus spp.</i>
Snake prickleback	<i>Lumpenus sagitta</i>
Sockeye salmon	<i>Oncorhynchus nerka</i>
Starry flounder	<i>Platichthys stellatus</i>
Three-spine stickleback	<i>Gasterosteus aculeatus</i>
Walleye pollock	<i>Theragra chalcogramma</i>
Birds	
Alder Flycatcher	<i>Empidonax alnorum</i>
Aleutian Tern	<i>Sterna aleutica</i>
American Dipper	<i>Cinclus mexicanus</i>
American Golden Plover	<i>Pluvialis dominica</i>
American Goshawk	<i>Astur atricapillus</i>
American Kestrel	<i>Falco sparverius</i>

Table 14-3. Fauna species identified on or adjacent to Joint Base Elmendorf-Richardson

Common Name	Scientific Name
American Pipit	<i>Anthus rubescens</i>
American Robin	<i>Turdus migratorius</i>
American Tree Sparrow	<i>Spizella arborea</i>
American Wigeon	<i>Mareca americana</i>
Arctic Tern	<i>Sterna paradisaea</i>
Arctic Warbler	<i>Phylloscopus borealis</i>
Baird's Sandpiper	<i>Calidris bairdii</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Bank Swallow	<i>Riparia riparia</i>
Barrow's Goldeneye	<i>Bucephala islandica</i>
Belted Kingfisher	<i>Ceryle alcyon</i>
Black-backed Woodpecker	<i>Picoides arcticus</i>
Black-bellied Plover	<i>Pluvialis squatarola</i>
Black-billed Magpie	<i>Pica hudsonia</i>
Black-capped Chickadee	<i>Poecile atricapillus</i>
Blackpoll Warbler	<i>Dendroica striata</i>
Blue-winged Teal	<i>Anas discors</i>
Bohemian Waxwing	<i>Bombycilla garrulus</i>
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>
Boreal Chickadee	<i>Parus hudsonicus</i>
Boreal Owl	<i>Aegolius funereus</i>
Brown Creeper	<i>Certhia americana</i>
Bufflehead	<i>Bucephala albeola</i>
Cackling Geese	<i>Branta hutchinsii</i>
Canada Goose	<i>Branta canadensis</i>
Canada Jay	<i>Perisoreus canadensis</i>
Canvasback	<i>Aythya valisineria</i>
Cinnamon Teal	<i>Anas cyanoptera</i>
Cliff Swallow	<i>Hirundo pyrrhonota</i>
Common Goldeneye	<i>Bucephala clangula</i>
Common Loon	<i>Gavia immer</i>
Common Merganser	<i>Mergus merganser</i>
Common Raven	<i>Corvus corax</i>
Common Redpoll	<i>Carduelis flammea</i>
Dark-Eyed Junco	<i>Junco hyemalis</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Dunlin	<i>Calidris alpina</i>
Eurasian Wigeon	<i>Anas penelope</i>
European Starling Surfbird	<i>Aphriza virgata</i>
Fox Sparrow	<i>Passerella iliaca</i>
Gadwall	<i>Anas strepera</i>
Glaucous-winged Gull	<i>Larus glaucescens</i>

Table 14-3. Fauna species identified on or adjacent to Joint Base Elmendorf-Richardson

Common Name	Scientific Name
Golden Eagle	<i>Aquila chrysaetos</i>
Golden-crowned Kinglet	<i>Regulus satropa</i>
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>
Gray-cheeked Thrush	<i>Catharus minima</i>
Great Gray Owl	<i>Strix nebulosa</i>
Great Horned Owl	<i>Bubo virginianus</i>
Greater White-fronted Goose	<i>Anser albifrons</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>
Greater Scaup	<i>Aythya marila</i>
Green-winged Teal	<i>Anas carolinensis</i>
Gyr Falcon	<i>Falco rusticolus</i>
Hairy Woodpecker	<i>Picoides villosus</i>
Harlequin Duck	<i>Histrionicus histrionicus</i>
Hawk Owl	<i>Surnia ulula</i>
Hermit Thrush	<i>Catharus guttatus</i>
Herring Gull	<i>Larus argentatus</i>
Hoary Redpoll	<i>Carduelis hornemanni</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>
Horned Grebe	<i>Podiceps auritus</i>
Hudsonian Godwit	<i>Limosa haemastica</i>
Killdeer	<i>Charadrius vociferus</i>
Lapland Longspur	<i>Calcarius lapponicus</i>
Least Sandpiper	<i>Calidris minutilla</i>
Lesser White-fronted Geese	<i>Anser erythropus</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Lesser Scaup	<i>Aythya affinis</i>
Lincoln's Sparrow	<i>Melospiza lincolnii</i>
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>
Mallard	<i>Anas platyrhynchos</i>
Merlin	<i>Falco columbarius</i>
Mew Gull	<i>Larus canus</i>
Myrtle Warbler	<i>Setophaga coronata hooveri</i>
Northern Flicker	<i>Colaptes auratus</i>
Northern Harrier	<i>Circus cyaneus</i>
Northern Pintail	<i>Anas acuta</i>
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Northern Saw-whet Owl	<i>Aegolius acadicus</i>
Northern Shoveler	<i>Anas clypeata</i>
Northern Shrike	<i>Lanius excubitor</i>
Northern Waterthrush	<i>Seiurus novaboracensis</i>
Northwestern Crow	<i>Corvus caurinus</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>

Table 14-3. Fauna species identified on or adjacent to Joint Base Elmendorf-Richardson

Common Name	Scientific Name
Orange-crowned Warbler	<i>Vermivora celata</i>
Ospreys	<i>Pion haliaetus</i>
Pacific Loon	<i>Gavia pacifica</i>
Pectoral Sandpiper	<i>Calidris melanotos</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Pine Grosbeak	<i>Pinicola enucleator</i>
Pine Siskin	<i>Carduelis pinus</i>
Red-breasted Nuthatch	<i>Sitta canadensis</i>
Red-necked Grebe	<i>Podiceps grisegena</i>
Red-necked Phalarope	<i>Phalaropus lobatus</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Red-throated Loon	<i>Gavia stellate</i>
Ring-necked Duck	<i>Aythya collaris</i>
Rock Dove	<i>Columba livia</i>
Rock Ptarmigan	<i>Lagopus mutus</i>
Rough-legged Hawk	<i>Buteo lagopus</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
Ruddy Turnstone	<i>Arenaria interpres</i>
Ruffed Grouse	<i>Bonasa umbellus</i>
Rusty Blackbird	<i>Euphagus carolinus</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>
Semi-palmated Plover	<i>Charadrius semipalmatus</i>
Semi-palmated Sandpiper	<i>Calidris pusilla</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>
Sandhill Crane	<i>Grus canadensis</i>
Short-billed Dowitcher	<i>Limnodromus griseus</i>
Short-eared Owl	<i>Asio flammeus</i>
Snow Goose	<i>Chen caerulescens</i>
Solitary Sandpiper	<i>Tringa solitaria</i>
Song Sparrow	<i>Melospiza melodia</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Spruce Grouse	<i>Canachites canadensis</i>
Steller's Jay	<i>Cyanocitta stelleri</i>
Swainson's Thrush	<i>Catharus ustulatus</i>
Townsend's Warbler	<i>Dendroica townsendi</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Trumpeter Swan	<i>Cygnus buccinator</i>
Tundra Swan	<i>Cygnus columbianus</i>
Varied Thrush	<i>Ixoreus naevius</i>
Violet-green Swallow	<i>Tachycineta thalassina</i>
Western Sandpiper	<i>Calidris mauri</i>
Western Wood Pewee	<i>Contopus sordidulus</i>

Table 14-3. Fauna species identified on or adjacent to Joint Base Elmendorf-Richardson

Common Name	Scientific Name
Whimbrel	<i>Numenius phaeopus</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
White-tailed Ptarmigan	<i>Lagopus leucurus</i>
White-winged Crossbill	<i>Loxia leucoptera</i>
White-winged Scoter	<i>Melanitta fusca</i>
Willow Ptarmigan	<i>Lagopus lagopus</i>
Wilson's Snipe	<i>Gallinago delicata</i>
Wilson's Warbler	<i>Cardellina pusilla</i>
Wilson's Phalarope	<i>Phalaropus tricolor</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>
Yellow Warbler	<i>Dendroica petechia</i>
Amphibians	
Wood frog	<i>Rana sylvatica</i>

Sources: Rothe et al. 1983, 3d Civil Engineering Squadron 2001, Peirce 2003

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8443 **Appendix K. Partnership Documents Affecting Joint Base Elmendorf-Richardson**

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Table 14-4. Cooperative Agreements and Memorandums of Agreement/Understanding for Joint Base Elmendorf-Richardson (JBER)

Type*	Title	Subject	Air Force (AF) Level	Date
CA	AK-COOP-I 38 Cooperative Agreement for the Protection, Development and Management of Vegetation Resources of Air Force Installations, Alaska	Vegetation expertise	11th Air Force Commander (11 AF/CC)	5 November 1996
CA	AK-COOP-090 USAG-AK and Center for Environmental Management of Military Lands at Colorado State University	Support for natural and cultural resources, as well as environmental management	—	4 August 1997
CA	AK-COOP-I 33 USAG-AK and the University of Alaska	Natural and cultural resource support	—	27 July 2001
IAA	JBER-IAA-701-FY19 Interagency Agreement between 673 ABW and Alaska Division of Forestry (AKDOF)	Wildland Fire Suppression and Mitigation Activities	673d Air Base Wing (673 ABW)	24 April 2019
MAA	Mutual Aid Agreement between JBER, Municipality of Anchorage, and Ted Stevens Anchorage International Airport	Mutual Aid in Fire Emergency Services	—	30 December 2016
MOA	Memorandum of Agreement between the Maritime Administration and Department of the Air Force (DAF), Pacific Air Force, Elmendorf Air Force Base (EAFB)	Gravel Extraction	3d Wing Commander (3 WG/CC)	August 2005
MOA	Archaeological Resources and Traditional Cultural Properties: The K'enaht'ana Dena'ina Utilization of Lands Now Under the Purview of US Army Garrison- Alaska, Fort Richardson, Alaska.	Cultural Resources Management	3 WG/CC	2006

Table 14-4. Cooperative Agreements and Memorandums of Agreement/Understanding for Joint Base Elmendorf-Richardson (JBER)

Type*	Title	Subject	Air Force (AF) Level	Date
MOA	Memorandum of Agreement Between Joint Base Elmendorf-Richardson and the Alaska State Historic Preservation Officer Regarding the Renovation of Building 18220 (ANC-03218) and Building 18224 (ANC-00955) at Joint Base Elmendorf-Richardson	Cultural Resources Management	3 WG/CC	2022
MOA	Memorandum of Agreement between 3 WG EAFB and Alaska Department of Fish and Game (ADF&G)	Hatchery Water and Sport Fish Stocking	3d Log Group Commander (CC)	(expired) 5 April 2001
MOA	AK-MOA-054 Memorandum of Agreement between the US Army Garrison Alaska, US Air Force, EAFB, ADF&G, and US Department of Agriculture–Animal and Plant Health Inspection–Wildlife Services	Bear/human conflict response	3 WG/CC	—
MOA	MOA-28-H-730 Memorandum of Agreement between the Municipality of Anchorage, AKDOF, Ted Stevens International Airport, Kulis Air National Guard Base, Alaska National Guard Fort Richardson, and 673 ABW EAFB	Fire prevention, hazardous material response, and protection from wildland fires	3 WG/CC	8 August 2002
MOA	WS0587-02288-001 Memorandum of Agreement between US Department of Agriculture–Animal and Plant Health Inspection–Wildlife Services and 673 ABW EAFB	Bird/Wildlife Aircraft Strike Hazard (BASH) program support	3d Log Group CC	21 August 2002
MOA	Native Village Eklutna	Support for conducting research for natural resources management	—	18 May 2010
MOU	Memorandum of Understanding regarding Watchable Wildlife in Alaska	Wildlife viewing	11 AF/CC	14 February 1998
MOU	Memorandum of Understanding regarding Comprehensive Wildlife Management Plan	Human/wildlife conflicts	3 WG/CC	28 March 2000

Table 14-4. Cooperative Agreements and Memorandums of Agreement/Understanding for Joint Base Elmendorf-Richardson (JBER)

Type*	Title	Subject	Air Force (AF) Level	Date
MOU	3d Wing Safety Office (3 WG/SE), Alaska Army National Guard (AKARNG) Bryant Army Airfield Manager	BASH Program	3 WG/SE	30 August 2012
MOU	JBER-IAA-N214-FY18 Memorandum of Understanding between JBER and the Bureau of Land Management	Integrated Natural Resources Management Plan and Vegetation Management on JBER withdrawn lands	673 ABW	5 September 2018

*Definitions: CA=Cooperative Agreement; IAA=Interagency Agreement; MAA=Mutual Aid Agreement; MOA=Memorandum of Agreement; MOU=Memorandum of Understanding

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