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2013



**611th Air Support Group
Alaska Installations**

**U.S. AIR FORCE, 611th AIR SUPPORT GROUP, ALASKA
611th CIVIL ENGINEER SQUADRON, ASSESSMENT MANAGEMENT**

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN 2013

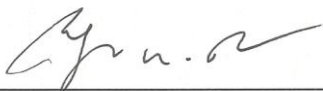
611th Air Support Group, Alaska Installations

This revised Integrated Natural Resources Management Plan (INRMP) meets requirements of the Sikes Act (16 USC 670a *et seq.*) as amended and as approved in previous plans in 2007, 2008, and 2009 by the 611th Air Support Group Commander, the Alaska Regional Director of the U.S. Fish and Wildlife Service, and the Alaska Department of Fish and Game commissioner. Use and mission of the installations have not significantly changed since approval of the previous plans. The Short and Long Range Radar Sites and Eareckson Air Station INRMPs were approved for use in 2007; the King Salmon Airport INRMP was approved for use in 2008; and the Inactive Sites INRMP was approved for use in 2009. They will remain in use until replaced by the final version of this plan.

The primary change in this revised INRMP is that of format to follow guidance provided in Air Force Instruction 32-7064. This INRMP also groups installations from the four previous plans into one document. Data specific to each installation and management goals, objectives, and projects have also been updated and included in this revision.

Sikes Act Cooperating Agencies*

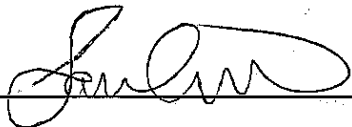
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3.4.2013
Date

*Above signatures are digital copies of originals, which are on file at the 611th Air Support Group.

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN 2013


611th Air Support Group, Alaska Installations

U.S. AIR FORCE, 611th AIR SUPPORT GROUP, ALASKA
611th CIVIL ENGINEER SQUADRON, ASSESSMENT MANAGEMENT

Invited Collaborators Endorsement

Both below agencies were afforded the opportunity to review and comment on this INRMP.

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James W. Balsiger for I/B
MAY 2, 2015
Date

The Bureau of Land Management reviewed and provided comments on drafts of the INRMP, but the agency declined to formally sign the document. Appendix 2.5.2, *Correspondence* includes the letter to this effect.

*The above signature is a digital copy of the original, which is on file at the 611th Air Support Group.

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN 2013

611th Air Support Group, Alaska Installations

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PREFACE

By working as a team, we can preserve both the natural diversity of military training areas and our opportunity to train the way we plan to fight, now and in the future.¹

The primary change in this revised Integrated Natural Resources Management Plan is that of format to follow guidance provided in Air Force Instruction 32-7064 and the combination of four separate plans into a single plan. Data specific to 611th Air Support Group's (611 ASG) 35 Alaska sites and management goals, objectives, and projects have also been updated and included in this revision.

Missions of 611 ASG's air stations and radar sites have changed over the decades... including defense against an invading nation in World War II, refueling aircraft and staging supplies during the Korean Conflict, ground-controlled aircraft intercept, operating Alaska's DEW line and White Alice Communications System, intelligence-gathering during the Cold War, supporting civilian aircraft, defense communications, missile defense, and emergency divert airfields. Regardless of the mission, military and civilian services provided by the U.S. Air Force at 611 ASG sites are first rate today, just as they have been over the decades.

611 ASG airfield and radar sites include Alaska's Arctic Coastal Plain, northwestern, southwestern and south-central coasts; the interior of Alaska; and the Aleutian chain of islands... all home of some of the most unique plant and wildlife species on the North American continent. This vast diversity of natural habitats is critical to our national environmental health and well-being.

This Integrated Natural Resources Management Plan is the 611 ASG's plan of action for the conservation of natural resources entrusted to the U.S. Air Force. The plan is intended for a finite period, but the philosophy behind it is for a much longer period of time.

The U.S. Air Force will conserve its biological diversity and make sound decisions regarding the use of natural resources to support both the military mission and needs of the region and the nation. Lands at 611 ASG sites have been used to serve our national defense mission for over 60 years. This legacy is not taken lightly by those who use the facilities today. This Integrated Natural Resources Management Plan is dedicated to the next generation of Americans who will use these lands and their natural resources.

¹ General Joseph W. Ralston, USAF, Vice Chairman, Joint Chiefs of Staff (March 1996 - April 2000) and former Commander, Eleventh Air Force and the Alaskan Command (July 1992 - July 1994)

Table of Contents

1.0	Executive Summary	1-1
1.1	Purpose of the INRMP	1-1
1.1.1	Purpose and Scope	1-1
1.1.2	INRMP Support of the Air Force Mission	1-1
1.2	Summary of Benefits of INRMP Implementation.....	1-2
1.3	Implementation of the INRMP	1-3
1.3.1	General Natural Resources Management Goals.....	1-3
1.3.2	Effects of Implementation of INRMP Goals on Management Direction	1-3
1.3.3	Significant Environmental Impacts of INRMP Implementation.....	1-3
2.0	General Information	2-1
2.1	Purpose	2-1
2.1.1	Scope.....	2-1
2.1.2	Function	2-2
2.2	Authority	2-2
2.2.1	Sikes Act	2-2
2.2.2	Department of Defense Authorities	2-3
2.2.3	Air Force Authorities	2-4
2.2.4	Other Related Authorities	2-4
2.3	Responsibilities	2-5
2.4	Management Philosophy	2-6
2.4.1	Support of Military Mission	2-6
2.4.2	Interdisciplinary INRMP Development	2-6
2.4.3	Ecosystem Management Principles	2-8
2.4.4	Support of Base Comprehensive Planning Process	2-10
2.5	Conditions for Implementation and Revision	2-11
2.5.1	Implementation and Review	2-11
2.5.2	INRMP Review and Revisions	2-11
3.0	Installation Overview	3-1
3.1	Location and Area	3-2
3.2	Site Histories	3-2
3.2.1	Air Stations	3-2
3.2.2	General Radar Sites	3-2
3.2.3	Inactive and Excess Sites	3-5
3.3	Military Mission	3-5
3.4	Surrounding Communities	3-6
3.5	Regional Land Use	3-6
3.6	Local and Regional Natural Areas	3-6
4.0	Physical Environment	4-1
4.1	Climate	4-1
4.1.1	General	4-1
4.1.2	Global Climate Change	4-1
4.2	Landforms and Topography	4-2
4.3	Geology and Soils	4-2
4.4	Hydrology and Flood Plains	4-3
5.0	Ecosystems and the Biotic Environment	5-1

5.1	Ecosystem Classification	5-1
5.1.1	North Slope (Arctic Coastal Plain) Sites	5-2
5.1.2	Interior Sites	5-3
5.1.3	Western Alaska Sites.....	5-3
5.1.4	Southwestern Alaska Sites	5-3
5.1.5	Aleutian Island/Alaska Peninsula Sites.....	5-3
5.2	Vegetation	5-3
5.2.1	North Slope (Arctic Coastal Plain) Sites	5-4
5.2.2	Interior Sites	5-5
5.2.3	Western Alaska Sites.....	5-6
5.2.4	Southwestern Alaska Sites	5-6
5.2.5	Aleutian Island/Alaska Peninsula Sites.....	5-6
5.3	Fish and Wildlife	5-7
5.3.1	Fish	5-11
5.3.2	Mammals	5-11
5.3.3	Birds	5-13
5.4	Threatened and Endangered Species	5-14
5.4.1	Confirmed Species on 611 ASG Sites	5-14
5.4.2	Species Protected by Marine Mammal Protection Act	5-14
5.4.3	Candidate and Proposed for Listing Species	5-20
5.4.4	Bald and Golden Eagle	5-20
5.4.5	DoD Partners in Flight Species of Concern	5-23
5.5	Wetlands	5-23
5.6	Other Natural Resources Information	5-24
6.0	Military Mission and External Impacts on Natural Resources	6-1
6.1	Land Use	6-1
6.2	Current Impacts	6-1
6.2.1	Eareckson AS and King Salmon Airport	6-2
6.2.2	Long Range Radar Sites	6-3
6.2.3	Inactive and Excess Sites	6-4
6.3	Potential Future Impacts	6-4
6.3.1	Eareckson AS and King Salmon Airport	6-5
6.3.2	Long Range Radar Sites	6-5
6.3.3	Inactive and Excess Sites	6-6
6.4	Natural Resources Needed to Support the Military Mission	6-6
6.4.1	Eareckson AS and King Salmon Airport	6-6
6.4.2	Long Range Radar Sites	6-7
6.4.3	Inactive and Excess Sites	6-8
6.5	Natural Resources Constraints to Missions and Mission Planning	6-8
6.5.1	Eareckson AS and King Salmon Airport	6-8
6.5.2	Long Range Radar Sites	6-10
6.5.3	Inactive and Excess Sites	6-11
7.0	Natural Resources Program Management	7-1
7.1	Natural Resources Program Management	7-1
7.1.1	U.S. Air Force	7-1
7.1.2	Other Agencies and Organizations.....	7-1
7.1.3	Tribal Governments.....	7-1
7.1.4	Universities.....	7-1
7.1.5	Contractors	7-2
7.2	Ecosystem Management	7-2
7.2.1	Ecosystem Management (General)	7-2

7.2.2	Biodiversity	7-3
7.2.3	Adaptive Management and Decision Making	7-3
7.2.4	Integrated Natural Resources Management Planning	7-3
7.3	Geographic Information System	7-3
7.3.1	Policy and Background	7-3
7.3.2	Natural Resources Spatial Database	7-4
7.3.3	GIS Maintenance and Use	7-5
7.4	Fish and Wildlife Management	7-5
7.4.1	Policy and Background	7-5
7.4.2	Monitoring	7-6
7.4.3	Bird Conservation Plans	7-8
7.4.4	Migratory Birds	7-14
7.4.5	Polar Bear Interaction Reduction	7-21
7.4.6	Eareckson AS Rat Eradication	7-23
7.4.7	Eareckson AS Fox Health.....	7-24
7.4.8	Eareckson As Kelp Management	7-26
7.4.9	Eareckson AS Harlequin Duck Study.....	7-26
7.4.10	Eareckson AS Barge Operations	7-26
7.4.11	Ground Squirrel Conflicts	7-26
7.4.12	Brown/Black Bear Conflicts	7-27
7.4.13	Other Human-Wildlife Conflicts.....	7-28
7.5	Management of Threatened and Endangered Species and Habitats	7-29
7.5.1	Policy and Background	7-29
7.5.2	Threatened Eiders	7-30
7.5.3	Marine Mammals	7-34
7.5.4	Aleutian Shield Fern	7-35
7.5.5	Candidate Species	7-35
7.5.6	Rare Plant Species.....	7-36
7.5.7	Bald Eagle	7-37
7.5.8	Species of Special Concern	7-38
7.5.9	Critical Habitat Considerations	7-38
7.6	Water Resource Protection	7-39
7.7	Wetland and Flood Plain Protection	7-40
7.7.1	Wetlands	7-40
7.7.2	Flood Plains	7-42
7.8	Grounds Maintenance, including Revegetation and Erosion Control	7-42
7.8.1	General	7-42
7.8.2	Invasive Species	7-44
7.8.3	Eareckson Air Station	7-45
7.8.4	King Salmon Airport	7-49
7.8.5	Long Range Radar Sites	7-51
7.8.6	Inactive and Excess Sites	7-52
7.9	Integrated Pest Management Program	7-52
7.10	Bird/Wildlife Aircraft Strike Hazard Management (BASH)	7-53
7.10.1	Policy and Background	7-53
7.10.2	Eareckson Air Station	7-53
7.10.3	King Salmon Airport.....	7-57
7.10.4	Long Range Radar Sites.....	7-59
7.10.5	Inactive and Excess Sites	7-61
7.11	Outdoor Recreation and Related Land Use	7-62
7.11.1	Consumptive Uses	7-62
7.11.2	Non-consumptive Uses	7-64
7.11.3	Other Recreation	7-64

7.12	Cultural Resources Protection	7-64
7.13	Public Outreach and Natural Resources Education.....	7-65
7.13.1	Public Outreach.....	7-65
7.13.2	Natural Resources Education	7-66
7.14	Installation Restoration Program, Demolition Program, and Related Concerns	7-66
7.14.1	Eareckson Air Station	7-68
7.14.2	King Salmon Airport	7-69
7.14.3	Long Range Radar Sites	7-69
7.14.4	Inactive and Excess Sites	7-71
7.15	Coastal Zone Management.....	7-73
7.16	Natural Resources Law Enforcement.....	7-74
7.17	Wildland Fire Management.....	7-74
8.0	Management Goals, Objectives, and Projects	8-1
8.1	INRMP General Natural Resources Goals and Objectives	8-1
8.2	INRMP Program-specific Goals, Objectives, Inhouse Actions, and Projects	8-1
8.2.1	Ecosystem Management	8-1
8.2.2	Geographic Information System	8-2
8.2.3	Fish and Wildlife Management	8-2
8.2.4	Management of Threatened and Endangered Species and Habitats.....	8-5
8.2.5	Water Resources Protections	8-6
8.2.6	Wetland and Flood Plain Protection	8-6
8.2.7	Grounds Maintenance, including Revegetation and Erosion Control	8-7
8.2.8	Integrated Pest Management	8-7
8.2.9	BASH	8-8
8.2.10	Outdoor Recreation and Related Land Use.....	8-8
8.2.11	Cultural Resources Protection.....	8-9
8.2.12	Public Outreach and Natural Resources Education.....	8-10
8.2.13	Installation Restoration Program, Demolition Program, and Related Concerns ..	8-11
8.2.14	Coastal Zone Management.....	8-11
8.2.15	Natural Resources Law Enforcement.....	8-11
8.2.16	Wildland Fire Management.....	8-12
8.3	General INRMP Implementation Projects.....	8-12
8.4	Other Planned Projects.....	8-13
9.0	INRMP Implementation	9-1
9.1	Work Plans	9-1
9.2	Natural Resources Management Staffing	9-1
9.3	Annual Coordination Requirements	9-2
9.4	Monitoring INRMP Implementation	9-3
9.5	Implementation Funding Options	9-3
9.5.1	Funding Categories of Priority	9-3
9.5.2	Operations and Maintenance	9-6
9.5.3	Alternative Sources of Funding	9-6
	References Cited	Ref-1
	Agencies and Persons Contacted	Con-1
	Plan Preparers	Prep-1
	INRMP Distribution List	Dist-1

Appendices

Appendix 2.2.4 Laws and Regulatory Instruments that May Affect 611 ASG Natural Resources Management	Laws-1
Appendix 2.4.2 General Items of Cooperation among the U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, and the 611th Air Support Group, U.S. Air Force	Coop-1
Appendix 2.5.2 INRMP Correspondence and Comments Received	Correspondence-1
Appendix 5.2 Vegetation Summaries for Active and Inactive Former Radar 611 ASG Sites	Veg-1
Appendix 5.4.4 DoD Partners in Flight Species of Concern that May Occur on 611 ASG Sites	PIF-1
Appendix 7.4.5 Polar Bear Interaction Management Plan	Polar Bear- 1
Appendix 7.15 Coastal Project Questionnaire and Certification Statement.....	Coastal-1
Appendix 9.1 Work Plans for Natural Resources Projects	Work Plans-1

Tables

Table 3.0 Site-specific Appendices, Site Status, and Acreage of 611 ASG Alaska Sites	3-1
Table 5.1 Ecosystem Classification of 611 ASG Sites	5-1
Table 5.3 Wildlife Surveys/Studies at 611 ASG Sites, except Eareckson AS	5-7
Table 5.4 Threatened and Endangered Species Known or Potentially Occurring on or near 611 ASG Sites	5-17
Table 5.5 Wetlands for Active and Most Inactive 611 ASG Sites	5-24
Table 7.8 Recommended Time Periods for Avoiding Vegetation Clearing	7-47

Figures

Figure 3.1 611 ASG Installations	3-3
Figure 5.4 USFWS-listed Species in Alaska	5-15
Figure 5.4.3 Pacific Walrus Haulouts	5-21
Figure 7.4.3 Bird Conservation Regions in Alaska	7-9

Acronyms

611 ASG	611th Air Support Group
611 CES	611th Civil Engineer Squadron
611 CES/CEA	611th Civil Engineer Squadron, Asset Management Flight
611 CES/CEAN	611th Civil Engineer Squadron, Natural and Cultural Resources Management and Compliance
611 CES/CEAO	611th Civil Engineer Squadron, Asset Optimization
611 CES/CEVR	611th Civil Engineer Squadron, Environmental Restoration
AAC	Alaska Air Command
AC&W	Aircraft Control and Warning
ACMP	Alaska Coastal Management Program
ADNR	Alaska Department of Natural Resources
ADFG	Alaska Department of Fish and Game
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFI	Air Force Instruction
AFS	Air Force Station
AK	Alaska
ALMS	Alaska Landbird Monitoring System
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
ARS	Alaska Radar System
AS	Air Station
ATV	all-terrain vehicle
AWOS	Automated Weather Observing System
BAM	Bird Avoidance Model
BASH	Bird Aircraft Strike Hazard
BLM	Bureau of Land Management
BOS	Base Operational Support
CFR	Code of Federal Regulations
DEW	Distant Early Warning
DoD	Department of Defense
DoDI	Department of Defense Instruction
EO	Executive Order
F	Fahrenheit
FAA	Federal Aviation Administration
FONPA	Finding of No Practical Alternative
FY	Fiscal Year
GIS	Geographic Information System
GMD	Ground-based Midcourse Defense
HQ AAC/DEPV	Headquarters, Alaska Air Command
HQ PACAF	Headquarters, Pacific Air Forces
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
LRRS	Long Range Radar Site
MAR	Minimally Attended Radar
MMPA	Marine Mammal Protection Act
mph	miles per hour
MOU	Memorandum of Understanding
msl	mean sea level

NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service, also called NOAA Fisheries
NOAA	National Oceanographic and Atmospheric Administration, Fisheries Service
NORAD	North American Air Defense
NPS	National Park Service
NSB	North Slope Borough
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
PCB	Polychlorinated biphenyl
POL	Petroleum, oil, and lubricants
PL	Public Law
RAB	Restoration Advisory Board
RRS	Radio Relay Site
SRRS	Short Range Radar Site
UAR	Unattended Radar
U.S.	United States
USDA	United States Department of Agriculture
USAF	United States Air Force
USC	United States Code
USFWS	United States Fish and Wildlife Service
WACS	White Alice Communication System

1. Executive Summary

1.1 Purpose of the INRMP

1.1.1 Purpose and Scope

This Integrated Natural Resources Management Plan (INRMP) guides the management of natural resources on 611th Air Support Group (611 ASG), United States Air Force (USAF) installations located throughout Alaska. INRMP implementation will support the 611 ASG military and other missions and conserve these installations' land and natural resources, help ensure compliance with environmental laws and instructions, and provide stewardship of the nation's public lands. The INRMP provides the basis and criteria for protecting and enhancing natural resources using landscape and ecosystem perspectives, consistent with the military mission.

This INRMP combines into a single document and updates four separate 2007-2009 INRMPs for Short and Long Range Radar Sites, Eareckson Air Station, King Salmon Airport, and the Inactive Sites, which will remain in use until replaced by the final version of this plan. The INRMP applies to organizations internal and external to 611 ASG that are involved with or interested in the management or use of natural resources and lands on 611 ASG sites.

This INRMP includes advantages, besides updating, over the four separate former INRMPs.

- The 2013 INRMP has about 200 pages less than previous plans.
- This INRMP, for the first time, has site-specific information in individual site appendices, significantly reducing effort required to obtain such information.
- This INRMP has new site maps, habitat change maps/acreage analyses for active and most inactive sites, and for the first time, wetland maps for active sites.
- This INRMP includes an updated *Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan*, emphasizing new Pacific walrus haulout avoidance measures.
- This INRMP has single source tables for listed species, wetlands, and habitat acreages for 611 ASG sites.
- This INRMP has projected annual updates that will significantly reduce plan maintenance costs.
- This INRMP includes a 611 ASG Project Environmental Questionnaire to enable project planners to expediently evaluate projects with regard to environmental requirements.
- This INRMP has projects projected out to 2023.

The physical scope of the plan is generally the U.S. Air Force (USAF) property comprising each site.

1.1.2 INRMP Support of the Air Force Mission

Preparation and implementation of this INRMP are required by the Sikes Act (16 United States Code [USC] 670 *et seq.*) and Air Force Instruction (AFI) 32-7064, *Integrated Natural Resource Management*. Additional INRMP guidance is provided by the Department of Defense (DoD) Instruction 4715.03, *Natural Resources Conservation Program*. This INRMP helps the 611 ASG comply with other federal and state laws, most notably laws associated with wetlands, endangered species, and wildlife management in general. Compliance requirements at least partially affecting implementation of the INRMP are included in Section 2.2, *Authority*. This plan describes how the 611 ASG will implement provisions of

AFI 32-7064 (Department of the Air Force 2004) on its 36 installations, two of which (Naknek Recreation Camps) have been combined within this INRMP.

This INRMP has the concurrence of the U.S. Fish and Wildlife Service (USFWS). This concurrence includes agreement that the INRMP complies with the Endangered Species Act (ESA). Review of this INRMP was via informal consultation with regard to the ESA. Implementation of this INRMP is not likely to adversely affect any threatened or endangered species.

The USFWS determined not to designate critical habitat on 611 ASG sites for the Steller's Eider, Spectacled Eider, or polar bear. The USFWS made this determination in part because the 611 ASG INRMP, as implemented, is a legally operative INRMP that "*provides a benefit to the species for which critical habitat [was] proposed for designation,*" per section 218 of the 2004 National Defense Authorization Act and ESA Section 4(a)(3)(b)(i). This revised INRMP continues applicable protections and procedures for these species.

Implementation of the INRMP directly supports the military mission. Natural resources projects contribute to airfield management; controlling birds and hazing large animals near runways are prime examples. Without such control, loss of personnel and aircraft due to a bird strike caused by an unexpected increased bird aircraft strike hazard (BASH) would affect transportation of personnel and equipment to 611 ASG sites. Regardless of the mission component, the loss of air transportation to 611 ASG sites would impact all missions. The BASH reduction program incorporated recommendations of the 611 ASG Bird Hazard Working Group.

Implementation of previous INRMPs accomplished projects to support military missions while complying with various environmental requirements and minimizing or avoiding impacts to protected species. These included periodic searches for nests of federally-threatened Steller's and Spectacled Eiders and the delineation of high value nesting habitat at sites where eiders are expected to occur. Informal ESA consultation was successfully completed to support environmental restoration and other mission-essential projects. In combination with other managed lands critical habitat was not delineated for the threatened eider nesting sites. Inactive bird nests were removed after state authorizations were obtained to allow Clean Sweep projects to complete environmental restoration and demolition at certain sites.

The Polar Bear Interaction Plan was completed in 2000 and has been revised twice, including the 2012 study used in development of this INRMP. "Taking" Permits were obtained for hazing polar bears as a result of the previous INRMPs, which protects personnel and allows projects to occur with minimized risks.

Without an INRMP for guidance, incidental or even intentional adverse affects can occur to resources, such as wildlife, wetlands, and coastal environments by actions taken to accomplish the mission or by personnel activities and operations, such as construction, demolition and maintenance. This INRMP supports the military mission by protecting and enhancing lands upon which the mission is critically dependent.

1.2 Summary of the Benefits of INRMP Implementation

INRMP implementation provides for the management of natural resources, including fish, wildlife, and plants, and provides the landscape necessary for sustainment of military uses. The INRMP ensures that plans to provide for the conservation and rehabilitation of natural resources on the installations are consistent with the use of the installations to ensure the readiness of the Armed Forces. The INRMP helps the 611 ASG comply with federal and state laws. INRMP implementation will help sustain the military mission by supporting appropriate ecosystem management. And, perhaps most importantly, INRMP

implementation will directly support the mission by continuing to reduce BASH risks and other conflicts that might hinder military and other operations.

1.3 Implementation of the INRMP

1.3.1 General Natural Resources Management Goals

Below are 611 ASG general natural resources goals. These goals and the objectives to achieve them are included in Section 2.4.3, *Ecosystem Management Principles*. Programs related to these general goals and objectives are described in Chapter 7, *Natural Resources Program Management*. Program-specific goals, objectives, and inhouse actions and projects to achieve them are summarized in Chapter 8, *Management Goals, Objectives, and Projects*.

Goal 1: Provide quality natural environments to support the military mission of 611 ASG sites.

Goal 2: Manage natural resources on 611 ASG sites to assure good stewardship of public lands entrusted to the Air Force.

Goal 3: Improve the quality of life of local communities near 611 ASG sites through quality natural resources-based recreational opportunities.

Goal 4: Comply with laws and instructions that pertain to management of 611 ASG sites' natural resources.

1.3.2 Effects of Implementation of INRMP Goals on Management Direction

Implementation of INRMP goals will not be a significant change in management direction on 611 ASG lands since accomplishing the missions will not change. Management specific to certain natural resources (land, plant and wildlife) that may not have been directly managed or may be managed differently would change. Such changes will be implemented to (1) support the Air Force mission; (2) respond to requirements agreed to by the Memorandum of Understanding for a *Cooperative Integrated Natural Resource Management Program on Military Installations* among the DoD, the USFWS, and the International Association of Fish and Wildlife Agencies; (3) enact actions required in response to regulations by other federal agencies or the State of Alaska; and/ or (4) respond to requirements of USAF regulations, *e.g.* Air Force Instruction 91-202, *The U.S. Air force Mishap Prevention Program*.

1.3.3 Significant Environmental Impacts of INRMP Implementation

Implementation of this INRMP is not expected to have significant environmental impacts. However, this INRMP is not an environmental document prepared to satisfy the requirements of the National Environmental Policy Act (NEPA). The INRMP will receive review under the USAF Environmental Impact Analysis Process.

This INRMP is a revision of the previous INRMPs that met the USAF categorical exclusions of 32 CFR 989, parts A.2.3.6 and A.2.3.7. However, prior to implementation of each action, the Environmental Impact Analysis Process will be performed, per NEPA requirements, as a final check as to whether significant environmental impacts would result. In a non-statistical or non-NEPA sense, there will be changes. They could result in additional BOS contractor responsibilities or projects accomplished by some other source.

2.0 General Information

2.1 Purpose

This Integrated Natural Resources Management Plan (INRMP) guides the management of natural resources on 611 ASG, USAF installations located throughout Alaska. INRMP implementation will support the 611 ASG military and other missions and conserve these installations' land and natural resources, help ensure compliance with environmental laws and instructions, and provide stewardship of the nation's public lands, in accordance with the Sikes Act. The INRMP will provide the basis and criteria for protecting and enhancing natural resources using landscape and ecosystem perspectives, consistent with the military mission.

This INRMP updates the Short and Long Range Radar Sites INRMP (Gene Stout and Associates and Blythe & Trousil, Inc. 2007a), Eareckson Air Station INRMPs (Gene Stout and Associates and Blythe & Trousil, Inc. 2007b), King Salmon Airport INRMP (Gene Stout and Associates and Blythe & Trousil, Inc. 2008), and the Inactive Sites INRMP (Gene Stout and Associates and Blythe & Trousil, Inc. 2009), which will remain in use until replaced by the final version of this plan.

The primary change in this revised INRMP is that of format to follow guidance provided in Air Force Instruction 32-7064. This INRMP also groups installations from the four previous plans into one document. Data specific to each installation and management goals, objectives, and projects have also been updated and included in this revision. Unless referenced otherwise, material within this INRMP is taken from the plans listed above.

The organization of this INRMP is different from single-installation INRMPs. Most information in this INRMP proper and its appendices (except appendices 3.0) apply to all 35 611 ASG sites. Information specific to each installation is within 35 site-specific appendices (*e.g.*, 3.0-Eareckson, 3.0-Oliktok, 3.0-Lay, 3.0-Nikolsii); these appendices are separately bound. This format allows general 611 ASG natural resources information to be found within chapters 2-9 of the INRMP, and it provides for a means to easily access specific installation information within installation-specific appendices.

2.1.1 Scope

The 611 ASG is responsible for the operation and management of 35 installations² (also called sites or lands), which are widely distributed throughout Alaska. This includes Eareckson Air Station (AS), King Salmon Airport, 14 active Long Range Radar Sites (LRRS), six Inactive sites (four former LRRS and Short Range Radar Sites [SRRS] and two recreation sites), and 13 Excess sites.

The INRMP applies to organizations internal and external to the 611 ASG that are involved with or interested in the management or use of natural resources and lands on 611 ASG installations in Alaska. The physical scope of the plan is generally the U.S. Air Force (USAF) property comprising each site.

This plan is part of the 611 ASG comprehensive planning process. It contains management strategies, goals, objectives, and actions/projects for the management of 611 ASG lands and natural resources. It is

² Officially, there are 36 sites, but this INRMP combines Rapids Camp and Lakes Camp 2 at Naknek Recreation annexes 1 and 2.

supplemented by annual, agency-coordinated updates and other related plans, such as Integrated Cultural Resources Management plans.

2.1.2 Function

This INRMP will guide the 611 ASG's natural resources management program. The INRMP has been developed primarily by 611 ASG natural resources personnel, but other related functions (*e.g.*, Geographic Information System (GIS), Installation Restoration Program [IRP]) have also contributed to ensure the plan is fully integrated. The INRMP has been reviewed by operations and mission functions to ensure the plan fully supports military and other missions on 611 ASG lands. Coordination with federal agencies involved with the management of natural resources in the region ensures this INRMP complies with and supports federal and state natural resources-related laws and mandates. The integration and coordination aspect of this INRMP are more fully explained in other INRMP sections.

This INRMP should be referenced in descriptions of affected environment to reduce verbiage in National Environmental Policy Act (NEPA) documents and IRP-related documentation. This INRMP is an important mechanism in obtaining funding to fulfill natural resources monitoring, surveys, and specific management activities at 611 ASG sites.

2.2 Authority

2.2.1 Sikes Act

The Sikes Act is the cornerstone legislative mandate that provides for natural resources management on Department of Defense (DoD) lands. The Sikes Act (16 USC 670 *et seq.*) states, *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 requires that, consistent with the use of military installations to ensure the preparedness of the Armed Forces, each INRMP shall, where appropriate and applicable, provide for:

- fish and wildlife management, land management, forest management, and fish and wildlife-oriented recreation;
- fish and wildlife habitat enhancement or modifications;
- wetland protection, enhancement, and restoration where necessary for support of fish or wildlife;
- integration of, and consistency among, the various activities conducted under the INRMP;
- establishment of specific natural resources management objectives and time frames for proposed action;
- sustained use by the public of natural resources to the extent such use is not inconsistent with the needs of fish and wildlife resources management;
- public access to the military installation that is necessary or appropriate for sustained use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources, subject to requirements necessary to ensure safety and military security;
- enforcement of all federal natural resource laws and regulations, when violations occur on the installation;
- no net loss in the capability of military installation lands to support the military mission of the installation; and
- such other activities as the Secretary of the military department considers appropriate.

The Sikes Act also requires or provides for:

- regular review of this INRMP and its effects, not less often than every five years;
- provisions for spending hunting and fishing permit fees exclusively for the protection, conservation, and management of fish and wildlife, including habitat improvement and related activities in accordance with the INRMP;
- exemption from procurement of services under Office of Management and Budget Circular A-76 and any of its successor circulars; and
- priority for contracts involving implementation of this INRMP to state and federal agencies having responsibility for conservation of fish or wildlife.

Sikes Act Improvement Act (1997). The Sikes Act, as amended, provides much of the legal authority for management of wildlife and natural resources on military lands. Key provisions include:

- required annual review of program effectiveness;
- migratory bird management to include opportunities for collecting hunting fees;
- public access for outdoor recreation on military installations to include opportunities for disabled veterans, dependants, and others;
- enforcement of federal laws for violations occurring on DoD lands;
- requirement for sufficient numbers of professionally trained civilian resource managers and enforcement personnel who are inherently governmental; and
- authority to enter into multi-year cooperative agreements with nonfederal agencies, organizations, or individuals for the purpose of management of natural resources.

2.2.2 Department of Defense Authorities

Department of Defense (DoD) Instruction (DoDI) 4715.03, *Natural Resources Conservation Program* (February 14, 2011) requires that... *installations prepare, maintain, and implement Integrated Natural Resources Management Plans (INRMPs) in coordination with the U.S. Fish and Wildlife Service (USFWS) and the appropriate State fish and wildlife management agency(s), and ensure that those plans are fully coordinated with appropriate installation offices responsible for preparing, maintaining, and implementing other programs and plans that may affect land use or be affected by land use decisions, to include but not be limited to operation and training plans, range sustainment plans, installation master plans, outdoor recreation plans, integrated cultural resources management plans, pest management plans, and other installation plans as appropriate.*

In 2006, the DoD, USFWS, and the International Association of Fish and Wildlife Agencies signed a Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations. The DoD, among other items, agreed to:

- take the lead in the development of policies related to INRMP development and implementation and invite USFWS and state fish and wildlife agency offices to participate in developing and updating INRMPs, well in advance of final product date;
- encourage military installations to take advantage of these agencies' natural resources expertise through the use of Economy Act transfers and Sikes Act cooperative agreements;
- encourage military installations to identify INRMP projects and give priority to those that ensure conservation of natural resources while sustaining military mission activities, achieve compliance with laws, and provide adequate staffing for development and implementation of INRMPs;
- provide access (subject to mission, safety, and security requirements) to military installations in order to facilitate the sustainable multipurpose use of its natural resources;

- identify DoD natural resources research needs and develop research proposals with input from the agencies; and
- encourage Military Services to establish natural resources management liaisons with the agencies to facilitate INRMP coordination, cooperative regional and local natural resources partnerships, and natural resources conservation technology transfer and training initiatives.

This INRMP was developed and will be implemented in a manner consistent with this Memorandum of Understanding.

2.2.3 Air Force Authorities

Air Force Instruction (AFI) 32-7064, *Integrated Natural Resources Management* (September 17, 2004) implemented Air Force and DoD Policy Directives. It explains how to manage natural resources on Air Force property in the United States so as to be in compliance with state, federal and local laws and standards for natural resources management.

Other Air Force Policy. Other policy documents that have some bearing on natural resources management include current Air Force AFIs on *Pest Management Program* (AFI 32-1053), which details pest management programs for the installation, and *The Fire Protection Operations and Fire Prevention Program* (AFI 32-2001), which covers wildland fire fighting procedures and policy.

2.2.4 Other Related Authorities

Appendix 2.2.4 lists federal laws, executive orders, Presidential memoranda, DoD directives/instructions, Air Force regulatory instruments, State laws, and other regulatory instruments that may affect implementation of this INRMP. The INRMP is prepared to assure compliance with these regulatory authorities.

Coastal Zone Management Act

Federal lands are excluded from the boundaries of Alaska's coastal zone under 15 CFR 923.3. However, federal agencies must comply with the Coastal Zone Management Act when federal actions on excluded lands may have spillover impacts that affect any land or water use or natural resource of the coastal zone.

Per 15 CFR 930, Subpart C, those federal activities affecting the coastal zone of Alaska must be consistent *to the maximum extent practicable* with standards and enforceable policies of the Alaska Coastal Management Program (ACMP). The ACMP was discontinued effective 30 June, 2011. However, the 611 ASG will continue to perform tasks specified in the Air Force Memorandum of Understanding with Coastal America (Coastal America 1992). Section 7.15, *Coastal Zone Management* has more information on this topic.

Alaska National Interest Lands Conservation Act

Air Force installations are on public lands. Use of public lands for subsistence is discussed in the Alaska National Interest Lands Conservation Act (ANILCA) (Public Law (P.L.) 96-487). ANILCA states (Section 802 (1)), *It is hereby declared to be policy of Congress that consistent with sound management principles, and the conservation of healthy populations of fish and wildlife, the utilization of the public lands in Alaska is to cause the least adverse impact possible on rural residents who depend upon subsistence uses of the resources of such lands...* (Section 810 (a)), *In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy or disposition of public lands under any provision of law authorizing such actions, the head of the Federal agency having primary jurisdiction over such lands or his/her designee shall evaluate the effect of such use, occupancy or disposition on subsistence*

uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes.

This plan does not withdraw, reserve, lease, or permit any use of public land and/or USAF lands. Therefore, a Section 810 evaluation is not included in this document, but Section 810 subsistence clearances would be done for actions on 611 ASG sites that may affect subsistence.

The *Traditional Land Use Survey Characterization for Remote Air Force Facilities in Alaska* (Braund and Associates 2004) indicated that 611 ASG INRMPs tend to emphasize wildlife conservation and sport hunting and fishing, though the Air Force sites are also subject to subsistence hunting and gathering.

2.3 Responsibilities

This INRMP has been developed by the 611th Civil Engineer Squadron, Natural Resource Management (611 CES/CEAN), in coordination with USFWS and the Alaska Department of Fish and Game (ADFG). The INRMP has been reviewed by Pacific Air Force Command, which is also responsible for its implementation. This INRMP is approved and signed by the Group Commander, 611 ASG.

Listed below are each of the command elements responsible for oversight and implementation of this INRMP.

611th Air Support Group. The group provides communications, engineering, and logistical, environmental, financial, and program management to maintain combat readiness for remote Alaska, Eleventh Air Force and the Alaska NORAD Region. The group includes the 611 ASG, the 611 Air Communications Squadron, and the 611 Civil Engineer Squadron (611 CES). The Group Commander is the final approval authority for the INRMP. It is the responsibility of all 611 ASG elements, and military users, to coordinate their proposed activities with this INRMP to ensure they comply with it.

611th Civil Engineer Squadron. The Squadron Commander is the Base Civil Engineer for the 611 ASG. The 611 CES provides engineering maintenance support and environmental services at remote 611 ASG sites. The squadron includes the Asset Management Flight, the Programs Flight, and the Operations Flight.

Asset Management Flight. The 611 Asset Management Flight (611 CES/CEA) is comprised of the Capital Asset Management Element, which includes real estate and environmental impact analysis responsibilities; the Environmental Restoration Element (611 CES/CEAR), which is responsible for the Installation Restoration Program (IRP); and the Natural Resource Management Element, which includes environmental compliance, cultural resource management and natural resource management responsibilities.

Natural Resource Program Management. Natural resource program management is within the Natural Resource Management Element (611 CES/CEAN). The Natural Resource Program Manager is responsible for ensuring the INRMP is prepared and updated/revised. The 611 CES/CEAN has primary responsibility for INRMP implementation and is also responsible for ensuring all elements of the Squadron comply with the INRMP.

In addition, assigned and tenant units and contractors operating on 611 ASG installations are required to conduct their operations according to specific requirements of this INRMP.

2.4. Management Philosophy

First and most important, we feel a deep and abiding sense of responsibility for the care of the lands and resources entrusted to our care. We are sworn to preserve and protect the Constitution -- and we understand the need to preserve and protect this land as well. We are stewards of beautiful and irreplaceable resources -- and we will proudly fulfill our obligation to care for them.³

2.4.1 Support of Military Mission

The principal purpose of DoD lands, waters, airspace, and coastal resources is to support mission-related activities. All DoD natural resources conservation program activities shall work to guarantee DoD continued access to its land, air, and water resources for realistic military training and testing and to sustain the long-term ecological integrity of the resources base and the ecosystem services it provides, in accordance with section 670a-670o of title 16, United States Code (U.S.C.)(also known as... the Sikes Act. (DoDI 4715.03)

Implementation of the INRMP directly supports the military mission in numerous ways. Natural resources projects contribute to airfield management; controlling birds near runways and hazing large animals are prime examples. Without such bird control, catastrophic loss of personnel and aircraft due to a bird strike caused by an unexpected increased bird aircraft strike hazard (BASH) would affect all other activities that may occur at 611 ASG sites. Likewise, without hazing of bears at some sites, a mauling of personnel would affect all other activities that may occur at 611 ASG sites.

Without an INRMP for guidance, incidental or even intentional adverse affects can occur to resources, such as wildlife, wetlands, and coastal environments by actions to accomplish the mission or by personnel activities and operations, such as construction, demolition, and maintenance. Conversely, these mission operations or support activities and indirect actions can be adversely affected by natural resources. This INRMP supports the military mission by protecting and enhancing lands upon which the mission is critically dependent.

Implementation of this INRMP will support 611 ASG military missions. The 611 CES/CEAN is committed to supporting the military mission, providing stewardship of resources entrusted to the Air Force, enhancing the quality of life of surrounding communities, and being a valued member of the overall 611 ASG team. Implementation of this INRMP will demonstrate those commitments.

2.4.2 Interdisciplinary INRMP Development

This INRMP cannot be implemented by the 611 ASG alone. In accordance with AFI 32-7064 and as required by the Sikes Act and the USAF ecosystem management philosophy, the 611 ASG has developed effective cooperative relationships with various agencies for managing natural resources at Inactive Sites.

The Alaska Department of Fish and Game (ADFG) is responsible for management of all fish and wildlife populations within Alaska. The North Slope Borough is responsible for management of natural resources on North Slope Borough lands, which neighbor many North Warning Long Range Radar Sites (LRRS) locations.

The USFWS, Region 7 is responsible for migratory birds and threatened and endangered species, including polar bears, sea otters, and walrus throughout the State of Alaska, as well as natural resources

³ Sheila E. Widnall, Secretary of the Air Force, 1994-1997.

within the National Wildlife Refuge (NWR) system. The following 611 ASG installations are specifically affected by their association with NWRs:

- Barter Island LRRS lies within the Arctic NWR,
- a portion of the Alaska Maritime NWR lies near Point Barrow LRRS,
- Cape Lisburne LRRS lies within the Chukchi Sea Unit of the Alaska Maritime NWR,
- Fort Yukon LRRS lies within the Yukon Flats NWR,
- Cape Romanzof LRRS lies within the Yukon Delta NWR,
- Cape Newenham LRRS lies within the Togiak NWR,
- Cold Bay lies within the Pavlof Unit of Alaska Peninsula NWR,
- King Salmon Airport is near the Alaska Peninsula/Becharof NWR, and
- Shemya Island (Eareckson Air Station) remains part of the Alaska Maritime NWR, though in 2001 the Defense Appropriations Act (Public Law (PL) 106-259, Section 302) transferred primary jurisdiction for military purposes of Shemya Island to the Department of the Air Force (White and Spraker 2006); both cooperate with each other when responsibilities overlap, such as dealing with Bird Aircraft Strike Hazard issues.

The mission of the NWR system is “*to administer a national network of lands and waters for the conservation, management, and where applicable, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans*” (www.fws.gov/refuges 2007). The USAF (611 ASG) and the USFWS agree that their respective interests on Shemya Island are of enough importance to warrant an annual meeting to review ongoing programs and discuss items of mutual interest. Both agencies bring appropriate personnel to these meetings to provide technical input into discussions.

This INRMP has been developed by the 611 CES/CEAN in coordination with the USFWS and ADFG. This INRMP (Appendix 2.4.2) includes general items of cooperation among the USAF, USFWS, and ADFG for natural resources management at 611 ASG sites, in accordance with the Sikes Act.

The National Marine Fisheries Service (NMFS) is responsible for marine fish, seals, and whales. AFI 32-7064 requires coordination, notification, and internal agency review of INRMPs by NMFS *if the installation includes or is adjacent to marine environments*. The NMFS was afforded an opportunity to review and comment on this INRMP. In the event a project may affect marine species managed by the NMFS, USAF will coordinate with NMFS, in accordance with the Marine Mammals Protection Act.

The Bureau of Land Management (BLM) is responsible for management of land uses and natural resources on BLM lands and is responsible for subsurface resource management on portions of some 611 ASG sites. The Air Force’s land interests at Wainwright former Short Range Radar Site (SRRS), Point Barrow LRRS, and Point Lonely site are through 20-year rights-of-way from the BLM as is King Salmon Airport. The King Salmon Airport withdrawal expired on October 17, 2011 and is currently authorized under a Federal Land Policy and Management Act right-of-way (AA-93105) which expires December 31, 2014. The Air Force has submitted a new withdrawal request to the BLM Alaska State Office, and the request is being processed (the average processing time for a new withdrawal is 2-3 years). Bullen Point site (also known as Flaxman Island), Oliktok LRRS, and Barter Island LRRS are withdrawn from public domain by public land order for military purposes. BLM may co-manage 611 ASG sites based on the terms and conditions of the site withdrawal.

The National Park Service is responsible for natural resources within Katmai National Park and Preserve, which is near King Salmon Airport and Naknek Recreation Camps.

The USAF is responsible for the management and stewardship of land and habitat resources within the confines of its lands and seeks to minimize any mission-related adverse impacts to natural resources outside the sites.

An example of USAF management partnership is the 611 CES/CEAN involvement in the development of the *Polar Bear Interaction Management Plan* (Bridges 2001) and the polar bear pamphlet and video, which were developed cooperatively between the USFWS, Coastal America Foundation, and 611 CES. USFWS again partnered with 611 CES as a reviewer for the 2008 revision to the *Polar Bear Interaction Management Plan* (Ohms 2008). This plan was again updated as part of this INRMP, in cooperation with the USFWS.

Natural resources management at King Salmon Airport is significantly enhanced by surveys and studies by other organizations and individuals. The ADFG and USFWS (Cook 1992, Scharf 1993, MacGowan 1994, Moore 1996, Ruhl and Moore 1996, Ruhl 1997, Kirk 1999, Spies 1998, and Savage and Murray 2007) monitor and conduct inventories of fish and wildlife resources within the general area of King Salmon Airport. The migratory waterfowl study is perhaps the best example of long-term monitoring in the area. Ongoing projects by various agencies and individuals include feeder surveys with Cornell University, Christmas bird counts, Breeding Bird Surveys (USFWS), and operation of a Measuring Avian Productivity and Survivability (MAPS) training center (USFWS).

An ecosystem monitoring program began with surveying sites and preparing wildlife habitat maps for various 611 ASG sites (see Section 5.2, *Vegetation*). The program is continuing with regular comparisons with available remote sensing images. These maps are a starting point in a program geared towards an ecosystem approach to land management of USAF properties. This approach is being augmented by monitoring efforts for a few select species, such as Spectacled and Steller's Eiders. Wildlife habitat maps have several uses in an ecosystem management program, including, but not limited to, (1) determining the aerial extent of habitats that are suitable for monitoring certain species of conservation concern, (2) determining the aerial extent of habitats that are in need of restoration because they have been altered by human activities, and (3) serving as base map layers for overall land management protocol (Schick *et al.* 2004). This program has made the most advancement at North Slope sites that have received regular surveying for threatened eiders. This is discussed further in Section 7.5, *Management of Threatened and Endangered Species and Habitats*.

2.4.3 Ecosystem Management Principles

Preparation and implementation of this INRMP are required by AFI 32-7064, *Integrated Natural Resource Management* (Department of the Air Force 2004). AFI 32-7064 requires the INRMP to implement ecosystem management on Air Force installations by setting goals for attaining a desired land condition.

Air Force principles for ecosystem management are as follows (AFI 32-7064):

- maintain or restore native ecosystem types across their natural range where practical and consistent with the 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;
- use regional approaches to implement ecosystem management on an installation by collaboration with other DoD components as well as other federal, state and local agencies, and adjoining property owners; and

- 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 Air Force mission.

Air Force policy also recognizes that biodiversity conservation is an integral part of ecosystem management. As such, installations are required to maintain or reestablish viable populations of all native species on Air Force-controlled lands when practical and consistent with the military mission.

Ecosystem management provides a means for the 611 ASG to conserve biodiversity, comply with environmental laws and regulations, and continue to provide high quality military readiness essential for the defense of the nation. The 611 ASG will use ecosystem management to guide its program in the next five years and beyond for management of its lands. Section 7.2, *Ecosystem Management* further discusses ecosystem management and biodiversity.

It is also Air Force policy⁴ to implement DoD policies for natural resources management, as stated in DoDI 4715.03.

Below are 611 ASG general natural resources goals and objectives. Some objectives apply to more than one goal. When this occurs, the most appropriate goal was chosen. Programs related to these general goals and objectives are described in Chapter 7, *Natural Resources Program Management*. Program-specific goals, objectives, and inhouse actions and projects to achieve them are summarized in Chapter 8, *Management Goals, Objectives, and Projects*.

Goal 1: Military Readiness. Provide quality natural environments to support the military mission of 611 ASG sites.

Objective 1. Ensure no net loss in the capability of installation lands to support existing and projected military missions (Sikes Act requirement).

Objective 2. Develop, manage, and conserve natural resources in a manner that is compatible with the military mission and that most efficiently uses personnel and material resources.

Objective 3. Reduce maintenance costs and labor.

Objective 4. Provide information on flood plains to enable proper facility siting and operation.

Objective 5. Accomplish wildlife hazard analyses for airfield operations and personnel safety.

Goal 2: Stewardship. Manage natural resources on 611 ASG sites to assure good stewardship of public lands entrusted to the Air Force.

Objective 1. Use ecosystem management strategies to protect, conserve, and enhance native fauna and flora with an emphasis on natural biodiversity enhancement.

Objective 2. Monitor and manage soils, water, vegetation, and wildlife with a consideration for all biological communities and human values associated with these resources. Monitoring and management plans will be developed in coordination with the USFWS and ADFG (this INRMP). This is not to say an official plan is necessary for changes in specific management actions, although coordination with appropriate agencies would be necessary.

Objective 3. Provide economic and other human-valued products of renewable natural resources when such products can be produced in a sustainable fashion without significant negative impacts on the military mission or other natural resources.

Objective 4. Involve local 611 ASG sites' communities in natural resources programs.

⁴ Memorandum for ALMAJCOM/A7, Depart of Defense Instruction (DODI) 4715.03, *Natural Resources Conservation Program*, September 2011, HQ USAF/A7C.

Objective 5. Ensure natural resources programs are coordinated with other agencies and conservation organizations with similar interests.

Objective 6. Provide assistance to and conduct cooperative studies with the ADFG, USFWS, and other agencies.

Objective 7. Maintain or improve the environment of the installation and surrounding area.

Objective 8. Minimize disturbance to native vegetation or habitat and revegetate with locally adapted and native species. Revegetation will be coordinated with other property managers to minimize the spread of unwanted vegetation.

Objective 9. Minimize wildlife-human conflicts.

Objective 10. Develop databases of existing natural resources compiled from literature and consultation with state and federal agencies.

Goal 3: *Quality of Life.* Improve the quality of life of local communities near 611 ASG sites through quality natural resources-based recreational opportunities.

Objective 1. Provide opportunities for consumptive and nonconsumptive uses of natural resources within biological and recreational carrying capacities of the resources, based on established State of Alaska resource limits.

Objective 2. Provide natural resources-based opportunities for other outdoor recreation.

Objective 3. Provide conservation education opportunities.

Objective 4. Minimize dangers to humans from wildlife.

Goal 4: *Compliance.* Comply with laws and instructions that pertain to management of 611 ASG sites' natural resources.

Objective 1. Comply with the intent of federal, state and local environmental regulations, executive orders, and DoD and USAF policies.

Objective 2. Manage natural resources within the spirit and letter of environmental laws, particularly the Sikes Act upon which this INRMP is predicated.

Objective 3. Inventory, protect, restore, and manage sensitive priority species.

Objective 4. Manage wetlands consistent with Executive Order 11990, *Protection of Wetlands*.

Objective 5. Manage natural resources consistent with the National Historic Preservation Act.

Objective 6. Protect and enhance habitat used by listed or proposed threatened and endangered species.

Objective 7. Conduct detailed surveys of potential wetlands prior to construction or demolition activities.

Objective 8. Manage flood plains consistent with Executive Order 11988, *Floodplain Management*.

Objective 9. Provide baseline data needed to implement the IRP.

Objective 10. Reclaim disturbed sites to restore previously existing native plant communities found at the site.

Objective 11. Implement Executive Order 12962, *Recreational Fisheries*, particularly the five initiatives of the National Recreational Fisheries Coordination Council.

Objective 12. Provide baseline data on natural resources that can be incorporated or expanded upon as needed on a project by project basis to comply with the National Environmental Policy Act (NEPA).

Objective 13. Use procedures within NEPA to make informed decisions that include natural resources considerations and mitigation.

Objective 14. Provide management plans that can be easily understood and administered.

Objective 15. Implement this INRMP within the framework of USAF policies and instructions.

2.4.4 Support of Base Comprehensive Planning Process

The INRMP is a critical component of the 611 ASG comprehensive planning process. The INRMP provides the background information and data on 611 ASG lands' natural resources; the framework, methodology, and specific actions necessary for management of those resources; and the guidance and

requirements that must be complied with to allow the military mission and natural resources management to continue unimpeded. Issues discussed and analyzed in the INRMP directly support base comprehensive planning, and the INRMP should be referenced for this information to ensure these issues are considered during the planning process.

2.5 Conditions for Implementation and Revision

2.5.1 Implementation and Review

Organizations responsible for implementation of this INRMP are listed in Section 2.3, *Responsibilities*. Correspondence and records of annual reviews regarding the INRMP between the 611 ASG Natural Resource Program Manager, the USFWS Alaska Region Sikes Act Representative, and the ADFG Deputy Commissioner of the Department will be maintained at the 611 CES office.

2.5.2 INRMP Review and Revisions

As discussed in Section 2.1, *Purpose*, this single, combined INRMP is a revision of the four previously approved plans (Gene Stout and Associates and Blythe & Trousil, Inc. 2007a, 2007b, 2008, and 2009), which remain in use until replaced by the final version of this plan. Appendix 2.5.2 includes correspondence significant to the coordinated development of this INRMP.

Air Force policy⁵ states, *Installations that have an Integrated Natural Resources Management Plan (INRMP) must conduct internal natural resource self-assessments annually. The annual natural Resources self-assessments shall address the Natural Resources Conservation Metrics in DoDI 4715.03, Enclosure 5. The United States Fish and Wildlife Service (USFWS) and the state fish and wildlife management agency shall be invited to participate in the internal natural resources self-assessment. Also invite the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service to participate if the installation includes or borders marine environments.*

After approval of this revised INRMP, coordination will occur between the 611 ASG, USFWS, and ADFG representatives to annually review this INRMP. Through annual review of this INRMP, changes to management programs and projects will be addressed and updated as necessary.

Section 101(b)(2) of the Sikes Act [16 USC 670a (b)(2)] states that each INRMP *must be reviewed as to operation and effect by the parties thereto on a regular basis, but not less than every 5 years*. DoD policy (DoDI 4715.03) requires installations to, *Conduct external INRMP reviews for operation and effect no less than every 5 years for all installations with INRMPs using the Natural Resources Conservation metrics. The 5-year period dates from the last review at which external regulatory stakeholders participated*. This policy further states, *Update or revise INRMPs as necessary based on results of these reviews*.

A significant revision of this INRMP would only be required if 611 ASG sites would experience a major mission change (e.g., mission realignment) or perhaps a major change to the overall natural resources management philosophy.

⁵ Memorandum for ALMAJCOM/A7, Depart of Defense Instruction (DODI) 4715.03, *Natural Resources Conservation Program*, September 2011, HQ USAF/A7C.

3.0 Installation Overview

*The mission of the Department of Defense is more than guns, planes, and missiles to protect the country against enemy attack. Part of the defense job is the safeguarding of the land, timber and waters, the fish and wildlife, the priceless natural resources which make this country of ours worth defending.*⁶

Overview information general to the 611 ASG and summaries of site-specific overview information are within this chapter. However due to the large number of 611 ASG sites in remote Alaska, most site-specific information and management details are within site-specific appendices 3.0. This format allows general 611 ASG natural resources information to be found within chapters 2-9 of the INRMP, and it provides for a means to easily access specific installation information within these site-specific appendices.

Site-specific appendices (3.0) and, in general, site-specific discussions within the main body of this INRMP are in the order in Table 3.0. This table also indicates the status and acreage of each 611 site.

Table 3.0. Site-specific Appendices, Site Status, and Acreage of 611 ASG Alaska Sites

INRMP Appendix	Site Name	Acres ⁷
• Appendix 3.0–Eareckson	Eareckson Air Station (AS), Shemya Island	3,520
• Appendix 3.0–Salmon	King Salmon Airport	927
• Long Range Radar Sites (Active Sites)		
○ Appendix 3.0– Barter	Barter Island LRRS	641
○ Appendix 3.0– Lisburne	Cape Lisburne LRRS	1,125
○ Appendix 3.0– Newnham	Cape Newenham LRRS	2,359
○ Appendix 3.0– Romanzof	Cape Romanzof LRRS	4,900
○ Appendix 3.0– Cold	Cold Bay LRRS	208
○ Appendix 3.0– Yukon	Fort Yukon LRRS	84
○ Appendix 3.0– Indian	Indian Mountain LRRS	4,226
○ Appendix 3.0– Kotzebue	Kotzebue LRRS	676
○ Appendix 3.0–Murphy	Murphy Dome LRRS	846
○ Appendix 3.0–Oliktok	Oliktok LRRS	832
○ Appendix 3.0–Barrow	Point Barrow LRRS	266
○ Appendix 3.0–Sparrevohn	Sparrevohn LRRS	1,179
○ Appendix 3.0–Tatalina	Tatalina LRRS	4,970
○ Appendix 3.0–Tin	Tin City LRRS	723
• Inactive Sites		
○ Appendix 3.0–Bullen	Bullen Point (Flaxman Island) former SRRS	605
○ Appendix 3.0–Campion	Campion Air Force Station.	2,326
○ Appendix 3.0–Louise	Lake Louise Recreation Site	25
○ Appendix 3.0–Lay	Point Lay former LRRS	1,442
○ Appendix 3.0–Lonely	Point Lonely former SRRS	1,802

⁶ General Thomas D. White, Air Force Chief of Staff, 1957-1961.

⁷ E-mail, 11 October 2011) Catherine M. Moody, Realty Specialist, 611 CES/CEAO, *Remote Alaskan and Pacific Sites Listings*.

○ Appendix 3.0–Wainwright	Wainwright former SRRS	1,519
● Excess Sites		
○ Appendix 3.0–Anvil	Anvil Mountain Radio Relay Site (RRS)	12
○ Appendix 3.0–Bear.	Bear Creek RRS	115
○ Appendix 3.0–Beaver	Beaver Creek RRS	36
○ Appendix 3.0–Bethel	Bethel RRS	22
○ Appendix 3.0–Big.	Big Mountain RRS	402
○ Appendix 3.0–Driftwood	Driftwood Bay RRS	459
○ Appendix 3.0–Granite	Granite Mountain RRS	258
○ Appendix 3.0–Kalakaket	Kalakaket Creek RRS	316
○ Appendix 3.0–Naknek and Annex 2 (Lake Camp)	Naknek Recreation Annex 1 (Rapids Camp)	80
○ Appendix 3.0–Nikolski	Nikolski RRS	323
○ Appendix 3.0–Nome	Nome Field POL Site	7
○ Appendix 3.0–North	North River RRS	144
○ Appendix 3.0–Heiden	Port Heiden RRS	171
	Total Acres	37,709

3.1 Location and Area

The 611 ASG is a tenant at Joint Base Elmendorf-Richardson, which is located within the Municipality of Anchorage in south-central Alaska. All 611 ASG lands are at remote sites in Alaska and on remote islands in the central Pacific Ocean. This INRMP only includes those sites in Alaska (Figure 3.1).

The 611 ASG is responsible for the operation and management of 36 installations (two Naknek Recreation Camps are combined within this INRMP) widely distributed throughout Alaska, including the Aleutian Islands. Sites include Eareckson Air Station (AS), King Salmon Airport, 14 active LRRSs, six Inactive sites, and 13 Excess sites. Acreages for these sites are in Table 3.0⁸. These sites have 263 buildings and have a replacement cost of over \$5 billion dollars.

3.2 Site Histories

3.2.1 Air Stations

In 1950 the Alaska Air Command (AAC) developed plans to use Galena and Naknek as forward operating bases for its fighters. In 1952 deployments began to use Galena and King Salmon as forward operating bases for fighter-interceptors. In 1954 Naknek and Galena Air Force Auxiliary Fields became King Salmon and Galena Airports (Cloe 2008).

Histories of Eareckson AS and King Salmon Airport are in appendices 3.0-Eareckson and 3.0-Salmon, respectively. Detailed histories of 611 ASG sites are in current Integrated Cultural Resources Management Plans for these sites (Center for Environmental Management of Military Lands 2010 (a and b), 2008, 2006).

3.2.2 General Radar Sites

SRRSs and some LRRSs (formerly a portion of the Distant Early Warning (DEW) Line are located in remote and sparsely populated areas at approximately 50-mile intervals across the coast of Alaska.

⁸ Acreages within this INRMP, particularly within appendices 3.0, may differ from those in Table 3.0 due to different calculation methodologies and/or the addition of buffer zones around some 611 ASG sites.

Figure 3.1. 611 ASG Installations



During the early years of the Cold War the Air Force constructed a series of aircraft control and warning (AC&W) radar sites throughout Alaska and a DEW radar system across northern Alaska and Canada and into the Aleutians. The Air Force then linked them with the White Alice Communications System (WACS) (*A Short Military History of Alaska: 1867-2007*, 3rd Wing History Office 2007.)

The following summarizes brief portions of the draft chronology *Military Development in Alaska* (Cloe 2008) that is a compilation of histories from many sources; the version used covers 1867 through 2005.

As the threat from the Soviet Union grew, the need for a national early warning radar system was recognized, and in 1947 planning began for a large system of radar stations and control centers in the contiguous U.S. as well as 37 radar stations and four control centers in Alaska. The plan was scaled back to a modified plan for 10 stations plus two control stations in Alaska. A perimeter of coastal early warning with interior ground control intercept stations to provide fighter direction to protect the main bases was planned.

The original AC&W system in Alaska included 10 stations planned as permanent, successors to a temporary radar system that began operation in 1949; called the Alaskan Interim Aircraft Control and Warning System. The temporary system consisted of six radar sites: **Elmendorf AFB** (Anchorage), **Clear** (near Anderson), **Nome** (assumed later named **Anvil Mountain**, [Augustine 2008]), **Naknek** (later renamed **King Salmon**), **Galena**, and **Gambell** (St. Lawrence Island) and two control centers at **Elmendorf AFB** and **Ladd AFB** (now **Fort Wainwright**, Fairbanks). The command's aircraft control and warning program became a reality; construction began in 1950. See Appendix 3.2.2 for further discussion of AC&W stations.

When the 10 permanent AC&W stations became operational in 1952, temporary Lashup radars at **Naknek**, **Willow**, **Farewell**, **Bethel**, **Clear**, and **Elmendorf** were taken out of operation. Orders were given to decommission the **Kotzebue** Lashup radar the following year.

During 1952 Opportunity Strike tests were conducted between various AC&W stations to determine the viability of using VHF and microwave radio communications to connect the radar stations to replace the unreliable HF and LF communications system. However, the VHF and microwave system had major construction and logistical support challenges, and Headquarters, USAF recommended that AAC conduct a study to determine a more reliable and less complex system.

AAC formed a working group to develop an air defense communications system that also supported other government agencies. Group discussions in 1954 and 1955 ultimately led to the project which became known as the White Alice Communications System (WACS). The Air Force awarded a contract to the American Telephone and Telegraph Company to conduct a communications study and make recommendations. See Appendix 3.2.2 for further discussion of WACS stations.

A study group of American scientists was formed in 1952 to develop an advance warning system for North America's northern boundary. Their immediate requirement was to create radar, radio equipment, and associated electronic systems, which would operate in an environment that included -60 °F, vicious electric storms in summer, constantly fluctuating currents of the North Magnetic Pole, and the strange phenomena of the northern lights (Denfeld 1993).

The DEW Line was created in record time. By December 1952 the system was designed, and a DEW Line was planned to extend across the northern regions of Alaska and Canada (Denfeld 1993). **Wainwright**, **Point Lonely**, and **Bullen Point** were activated in 1953. See Appendix 3.2.2 for further discussion of DEW Line stations.

In 1985 the United States and Canada signed an agreement to modernize the aging DEW Line System. The replacement system, known as the North Warning System, would consist of long- and short-range radars. The two countries agreed to refurbish 12 DEW Line sites (including **Wainwright, Point Lonely, and Bullen Point**) and equip them with AN-124 Short Range Radar, which were installed in 1993. **Barter Island, Point Lay, Point Barrow, and Oliktok** were equipped with FPS-117 Long Range Radar, which were installed in 1987. The installation of an FPS-117 at **Barter Island** was delayed because the site was being used to test the prototype AN-124 Short Range Radar which would be used at other North Warning System sites. The **Barter Island** site became operational as part of the North Warning System in November 1990 (Fuller 1994).

The North Warning SRRSs and LRRSs are a USAF contractor-operated radar/communications network, part of the overall North American Aerospace Defense (NORAD) Command mission. A BOS contract is used to provide manning for operation, maintenance, and support of active LRRS facilities.

Additional active LRRS site-specific historical information is within Appendices 3.0.

3.2.3 Inactive and Excess Sites

To understand the 611 ASG inactive sites' installation history it is helpful to review the facilities as one of or a combination of the following: a radar site, primarily a fuel storage site, a recreation site, or a communication site linking the radar sites to control centers.

Campion and **Bethel** were former AC&W stations. They were not replaced when others were updated. **Point Lonely** and **Point Lay** were among the DEW Line stations on the North Slope of Alaska; they were converted Alaska Radar System sites, before becoming inactive **Point Lonely** was a SRRS, and **Point Lay** was a LRRS. **Port Heiden, Driftwood Bay, and Nikolski** were part of the Aleutian DEW Line Stretch-Out Project on the Alaska Peninsula and Aleutian Islands. **West Nome Tank Farm** (now called Nome Field POL Site) was a component of Marks AFB. **Lake Louise** and **Naknek Recreation Camps** supported recreational opportunities to Elmendorf AFB, Eielson AFB, and King Salmon Airport. **Anvil Mountain, Bear Creek, Beaver Creek, Big Mountain, Granite Mountain, Kalakaket Creek, and North River** were RRSs and part of the WACS. These RRSs were closed, no longer needed, when a network of commercially provided earth-satellite communications system became available. Additional inactive and excess site-specific historical information are within Appendices 3.0.

The environmental cleanup of hazardous material began at inactive sites and no-longer-needed facilities at some active sites in the early 1980s. In 1985 the Alaska Cleanup Effort began. It included facility demolition and burial and hazardous material cleanup. The 5099th Civil Engineering Operations Squadron (a predecessor squadron of the 611 CES) was the primary agency for site cleanup. Additional information on Operation Clean Sweep and its projects during the last five years and those planned for 2013-2017 are in Section 7.14, *Installation Restoration Program, Demolition Program, and Related Concerns*.

3.3 Military Mission

The initial mission of the air defense system in Alaska was to detect and report all airborne vehicles operating within the designated detection capabilities of the surveillance radars, regardless of direction and movement. The mission also included the operation and maintenance of a communications system.

The mission of the 611 ASG is to provide communication, engineering, logistics, environmental, financial, and program management support to maintain combat readiness for remote Alaska, Eleventh Air Force, and the North American Air Defense (NORAD). The 611 ASG provides surveillance radars, arctic infrastructure including airfields, and worldwide ready Expeditionary Air Force warriors for

homeland defense, decisive force projection, and aerospace command and control in Alaska (Center for Environmental Management of Military Lands 2010b).

Active installations also gather radar data used for en route civilian air control, shared with the Federal Aviation Administration (FAA). Remote installations (sites) are subordinate to the 611 ASG, headquartered at Elmendorf AFB. Active installations are directly linked via satellite to the Regional Operations Control Center at Elmendorf AFB. Inactive sites no longer fulfill a specific military mission.

More specific military missions of Eareckson AS and King Salmon Airport are in appendices 3.0-Eareckson and 3.0-Salmon.

3.4 Surrounding Communities

Site-specific information regarding surrounding communities on 611 ASG installations is in site-specific 3.0 appendices.

3.5 Regional Land Use

Site-specific information regarding regional land use on 611 ASG installations is in site-specific 3.0 appendices.

3.6 Local and Regional Natural Areas

Site-specific information regarding local and regional natural areas on 611 ASG installations is site-specific 3.0 appendices.

4.0 Physical Environment

4.1 Climate

4.1.1 General

Geographical features of Alaska have a significant effect on Alaska's climate, which falls into five major zones: maritime, maritime continental, transition zone between the maritime and continental, continental, and arctic (www.wrcc.dri.edu/narratives/Alaska 2007).

611 ASG sites located on the Aleutian Islands; those on the Alaska Peninsula; and those near Bristol Bay, Norton Sound, and the Bering Sea have a maritime climate. Inactive Sites at interior locations have a continental climate. Inactive Sites located on the North Slope are in the arctic climate zone.

Precipitation on the southern side of the Alaska Range in the Alaska Peninsula and the Aleutian Islands is generally less than 60 inches. Precipitation amounts decrease rapidly to the north, with an average of 12 inches in the continental zone and less than 6 inches in the arctic region (www.wrcc.dri.edu/narratives/Alaska 2007).

Mean annual temperatures in Alaska range from the low 40s degree (°) Fahrenheit (F) under the maritime influence in the south to a chilly 10° F along the Arctic Slope north of the Brooks Mountain Range. The greatest seasonal temperature contrast between seasons is found in the central and eastern portion of the continental interior. In this area summer heating produces average maximum temperatures in the upper 70s ° F with extreme readings in the 90's F (www.wrcc.dri.edu/narratives/Alaska 2007). Site-specific appendices 3.0 include 611 ASG site-specific climate information.

4.1.2 Global Climate Change

According to a number of scientists, effects of global warming are already taking a toll in Alaska. Damage to forests, loss of wetlands, degradation of salmon habitat, rising ocean levels, and widespread melting of permafrost are being attributed to a permanent and significant climate regime shift. Major changes in temperature, warming of rivers and extensive melting of permafrost have been clearly evidenced in both Alaska and Canada over the last 20 years. In areas with more severe winter temperatures thermokarst (melting of permafrost) is a major problem.

Updates in climate tables for the seven climate tables in appendices 3.0, sections 4.1, *Climate* for this INRMP compared to the 2005-2007 INRMPs clearly point to increasing temperatures and increasing precipitation. Most months at these sites (*i.e.*, King Salmon Airport, Cold Bay, Kotzebue, Murphy Dome, Point Barrow, Tatalina, and Tin City) had warmer high and low average temperatures and higher precipitation than in the previous INRMPs.

An example of climate change effects on the environment have been identified in recent studies of forest health. Tree growth studies conducted by University of Alaska Professor, Glenn Juday, have found clear indication that normal cycles of forest growth changed dramatically in the early to mid 1970s. The studies also show that the forests have been experiencing stresses since then, often involving complex interactions of different effects of warming that have no precedent in the historical record. Spruce bark beetle (*Dendroctonus rufipennis* [Kirby]) infestations reached epidemic proportions during the 1990s, potentially the result of warmer than average summers and other climatic and forest conditions. Infestation spread and persistence has resulted in catastrophic long-term loss of 60–80 percent of spruce

trees larger than nine inches in diameter. This infestation as well as those insects that attack other plant species reduce forest diversity and increase fuel loading, which substantially increases forest fire danger in affected areas.

Rising world ocean levels is also identified as a likely source of impact to coastal 611 ASG sites. Rising sea levels could impact flood plains and wetlands on these sites. The University of Alaska, Fairbanks has been collecting climate change data, and this process includes some 611 ASG sites. Changes in the extent of polar ice may be the reason that some northern coastal 611 ASG sites (*e.g.*, Point Lay site, Cape Lisburne LRRS) are apparently being used as haulouts for walruses and seals to a greater degree than in the past.

4.2 Landforms and Topography

Alaska contains 375 million acres of land and many thousands of lakes. The two longest mountain ranges are the Brooks Range, which separates the Arctic and the interior regions and the Alaska-Aleutian Range, which extends westward along the Alaska Peninsula and the Aleutian Islands, and northward about 200 miles from the Peninsula, then eastward to Canada. Other shorter but important ranges are the Chugach Mountains, which form a rim to the central north Gulf of Alaska, and the Wrangell Mountains lying to the northeast of the Chugach Range and south of the Alaska Range. Both of these shorter ranges merge with the St. Elias Mountains, extending southeastward through Canada and across southeastern Alaska as the Coast Range. Numerous peaks in excess of 10,000 feet are found in all but the Brooks Range. The highest peak (20,320 feet above sea level) in the North American Continent, Mt. McKinley (Denali), is in south-central Alaska. Many other peaks tower above 16,000 feet; however, nearly all of the inhabited sections of the state are at 1,000 feet elevation or less (www.wrcc.dri.edu/narratives/Alaska 2007).

Appendices 3.0 include 611 ASG site-specific landform information.

4.3 Geology and Soils

The Arctic Coastal Plain is one of the principal areas that was not glaciated (Wahrhaftig 1965). Thus, periglacial features, such as polygonal ground, sorted circles, pingos, and ice wedges, can be observed. Sites in the Arctic exhibit these features. A tundra mat overlies organic-rich peaty horizons that contain silt at these sites.

Permafrost is a major geographic and geologic factor in Alaska. Permafrost is a layer of soil at variable depths in which the temperature has been below freezing continuously from a few to several thousands of years. It exists where summer heating fails to penetrate to the base of the layer of frozen ground. Permafrost covers most of the northern third of Alaska. Discontinuous or isolated patches also exist over the central portions in an overall area covering nearly a third of Alaska. No permafrost exists in the south-central and southern portions of the state (www.wrcc.dri.edu/narratives/Alaska 2007).

Sites located on lower areas are underlain by sediments and deposits originating elsewhere. The geology and soils of some sites (*e.g.*, Tatalina LRRS, Naknek Recreation Camps, and Bethel) developed as a result of a variety of events including tectonism, volcanism, sedimentation, and erosion that have shaped the landscape, rocks, soils, and minerals. Most bedrock in these areas is composed of volcanic rock, and soils are primarily of volcanic origin with depths ranging from shallow at higher elevations to deep with high organic content in the lower wet areas. In the case of Bethel, organic material, including wood chips and bark, suggest that these are freshwater estuarine deposits.

The geology and soils of several Inactive Sites are centered on volcanic activity. This applies to Big Mountain, sites on the Alaska Peninsula, and sites in the Aleutian Islands. Most bedrock in these areas is composed of volcanic rock, and soils are primarily of volcanic origin with depths ranging from shallow at higher elevations to deep with high organic content in the lower wet areas.

Most rocks of the Seward Peninsula and Norton Sound area are of sedimentary origin and are highly metamorphosed, consisting primarily of limestone overlain by schistose rocks. Soils generally consist of silt loam to gravelly silt loam, varying from poorly drained to well drained, some of which are overlain with thick mats of organic material depending on the specific site.

The geology and soils of interior sites varies greatly depending on the specific location. Appendices 3.0 include 611 ASG site-specific geology and soil information.

4.4 Hydrology and Flood Plains

Surface drainage on the Arctic Coastal Plain occurs as sheetflow and shallow creek runoff from near the coast. Infiltration may occur to a limited extent down to the permafrost table during summer. The groundwater regime is controlled by an extensive permafrost layer underlying the entire region.

Sites located on local topographic high points generally do not exhibit well defined drainage patterns; however, drainages that do exist generally lead to large tributary systems. Some 611 ASG sites have major surface water features nearby, such as Kuk River and Wainwright Inlet near Wainwright site, Indian River near the Indian Mountain LRRS, Yukon River near the Fort Yukon LRRS, Unalakleet River near North River site, the Yukon River near Campion site, and Naknek River near the Naknek Recreation Camps site. Other sites have significant lakes nearby; such as Iliamna Lake near Big Mountain site; Lake Louise, the namesake of Lake Louise site; and Naknek Lake near one of the Naknek Recreation Camps sites. The availability of groundwater varies greatly depending on the specific site and the presence or absence of permafrost.

Appendices 3.0, sections 4.4, *Hydrology* include 611 ASG site-specific hydrology information, including flood plains.

5.0 Ecosystems and the Biotic Environment

Appendices 3.0, sections 5.0 include 611 ASG site-specific general ecosystem information, including lists of vascular plants, fish, mammals, and birds. Scientific names for most plants and animals on 611 ASG sites are included in these species lists.

5.1 Ecosystem Classification

The 611 ASG sites all lie within the Polar Domain. The below table indicates site breakdown by Division and Province. Descriptions of these provinces are within appendices 3.0, sections 5.1, Ecosystem Classification. This classification was taken from www.fs.fed.us/land/ecosysgmt/colorimagemap/ecoreg1_akprovinces.html, accessed January 2012.

Table 5.1 Ecosystem Classification of 611 ASG Sites

Domain	Division	Province	611 ASG Sites
Polar	Tundra	Arctic Tundra	Oliktok, Bullen Point, Point Lay, Point Lonely, Wainwright
		Bering Tundra (Northern)	Cape Romanzof, Kotzebue, Bethel, North River
		Bering Tundra (Southern)	King Salmon, Cold Bay, Big Mountain, Naknek, Port Heiden
	Tundra-Mountain Provinces	Brooks Range Tundra-Polar Desert	Barter Island, Cape Lisburne, Point Barrow
		Seward Peninsula Tundra-Meadow	Tin City, Anvil Mountain, Granite Mountain, Nome
		Ahklun Mountains Tundra-Meadow	Cape Newenham
		Aleutian Oceanic Meadows-Heath	Eareckson, Driftwood Bay, Nikolski
	Subarctic	Yukon Intermontane Plateaus Tayga	Indian Mountain, Campion
		Upper Yukon Tayga	Fort Yukon
	Subarctic-Mountain Provinces	Yukon Intermontane Plateaus Tayga-Meadow	Sparrevohn, Tatalina, Kalalaket Creek
		Alaska Range Humid Tayga Tundra-Meadow	Lake Louise
		Upper Yukon Tayga-Meadow	Murphy Dome, Bear Creek, Beaver Creek

Below are general descriptions of areas that encompass 611 ASG sites. In 2011 Audubon Alaska, in cooperation with Oceana, completed the *Place-based Summary of the Arctic Marine Synthesis: Atlas of the Chukchi and Beaufort Seas* (Smith 2011) (http://ak.audubon.org/sites/default/files/documents/place-based_summary_of_the_arctic_marine_synthesis_final.pdf). The project area included the southern Beaufort, southern Chukchi, and northern Bering seas. The atlas provided a holistic look at the dynamic Arctic Ocean ecosystem through 44 maps describing the region's physical oceanography, water column and benthic life, fish, birds, mammals, and human influences. This atlas provides additional, up-to-date information on 611 ASG coastal sites from North River site to Barter Island LRRS.

5.1.1 North Slope (Arctic Coastal Plain) Sites

611 ASG sites on the North Slope include Barter Island LRRS, Kotzebue LRRS, Oliktok LRRS, Point Barrow LRRS, Tin City LRRS, Bullen Point site, Point Lay site, Point Lonely site, and Wainwright site.

The northern portion of Alaska, which drains into the Arctic Ocean, is collectively designated the North Slope. This geographical region has a total land area of 118,849 square miles and is divided into three diverse physiographic provinces: the Brooks Range, which runs east-west and accounts for 52,573 square miles; the Arctic Foothills, which lie north of the Brooks Range and comprise 38,909 square miles; and the Arctic Coastal Plain, which includes 27,367 square miles and encompasses the area between the Arctic Foothills and the Arctic Ocean.

The low relief of the flat Coastal Plain and permafrost promote geomorphologic processes related to the formation of ice wedge polygons, large elliptical lakes, thaw lakes, and occasional pingos. Because of the very low relief and presence of permafrost throughout the region, drainage is poor, and streams are small and meander widely. In some areas, up to 40 percent of the surface area is covered by water.

Polygonal or patterned ground is a conspicuous surface feature throughout much of the North Slope. Temperature-induced contraction cracks are formed in polygonal patterns similar to those encountered on dry mud flats. These cracks fill with water and freeze. Continued cracking, filling, and freezing along the same lines eventually form a network of ice wedges that sometimes become several yards deep and are generally spaced tens of yards apart. In time, ice wedges form troughs bounded by ice push ridges. Troughs, ridges, and undisturbed central areas are referred to as ice-wedge polygons.

Thaw lakes are important features, usually originating from small, shallow ponds that generally begin in low-centered polygons forming the intersections of ice wedges. Thaw lakes originate from thermal erosion of tundra sediments. The redistribution of sediments within the lake basin by wave action gives lakes their characteristic elliptical shape and orientation (Sellman *et al.* 1975).

The polygonal ground pattern results from thermal contraction cracks that form in the tundra surface (Lachenbruch 1962). Gradual filling of cracks causes subsurface ice wedges to form with a subsequent increase in the subsurface sediment volume. The growth of ice wedges creates small ridges and mounds, giving the tundra surface a complex, micro-scale topography. Other nearby ponds may expand and coalesce to form larger ponds and lakes. During summer the underlying permafrost thaws, allowing deepening and enlarging of small lakes. As lakes expand, they join with others and become deep enough to maintain an unfrozen zone, or thaw bulb, in a permafrost area, usually around a lake, stream, or man-made structure. Because thaw lakes are largely unstable, with active erosion at basin margins, their basins often coalesce and drain. The thaw lake cycle consists of repetitive stages of lake formation and ultimate drainage and is the primary geomorphic process that modifies the land surface. This cycle generally takes several hundred years to complete.

Pingos are another important surface feature. Pingos are small, conical hills that have a central core of ice. Closed-system pingos develop when tundra thaw lakes drain and permafrost encroaches from the sides. As sediments near the center slowly freeze, a massive segregation of ice develops. The volume increases as freezing pushes the tundra and ice upward, forming a large, ice-cored mound or pingo. As the pingo expands upward, a summit crack or fissure often opens, exposing the ice core and allowing part of it to melt and a small lake to form in the crater. Closed-system pingos are characteristic of the continuous permafrost zone.

The Arctic Coastal Plain consists of unconsolidated marine, alluvial (river), lacustrine (lake), and aeolian (wind) deposits of silty sand and gravel of the Quaternary period (Gubik Formation). A generalized

section of the Gubik would show a basal gravelly sand, overlain by white laminated sand or dark silt, which is overlain by orange sand or sand interlayered with a dark silt-sand that grades upward through a layered zone into the orange sand. The thin basal gravel may be absent, and material under the main gravel may vary from reworked silty clay to sand with lenses of gravel and sand. These sediments were laid down during a series of marine transgressions that encroached upon the Plain, the most recent of which occurred during the mid-Wisconsinan time, about 35,000 years ago. These frequent sea level changes alternately exposed and submerged portions of the gently sloping terrain, resulting in alternating alluvial and marine depositional layers.

5.1.2 Interior Sites

611 ASG sites in the Interior include Fort Yukon LRRS, Indian Mountain LRRS, Murphy Dome LRRS, Sparrevohn LRRS, Tatalina LRRS, Campion RRS, Lake Louise Recreation Site, Bear Creek RRS, Beaver Creek RRS, and Kalakaket Creek RRS.

611 ASG sites in the interior of Alaska are at different elevations, generally in subalpine and alpine tundra. Permanently frozen ground is scattered throughout the southern part of interior forests and is nearly continuous in the northern sections. Although precipitation is light at 6-12 inches per year, evaporation is low, and permafrost forms an impervious layer, making bogs and wet areas common. Snowfall averages 55 inches per year at Fairbanks, but snow cover usually persists from mid-October until mid to late-April (Viereck and Little 1972).

5.1.3 Western Alaska Sites

Western 611 ASG sites include Cape Romanzof LRRS, Cape Newenham LRRS, Anvil Mountain RRS, Granite Mountain RRS, Nome Field POL Site, and North River RRS.

5.1.4 Southwestern Alaska Sites

611 ASG sites in southwestern Alaska include King Salmon Airport, Bethel RRS, Big Mountain RRS, and Naknek Recreation Camps.

5.1.5 Aleutian Island/Alaska Peninsula Sites

611 ASG sites in the Aleutian Islands/Alaska Peninsula include Eareckson AS, Cold Bay LLRS, Driftwood Bay RSS, Nikolski RRS, and Port Heiden RRS.

5.2 Vegetation

Generally, there is little site-specific pre-military use, vegetative cover information. Also, since there is little turf or landscaped grounds on most 611 ASG sites, this section is combined into a single section instead of being subdivided into historic vegetative cover, current vegetative cover, and turf and landscaped areas.

Wildlife habitat maps were developed for Active 611 ASG sites and Bullen Point, Point Lay, Point Lonely, and Wainwright sites following site visits by ABR, Inc. These maps and detailed explanations of their methodologies are shown and explained in Gene Stout and Associates and Blythe & Trousil Inc. 2007a, 2007b, 2008, and 2009 (based on original publications by Schick *et. al.* (2004) and Frost *et al.* (2005a and 2005b).

These maps were updated for five sites (Eareckson AS [Roth and Macander 2009]; King Salmon, Oliktok LRRS, Bullen Point former SRRS, and Wainwright former SRRS [Wells *et al.* 2010]) using the following data sources.

- Eareckson AS's original 2003 aerial photos were updated using 2008 Worldview-1 imagery.
- King Salmon Airport's original 2001 aerial photos were updated using 2006 aerial photos and 2007 multi-spectral Quick Bird imagery.
- Oliktok LRRS's original 1979 and 2000 aerial photos were updated using 2005 multi-spectral Quick Bird and 2005 panchromatic Quick Bird imagery.
- Bullen Point site's original 2000 aerial photos were updated using 2006 pan-sharpened Quick Bird imagery.
- Wainwright site's original 1985 and 2000 aerial photos were updated using 2006 pan-sharpened Quick Bird imagery.

As a part of the development of this INRMP, the Center for Environmental Management on Military Lands, Colorado State University developed updated wildlife habitat maps for remaining active sites. These, and other updates described above, include habitat change analyses for each active site compared to 2001. This project used 2001 National Land Cover Database data (<http://www.mrlc.gov/nlcd2001.php>) as a baseline for comparison with the most recent imagery found on Google Earth for each site and, if available, 2009-2010 SPOT-5 satellite imagery (<http://www.alaskamapped.org/ortho>).

Appendices 3.0, sections 5.2 include site-specific vegetation information. Most general vegetation information within these sections for active and former LRRSs and former SRRSs was taken from Schick *et al.* (2004), Roth and Macander 2009), and Frost *et al.* (2005a and 2005b).

Considering the relatively small size, remote locations, and number of 611 ASG sites, the only cost-effective means to survey and monitor vegetation is via remote imagery. It is important to recognize limitations with use of aerial photography and satellite imagery.

Imagery is rapidly changing in methodology and quality. Thus, vegetation calculations made using 2001 and earlier data cannot be precisely compared with newer maps using newer imagery. This is particularly true when comparing ground-truthed vegetation analyses with strictly satellite imagery. In some cases, changes in habitat classes shown for active sites in appendices 3.0 are due to changing technology and methodology, not actual changes in vegetation. In some cases, methodology-induced changes can be quantified, but this is not always the case.

INRMP Appendix 5.2 summarizes habitat classes for each active site and inactive former LRRS/SRRS sites. More specific habitat data and maps are in site-specific appendices 3.0, sections 5.2, *Vegetation*, maps 5.2 and tables 5.2.

5.2.1 North Slope (Arctic Coastal Plain) Sites

Historic

Elias *et al.* (1996) studied historical biodiversity at remote USAF sites in Alaska. Inventories included modern plant communities, modern insects, Holocene plant communities, and Holocene insects. The Holocene is the period of geologic time since the last ice age. The study indicated likely significant differences in ancient and modern environments between western (Point Barrow LRRS) and eastern (Barter Island LRRS) regions of the Arctic coast of Alaska, most likely caused by varying substrates and different climates.

During the early Holocene (10,200 - 5,600 years before present), vegetation at what would become Barter Island LRRS (Appendix 3.0-Barter) was not dominated by grasses and heaths, as was the case at Point Barrow (Appendix 3.0-Barrow). Plant species richness was likely poorer than at present. Conditions were

probably significantly warmer than during the later Holocene (1,500 years before present to the present). Warmer conditions in the eastern region were further evidenced by a significantly different insect assemblage about 10,500 years ago compared to the present. Climatic conditions at Barter Island probably could have supported a coniferous forest, but likely only for a brief time, probably about 11,000-10,000 years ago. However, there is no evidence that such a forest existed.

Current

The wet sedge meadow environment is characteristic of about three-quarters of the Arctic Coastal Plain. Meadows are characterized by peaty soils with a shallow active zone above the continuous permafrost and a water-saturated surface in summer.

On the Coastal Plain, the meadow plant community occurs in a mosaic of innumerable small, relatively shallow lakes. Vegetation of the wet tundra environment is determined by the extent of moisture in microhabitats of polygonal surfaces. Wet habitats found on low-centered polygons, in ice wedge troughs, or along stream and lake margins support mosses, cottongrass, sedges, grasses, marsh marigolds, and buttercups. Freshwater ponds are often outlined by *Arctophila fulva* in deeper water.

Wet habitats are found on low-centered polygons, in ice wedge troughs, or along stream and lake margins. In very wet environments, such as low-centered polygons or ice wedge troughs, the vegetation is dominated by the grass *Dupontia fischeri*, sedges (e.g., *Carex aquatilis*), mosses, and cottongrass. Pendent grass, which grows in the shallowest zones of ponds, is an important emergent species on shorelines. Freshwater ponds are often outlined by *Arctophila fulva* in deeper water. Marsh marigold and buttercup are also found in wet meadows (Webber 1978, Murray 1978). Drier areas, such as found on high-centered polygons, may support a greater plant diversity, including dwarf willows, lichens, avens, mosses, grasses, herbs, louseworts, heather, poppies, and saxifrages (Murray 1978, Webber 1978).

5.2.2 Interior Sites

611 ASG sites in the interior of Alaska are at different elevations, generally in subalpine and alpine tundra. Vegetation types in the interior of Alaska form a mosaic of patterns related to past fire history, to slope and aspect, and to the presence or absence of permafrost. Most forest stands are mixtures of two or more tree species but are usually classified by the dominant species (Viereck and Little 1972).

The vegetation cover of the Interior sites consists primarily of white spruce/paper birch forest. The white spruce/paper birch forest extends from the Kenai Peninsula to the southern slopes of the Brooks Range and is generally called the boreal forest or taiga. This forest covers about 32 percent of interior Alaska, or about 106 million acres (Viereck and Little 1972). Lowland brush bogs and muskegs are found on wetter sites, generally underlain with shallow permafrost.

The boreal forests of interior Alaska consist of a mosaic of vegetation types, reflecting combined effects of landform, topographic position, soil type, and the occurrence of past fires. Forest types on productive well drained sites, include white spruce, mixed white spruce-aspen, mixed white spruce-balsam poplar, aspen, and mixed white spruce-paper birch (Clark and Kautz 1999).

Forests of the Yukon Region experience some of the greatest climatic extremes in North America. The principal trees of the transcontinental boreal forest reach their northern limits in this region. Interactions of the severe climate with repeated fires, discontinuous permafrost, and braided drainage systems have resulted in a complex pattern of vegetation (Gutleber undated(b)).

Four principal vegetation types are found in the general Yukon Region, including bottomland spruce/poplar forest, upland spruce/hardwood, low bush bog, and muskeg. Upland spruce/hardwood

forest is the most extensive vegetation type in the Yukon Region, and, with exception of the Yukon Delta, it is found throughout the region. The treeline decreases in elevation from east to west and varies from 2,000 to 3,500 feet above msl along the Alaska-Yukon border, dropping to 2,000 feet above msl on southern slopes of the central Brooks Range and northern slopes of the Alaska Range, and dropping to 1,000 feet above msl or less along the lower Yukon River (Gutleber undated(b)).

5.2.3 Western Alaska Sites

ASG sites in western Alaska and those on topographic high points generally have vegetation types that form a mosaic of patterns related to slope and aspect and the presence or absence of permafrost. Vegetation varies from species common to coastal plains to the alpine tundra, small willows, lichens, and mosses found at higher elevation sites.

5.2.4 Southwestern Alaska Sites

Vegetation types in southwestern Alaska and the interior form a mosaic of patterns related to past fire history, slope, aspect, precipitation, and the presence or absence of permafrost.

5.2.5 Aleutian Island/Alaska Peninsula Sites

Vegetation in the Aleutian Islands is classified as Ocean Boreal Heath, which is tundra characterized by dwarf shrubs, herb, and grasses. Grasses are common, and cotton grass may be predominant in poorly drained areas. At slightly higher locations with better drainage, dwarf shrubs, including crowberry, cloudberry, lapland cornel, and blueberry, are dominant. During summer, colorful flowers produced by forbs, such as buttercup, lousewort, monkshood, and violet, are scattered throughout this community.

Dominant community types include beach rye grassland on remnants of crowberry tundra. Predominant vegetative cover consists of beach grass grasslands, which tend to colonize disturbed areas and remnants of crowberry tundra. Coastal areas support a larger number of Arctic plant species than inland locations, which are predominantly alpine in character.

Upland tundra communities occupy higher slopes where wind is a dominating factor in determining vegetation. Woody heath plants cover large areas of the island where high winds have a desiccating effect in spite of the humidity. Vegetation above the wind plane is dominated by representatives of the heath family Ericaceae, such as crowberry or blueberry, and creeping willows, sedges, mosses, and lichens (Sekora 1973).

No large native trees grow in the Aleutian Islands. Sitka spruce were first introduced to the Aleutians by the Russians in 1805. Many trees were introduced by the Americans during World War II, which resulted in small groves at False Pass, Unalaska, and Chernofski islands, Fort Glenn and Nikolski on Umnak Island, and Atka, Adak, Amchitka, Shemya, and Attu Islands (Sekora 1973). Few trees remain on Shemya Island.

Beds of kelp occur in coastal waters of the island. Principal freshwater plants in the Aleutian Islands are pondweed, water milfoil, and mare's tail. The most productive lakes on the island have large populations of blue-green algae. Large mosses and leafy liverworts occur in the freshwater stream.

The northern side of the Alaska Peninsula exhibits a diversified terrestrial environment. Habitats found in the area include open, low-shrub, and ericaceous tundra of the tops and windward sides of small hills, ridges, and exposed sites. These areas are dominated by heaths and include crowberry, bearberry, lichens, dwarf willows, and mosses. Other species include low-bush cranberry, yarrow, fireweed, grasses, and sedges. Leeward sides of hills and protected areas support the same species, but growth is taller and more

lush. In addition, alders, willows, cow parsnip, dewberry, monkshood, dwarf birch, devil's club, and other species occur on leeward sides of hills (CH2M Hill 1994e).

5.3 Fish and Wildlife

Numerous surveys and studies have been accomplished at or nearby various installations included in this INRMP. Table 5.3 in Appendix 3.0-Eareckson includes wildlife surveys and studies for Eareckson AS. Table 5.3 (below) lists known wildlife survey/monitoring efforts at or near other 611 ASG sites. Many of these surveys and studies were performed by other agencies, particularly the USFWS.

Table 5.3 Wildlife Surveys/Studies at 611 ASG Sites, except Eareckson AS

Installations*	Study Name	Author	Purpose	Years
Barter Island LRRS	Life History and Ecologic Observations on the Tundra Mouse and Lemmings at Barter Island, Alaska	Barkalow, F.S.	Study	1952
Cold Bay LRRS	The Summer Distribution and Standing Stock of the Fishes of Izembek Lagoon, Alaska	Tack, S.L.	Study	1970
Oliktok LRRS	A Summary of Observations of Birds at Oliktok - Summer - 1971	Hall, G.E.	Survey	1971
Cape Lisburne LRRS	Seabird nesting and production Reports Over 25 Years	Dave Roseneau (USFWS) and others	Surveys	1970s-Present
Cape Newenham LRRS	Seabird Nesting and Production Reports over 25 years	Various USFWS Togiak staff	Survey	1970s-Present
Cold Bay LRRS	Breeding Bird Survey stop and area surveys	Various USFWS Izembeck staff	BBS	1970s-Present
Cape Lisburne LRRS	Ecological Studies of Colonial Seabirds at Cape Thompson and Cape Lisburne, Alaska	Springer, A.M., D.G. Rosenaeu, and M. Johnson	Studies	1979
King Salmon Airport	Species composition and numbers of birds recorded in the King Salmon-Naknek Christmas Bird Count	Provided by Susan Savage, USFWS	Survey	1986-1997
Cold Bay LRRS	Birds of Izembek Lagoon/Cold Bay, Alaska	Kinchloe, K., M. North, L. Tibbitts, and D. Ward, USFWS	Survey	1988
King Salmon Airport	Spring Staging of Waterfowl Along Major Drainages of Bristol Bay 1991-1995, with an Emphasis on the Naknek River, Alaska, March - May 1995	Moore, H.	Survey	1991-1995
Point Barrow LRRS	Habitat Use by Steller's Eiders During the Breeding Season Near Barrow, Alaska, 1991-1996	Quakenbush, L., R. Suydam, and T. Obritschkewitsch, USFWS and North Slope Borough	Study	1991-1996
Cape Lisburne LRRS	Murre and Kittiwake Monitoring and Effects of Blasting and Aircraft Disturbance at Cape Lisburne, Alaska	Denlinger, L.M., D.G. Roseneau, A.L. Sowls, and A. Springer	Study	1992
King Salmon Airport	Fall Staging of Waterfowl Along the Naknek River, Alaska Peninsula, Alaska, August - November 1993	Scharf, L., USFWS	Survey	1993

Installations*	Study Name	Author	Purpose	Years
Barter Island LRRS Cape Lisburne LRRS Kotzebue LRRS Oliktok LRRS Point Barrow LRRS Tin City LRRS Bullen Point SRRS Point Lay LRRS Point Lonely SRRS Wainwright SRRS	Spectacled and Steller's Eider Surveys at Remote Air Force Sites in AK, 1994	Robert H. Day, Robert J. Ritchie and Debora A. Flint	Survey	1994
Cape Romanzof LRRS	An Avifaunal Reconnaissance of the Cape Romanzof LRRS, Askinok Mountains, AK	Brian J. McCaffery	Survey	1994
King Salmon Airport	Spring Staging of Waterfowl Along Major Drainages of Bristol Bay, with an Emphasis on the Naknek River, Alaska, March - May 1994	MacGowan, B., USFWS	Survey	1994
King Salmon Airport	Banding Totals from Mother Goose Lake, Becharof NWR, and King Salmon	Provided by Susan Savage, USFWS	Survey	1994- 97
Cape Lisburne LRRS Cape Newenham LRRS Cape Romanzof LRRS Tin City LRRS	Kittlitz's Murrelet Surveys at Remote Air Force Sites in AK, 1995	Robert H. Day and Alica A. Stickney	Survey	1995
Tatalina LRRS	Results of the 1995-1998 Tatalina North American Breeding Bird Survey, Tatalina LRRS, AK	Beverly Roedner Skinner	BBS	1995- 1998
Cape Romanzof LRRS	Results of the 1996 Avifaunal Inventory, Cape Romanzof LRRS, AK	Brian J. McCaffery and Christopher M. Harwood	Survey	1996
Oliktok LRRS	Brant Use of the Oliktok LRRS and Movements in the Kuparuk Oilfield	Alice A. Stickney	Behavior	1996
King Salmon Airport	Spring Staging of Waterfowl Along Major Drainages of Bristol Bay, with an Emphasis on Naknek River, Alaska, March - May 1996	Ruhl, G., and H. Moore, USFWS	Survey	1996
Cape Romanzof LRRS	Nesting Biology and population Ecology of Yellow Wagtails at Cape Romanzof LRRS, AK	Heather Moore	Population	1996- 1999
Cape Romanzof LRRS	Results of the 1997 Avifaunal Inventory, Cape Romanzof LRRS, AK	Brian J. McCaffery, Christopher M. Harwood, and Heather Moore	Survey	1997
King Salmon Airport	Spring Staging of Waterfowl Along Major Drainages of Bristol Bay, with an Emphasis on Naknek River, Alaska, March - May 1997	Ruhl, G., USFWS	Survey	1997
King Salmon Airport	Spring Staging Waterfowl on the	Spies, M., USFWS	Survey	1998

Installations*	Study Name	Author	Purpose	Years
	Naknek River, Alaska Peninsula, Alaska, March-May 1998			
King Salmon Airport	Spring Staging Waterfowl on the Naknek River, Alaska Peninsula, Alaska, March-May 1999	Kirk, L., USFWS	Survey	1999
Cape Romanzof LRRS	Spring Migration of Spectacled Eiders at Cape Romanzof, Alaska	McCaffery, B. J., M. L. Wege, and C. A. Nicolai	Survey	1999
Point Barrow LRRS	Breeding Biology of Steller's Eiders Nesting Near Barrow, Alaska, 1999, 2000	Obritschkewitsch, T., P.D. Martin, and R.S. Suydam, USFWS	Study	1999, 2000
Cape Romanzof LRRS	Results of the 1996, 1997, and 2000 Avifaunal Inventory, Cape Romanzof LRRS, AK	Brian J. McCaffery	Survey	2000
Oliktok LRRS Point Barrow LRRS Bullen Point SRRS Point Lay LRRS Point Lonely SRRS Wainwright SRRS	Eider Surveys at USAF Radar Sites in Northern AK, June 2000	Robert H. Day and John R. Rose	Survey	2000
King Salmon Airport	Bird Observation Report as Requested for King Salmon Air Base	Reed J. and E. Wehmeyer	BASH	2000
King Salmon Airport	Spring Staging of Waterfowl Along the Naknek River, Alaska, March-May 2000-2001	Oligsclaeger, L.M. and S.M. Schuster, USFWS	Survey	2000-2001
Point Barrow LRRS	Migration Rates and Flight Behavior of Migrating Eiders Near Towers at Barrow, Alaska	Day, R.H., J.R. Rose, B.S. Cooper, and R.J. Blaha	Study	2001
Point Barrow LRRS Oliktok LRRS Bullen Point SRRS Point Lay LRRS Point Lonely SRRS Wainwright SRRS	Eider Surveys at USAF Radar Sites in Northern AK, 2001	Steven Kendal, C. Dau, and P. Martin	Survey	2001
Point Barrow LRRS	Results of Steller's Eider Surveys Near Barrow and the Meade River, Alaska, 2001	Ritchie, R. and J.G. King	Survey	2001
Tatalina LRRS	Results of the 2001-2004 Tatalina North American Breeding Bird Survey, Tatalina LRRS, AK	Sandra M. Siekaniec	BBS	2001-2004
Point Barrow LRRS Oliktok LRRS Bullen Point SRRS Point Lay LRRS Point Lonely SRRS Wainwright SRRS	Spectacled and Steller's Eider Surveys and Habitat mapping at U.S. Air Force Radar Sites in Northern AK, 2002	Robert J. Ritchie, Charles T. Schick, and John E. Shook	Habitat map and survey	2002
Cape Romanzof LRRS	Bird-Aircraft Strike Hazard Survey – Fall 2002	Fred J. Broerman	BASH	2002
King Salmon Airport	Wildlife Hazard Assessment of King Salmon Airport, King Salmon, Alaska (April 30, 2002 through October 16, 2002)	Borchert, N.J.H., C.L. Rossi, and W.F. Wilmoth	BASH	2002
Tin City LRRS	Collision Potential of All Migrant	Jennifer H. Boisvert,	Wind	2003

Installations*	Study Name	Author	Purpose	Years
	Sandhill Cranes and Other Birds, USAF Tin City LRRS, Sep 2003	Charles T. Schick and Robert H. Day	Turbine assess	
Point Lay LRRS Point Lonely SRRS	Spectacled and Steller's Eiders Surveys and Habitat Mapping at U.S. Air Force Radar Sites in Northern Alaska, 2003	Charles T. Schick, Gerald V. Frost and Robert J. Ritchie	Habitat Map and Survey	2003
King Salmon Airport	Spring Staging Waterfowl on the Naknek River, Alaska Peninsula, Alaska, March-May 2004	Schuster, S.M., USFWS	Survey	2004
Oliktok LRRS	Report on Salt Marsh Conditions at the Oliktok Long Range Radar Site	U.S. Army Engineer District, Alaska, (Hardin Legare and Terry Carpenter)	Hydrology & Vegetation Survey	2004
Barter Island LRRS	Raven Nest Removal, 28 Oct 2005, A Chronology of Nesting	Gene Augustine	Permit Report	2005
Point Barrow LRRS	Breeding Biology of Steller's Eiders Nesting Near Barrow, AK, 2005	Nora A. Rojek	Tech Report	2005
Tin City LRRS	Collision Potential of All Migrant Sandhill Cranes and Other Birds, USAF Tin City LRRS, May 2005	Jennifer H. Boisvert and Robert H. Day	Wind Turbine assess	2005
Tatalina LRRS	Results of the 2005 Tatalina North American Breeding Bird Survey, Tatalina LRRS, AK	Robin Corcoran	BBS	2005
King Salmon Airport	Wildlife Observations and Wildlife Habitat Mapping for King Salmon Forward Operating Location	Frost, G.V., J.H. Boisvert, and C.T. Schick	Survey	2005
King Salmon Airport	Spring Staging Waterfowl On The Naknek River, Alaska Peninsula, Alaska, March-May 2005	Lapinski, S., and B. Williamson, USFWS	Survey	2005
Point Barrow LRRS Oliktok LRRS Bullen Point SRRS Point Lay LRRS Point Lonely SRRS Wainwright SRRS	Spectacled and Steller's Eider Surveys at U.S. Air Force Radar Sites in Northern AK. 2006	Gerald V. Frost, Robert J. Ritchie and Tim Obritschkewitsch	Survey	2006
King Salmon Airport	Spring Staging Waterfowl on the Naknek River, Alaska Peninsula, Alaska, March-May 2006	Savage, S.E. and W. Murray, USFWS	Survey	2006
King Salmon Airport	Spring Staging Waterfowl on the Naknek River, Alaska Peninsula, Alaska, March-May 2007	Savage, S.E., USFWS	Survey	2007
Oliktok LRRS Point Barrow LRRS Bullen Point SRRS Point Lay LRRS Point Lonely SRRS Wainwright SRRS	Spectacled and Steller's Eider Ground-based Nest Surveys and Avian Inventory at Six U.S. Air Force Radar Sites in Northern Alaska	OASIS Environmental Inc.	Habitat Map and Survey	2008

*Projects may be at or near these sites.

Appendices 3.0, sections 5.3 include site-specific fish and wildlife information.

5.3.1 Fish

Sixty-six species of fish inhabiting marine, estuarine, and freshwater systems have been identified in the Arctic region (Hart Crowser 1987). Fish species in the Chukchi Sea include Arctic cod, cisco, sculpin, Arctic flounder, pink salmon, chum salmon, Pacific herring, and Arctic char.

The most abundant species of marine fish found in the Beaufort Sea include Arctic cod, Arctic flounder, fourhorn sculpin, and Pacific herring. Freshwater species may include Arctic grayling, round whitefish, and burbot. Anadromous species found in the nearshore environment include Arctic char, Arctic cisco, least cisco, Bering cisco, inconnu, rainbow smelt, humpback whitefish, and broad whitefish.

Fish species inhabiting coastal waters of Norton Sound in western Alaska include all five of the six species of Pacific salmon (Chinook, sockeye, coho, chum, and pink), Pacific cod, Arctic char, and halibut. Freshwater occurring in the area include Arctic grayling, rainbow trout, whitefish, and northern pike. Marine invertebrates are abundant in Norton Sound.

All five species of salmon are found in Kotzebue Sound, but only chum salmon occur in substantial numbers. Species important to subsistence fishing in the area include. Other species found in the area include tomcod, Arctic cod, rainbow smelt, flounder, nine-spined stickleback, whitefish, Arctic char, and herring.

The most widely distributed fish in the Yukon-Koyukuk drainages are several species of whitefish, Arctic grayling, slimy sculpin, burbot, Arctic lamprey, longnose sucker, northern pike, sheefish, and three species of Pacific salmon (chum, king, and coho). The Yukon River and its tributaries are important spawning, rearing, and migration habitat for many of these species.

The upper Kuskokwim River basin supports a variety of anadromous and freshwater fish. Common species include five species of salmon, whitefish, sheefish, rainbow trout, pike, Arctic char, Dolly Varden, Arctic grayling, burbot, suckers, and blackfish.

Fish species occurring along the Alaska Peninsula include pink, chum, and coho salmon, Dolly Varden, Arctic char, and steelhead trout. Saltwater fish occurring near the sites include Pacific herring, flounder, halibut, and smelt.

Fish species occurring near the Aleutian Islands sites include all five Pacific salmon species, Arctic char, and Dolly Varden. Principal marine fishes of the Aleutian Islands include halibut, Pacific Ocean perch, Pacific cod, sablefish, yellowfin sole, walleye Pollack, sandlance, and Pacific herring (USFWS 1988).

5.3.2 Mammals

Depending on the 611 ASG site location, terrestrial and/or marine mammals may be present in the area. Terrestrial mammals are protected by the state of Alaska.

Brown lemmings, Arctic ground squirrel, and collared lemmings are common in the Arctic, and caribou occur near many 611 ASG sites; all are herbivorous. Carnivorous mammals include the Arctic fox, brown/grizzly bear, wolf, and wolverine. Musk oxen are on or near a few northern sites.

Terrestrial mammals inhabiting the Seward Peninsula area include northern red-backed, tundra, and Alaska voles; masked and tundra shrews; brown and collared lemmings; snowshoe and tundra hares; Arctic ground squirrels; wolverines; Arctic and red foxes; mink; martens; beavers; muskrats; weasels; etc. Larger species include brown/grizzly and black bears, caribou, and moose.

North Slope sites (Wainwright, Point Barrow, Oliktok, Bullen Point, and Barter Island) and sites located along the northwestern coast (Cape Lisburne, Kotzebue, and Tin City) are within the range of polar bears (Bridges 2001).

Mammals of southwestern Alaska include caribou, moose, brown bear, red foxes, porcupines, snowshoe hares, short-tailed weasels, least weasels, lemmings, shrews, voles, Arctic ground squirrels, tundra hares, mink, beavers, muskrats, river otters, red squirrels, wolverines, wolves, coyotes, and lynx.

The Yukon Region encompasses a wide variety of animal habitats. The richest interior habitat centers around broad valley systems that have been described as solar-basins, areas with rich alluvial soils sheltered from storms, heavy summer rains, and cloud cover by surrounding mountain ranges. Scrubby timber, brush, marsh, and muskeg are interspersed throughout these interior valleys, supporting upland species (Gutleber undated(b)).

Representative mammals of the Alaska interior include beaver, black and (less commonly) brown/grizzly bears, caribou, lynx, marten, mink, moose, muskrat, red fox, snowshoe hare, wolf, wolverine, and several small rodent species.

Terrestrial mammals inhabiting Umnak and Unalaska islands include red fox, Arctic fox, Arctic ground squirrel, collared lemming, tundra vole, Norway rat, and domestic sheep, cattle, and horses. Reindeer also occur on Umnak Island.

The Marine Mammal Protection Act (MMPA) of 1972 describes (1) a moratorium on taking and importation of marine mammals and marine mammal products with certain exceptions and (2) an international program through cooperative agreements for protection and conservation of all marine mammals covered by the MMPA. Marine mammals include whales, seals, sea otters, walrus, and polar bears; one or more species are known to occur for at least a short time in marine waters near the coastal sites.

Marine mammals that may occur in western Alaska coastal waters include the endangered bowhead whale; gray, killer, and beluga whales; spotted and ribbon seals; and proposed for listing ringed and bearded seals. Pacific walrus occur in offshore waters (Wynne 1993). In addition, endangered North Pacific right, fin and humpback whales potentially occur in the area (USFWS 1997b). Other marine mammal species that occur during the summer in the area include the minke whale and harbor porpoise.

Marine mammals that may occur in coastal waters of Norton Sound include the endangered bowhead whale; gray, killer, and beluga whales; spotted and ribbon seals; and proposed for listing ringed and bearded seals. The endangered Steller sea lion (western population) and Pacific walrus also occur in offshore waters (Wynne 1993). In addition, endangered North Pacific right bowhead, fin, blue, and humpback whales (USFWS 2011) potentially occur in the area (USFWS 1997b). Harbor porpoises are also found in Norton Sound in summer (Mandy Mirgura, electronic mail, March 4, 2009).

Marine mammals that may occur in coastal waters of Umnak and Unalaska islands include the threatened northern sea otter; endangered Steller sea lion; endangered fin, sperm, North Pacific right, blue, and bowhead whales (USFWS 2011); harbor and northern fur seals; and minke and killer whales (USFWS 1988).

Marine mammals found in the Aleutians include the gray whale, endangered humpback whale, Baird's beaked whale, Pacific white sided dolphin, Dall's porpoise, harbor porpoise, ribbon seal, and proposed for listing spotted seal.

5.3.3 Birds

The wet tundra environment of the Arctic provides nesting and foraging habitat for a wide variety of bird species. Common breeding birds in the area include Arctic Loon, Red-throated Loon, Whistling Swan, Brant, Canada Goose, Eiders, Northern Pintail, Old Squaw, American Golden Plover, Black-bellied Plover, Long-billed Dowitcher, Dunlin, Pectoral Sandpiper, Semipalmated Sandpiper, Red Phalarope, and Northern Phalarope. The area is frequented by large numbers of waterfowl during the post-breeding molt and fall migration. Passerine species that use the tundra in the area include Snow Buntings, Lapland Longspurs, and Redpolls. Yellow Wagtails, Savannah Sparrows, Lapland Longspurs, Western Kingbirds, Snow Buntings, and Common Redpolls are also common.

Several million birds consisting of approximately 150 species occur on the North Slope, including seabirds, waterfowl, shorebirds, passerines, and raptors. Shorebirds and waterfowl disperse to nesting grounds on moist tundra and marshlands of the Arctic Slope.

The moist tundra and brush environment of the Seward Peninsula area provides nesting and foraging habitat for a wide variety of bird species. Breeding birds in the area include American Pipit, Fox Sparrow, Golden-crowned Sparrow, Savannah Sparrow, Lapland Longspur, Yellow Warbler, Yellow Wagtail, White-crowned Sparrow, Fox Sparrow, Savannah Sparrow, and Semipalmated Plover.

Numerous species of waterfowl and shorebirds feed and rest in the waters of southwestern Alaska during their migrations, and many passerine and predatory birds occur in the area. Waterfowl and shorebirds use the area for resting and feeding during migrations, and many species nest in the area.

Some of the more common waterfowl that nest or stop over in areas near interior sites during their migratory flights include the American Widgeon, Mallard, Green-winged Teal, Loons, Horned and Red-necked Grebe, Northern Pintail, Surf and White-winged Scoter, and Canada and White-fronted Geese. Numerous waterfowl, on their way to and from nesting areas, stop to feed and rest on the Yukon River. The Alaska Peninsula supports diverse and abundant marine species, including waterfowl and seabirds that use the marine waters for feeding and resting. Waterfowl and shorebirds also use the numerous ponds and lakes in the area during yearly migrations. The Alaska Peninsula supports raptors, such as the Bald Eagle, Rough-legged Hawk, Harrier, Osprey, Merlin, Gyrfalcon, and Short-eared Owl. Willow and Rock Ptarmigan are abundant, and passerine species pass through in large numbers during seasonal migrations.

The Alaska Peninsula supports diverse and abundant marine species, including waterfowl and seabirds that use the marine waters for feeding and resting. Waterfowl and shorebirds also use the numerous ponds and lakes during yearly migrations. The Alaska Peninsula supports raptors, such as the Bald Eagle, Rough-legged Hawk, Harrier, Osprey, Merlin, Gyrfalcon, and Short-eared Owl. Willow and Rock Ptarmigan are abundant, and passerine species pass through in large numbers during seasonal migrations.

The Aleutian Islands provide unique nesting habitat for several million shorebirds and other bird species. The islands are also an important migration and staging area for a wide variety of waterfowl, shorebirds, and passerines and provides wintering habitat for a number of species. Bird species typically found in the Aleutians include Rock Sandpiper, Wandering Tattler, Bald Eagle, Common Raven, Double-crested Cormorant, American Golden Plover, Semipalmated Plover, Canada Goose, Horned Puffin, Tufted Puffin, and Crested Auklet (USFWS 1988).

5.4 Threatened and Endangered Species

The Endangered Species Act of 1973 defines an endangered species as one that is in danger of extinction throughout all or a significant part of its range, and a threatened species is one likely to become endangered within the foreseeable future throughout all or a significant portion of its range. The most current combined USFWS and NMFS lists of endangered, threatened, proposed, candidate, and delisted species in Alaska can be found at the Alaska Region USFWS website ([Alaska.fws.gov/fisheries/endangered/consultation_guide.htm/4 species list.pdf](http://Alaska.fws.gov/fisheries/endangered/consultation_guide.htm/4%20species%20list.pdf)) (USFWS 2011, visited in May 2012).

Figure 5.4 shows the latest map for USFWS-listed (threatened, endangered, candidate, and proposed for listing) species in Alaska, including critical habitat (originally provided in Judy Jacobs [USFWS] e-mail to Matt Moran, May 5, 2012 and modified for clarity by Kimberly Klein [USFWS] and sent to Gene Stout and Matt Moran on November 9, 2012 via e-mail).

5.4.1 Confirmed Species on 611 ASG Sites

Confirmed nesting reports for threatened Spectacled or Steller's Eiders are summarized in Section 7.5.2, *Threatened Eiders*. The Spectacled Eider has been confirmed on 12 611 ASG sites or is potentially on or near 12 other 611 ASG sites, and the Steller's Eider has been confirmed on 13 611 ASG sites or is potentially on or near 12 other 611 ASG sites.

The threatened northern sea otter is confirmed to occur on Eareckson AS and is known to be near Cold Bay LRRS, Driftwood Bay Site, and Nikolski Site; it is potentially near Port Heiden Site. The endangered Steller sea lion is found on and near Eareckson AS, Cape Newenham LRRS, and Cape Romanzof LRRS; it is potentially found on or near six other sites. The threatened polar bear occurs on or near 13 611 ASG sites. Six species of endangered whales occur near 611 ASG coastal sites.

No threatened or endangered species are known to occur on remaining 611 ASG sites. Appendices 3.0, sections 5.4, *Threatened and Endangered Species* include site-specific threatened and endangered species information. Below Table 5.4 summarizes information on federally-listed species found on or near 611 ASG sites. This table does not include formerly federally-listed species or species that have not been confirmed or thought to be potentially near 611 ASG sites, such as the Aleutian Cackling Goose, American Peregrine Falcon, North American lynx, gray whale, and the Aleutian Shield-fern. It also does not include rare plants that are not federally-listed. Species status information was taken from [http://alaska.fws.gov/fisheries/endangered/pdf/consultation_guide/4 species list.pdf](http://alaska.fws.gov/fisheries/endangered/pdf/consultation_guide/4%20species%20list.pdf) (USFWS 2011, visited in May 2012). Specific data within this table come from reports listed at the end of the table, most of which is also within appendices 3.0, sections 5.3.2, *Mammals*; 5.3.3, *Birds*; and 5.4, *Threatened and Endangered Species* and species lists in appendices within those site-specific appendices. Some of this information is also within INRMP Section 7.5, *Management of Threatened and Endangered Species and Habitats*.

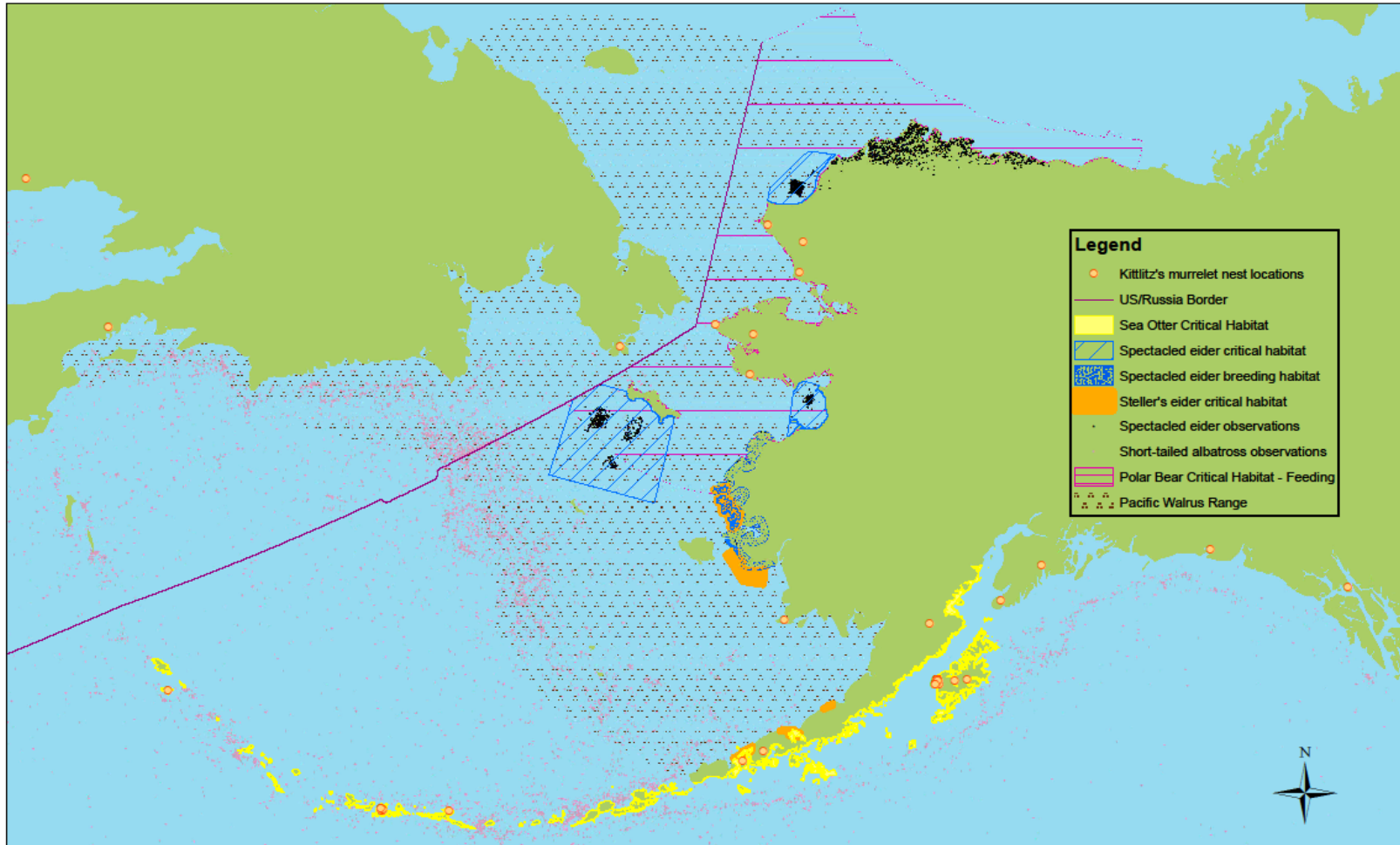
5.4.2 Species Protected by Marine Mammal Protection Act

Threatened and endangered marine mammals occurring near 611 ASG sites include the federally-threatened northern sea otter (*Enhydra lutris kenyoni*), southwest Alaska population; federally-endangered steller sea-lion (*Eumetopias jubatus*), western population; federally-threatened polar bear (*Ursus maritimus*); federally-endangered blue whale (*Balaenoptera musculus*); federally-endangered bowhead whale (*Balaena mysticetus*); federally-endangered fin whale (*Balaenoptera physalus*); federally-endangered humpback whale (*Megaptera novaeangliae*); federally-endangered North Pacific right whale (*Eubalaena japonica*); federally-endangered sperm whale (*Physeter macrocephalus*), and federally-threatened ringed (*Phoca hispida hispida*) and bearded (Beringia Distinct Population Segment, *Erignatuhus barbatus nauticus*) seals.

Figure 5.4. USFWS-listed Species in Alaska

Selected threatened and endangered species information
Anchorage Fish and Wildlife Field Office
November 13, 2012.

Disclaimer: This map does not contain complete
 species distribution data. For more information, please contact
 Kimberly_Klein@fws.gov, 907-271-2066



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Table 5.4. Threatened and Endangered Species Known or Potentially Occurring on or near 611 ASG Sites

Common Name	Short-tailed Albatross	Spectacled Eider	Steller's Eider	Yellow-billed Loon	Kittlitz's Murrelet	Polar Bear	Pacific Walrus	Northern Sea Otter*	Steller Sea Lion**	Humpback Whale	North Pacific Right Whale	Sperm Whale	Blue Whale	Fin Whale	Bowhead Whale	Ringed Seal***	Bearded Seal****
Scientific Name	<i>Phoebastria albatrus</i>	<i>Somateria fischeri</i>	<i>Polysticta stelleri</i>	<i>Gavia adamsii</i>	<i>Brachyramphus brevirostris</i>	<i>Ursus maritimus</i>	<i>Odobenus rosmarus divergens</i>	<i>Enhydra lutris kenyoni</i>	<i>Eumetopias jubatus</i>	<i>Megaptera novaeangliae</i>	<i>Eubalaena japonica</i>	<i>Physeter macrocephalus</i>	<i>Balaenoptera musculus</i>	<i>Balaenoptera physalus</i>	<i>Balaena mysticetus</i>	<i>Phoca hispida hispida</i>	<i>Erignathus barbatus nauticus</i>
Federal Status	E	T	T	CAN	CAN	T	CAN	T	E	E	E	E	E	E	E	T	T
611 Air Support Group Site Known Status																	
Eareckson AS	CN (unlikely)	CN (rare)	C (rare)	C! (rare)	C!			C!	C	CN	CN	CN	CN	CN	CN		
King Salmon Airport		C (1991 and 1993 accidental)	CN (nonbreeding)		P												
Long Range Radar Sites																	
Barter Island		P		P		C!									P	C	C
Cape Lisburne		C! (unlikely to breed)	P (unlikely to breed)	C!	C!	C!	C! (haulout)							CN	CN	P	P
Cape Newenham		P	CN!	P	C!		C! (haulout)		C							CN	CN
Cape Romanzof		CN!	CN	C!	P		C!		C						CN	P	P
Cold Bay			CN!	P	CN!		CN!	CN!									
Fort Yukon	None known																
Indian Mountain	None known																
Kotzebue		P (unlikely to breed)	P (unlikely to breed)	C!	P	C!	CN!			PN				PN	CN	CN	CN
Murphy Dome	None known																
Oliktok		C!	C!	C		C!	C								CN	C	P
Point Barrow		C!	C!	C!	C!	C!	C! (haulout)								CN	CN	CN
Sparrevohn	None known																
Tatalina	None known																
Tin City		C (unlikely to breed)	P (unlikely to breed)	C!	C!	C!	C!		CN	PN	PN			PN	PN	CN	CN

Common Name	Short-tailed Albatross	Spectacled Eider	Steller's Eider	Yellow-billed Loon	Kittlitz's Murrelet	Polar Bear	Pacific Walrus	Northern Sea Otter*	Steller Sea Lion**	Humpback Whale	North Pacific Right Whale	Sperm Whale	Blue Whale	Fin Whale	Bowhead Whale	Ringed Seal***	Bearded Seal****
Inactive Sites																	
Bullen Point		C	P	C		C!	CN			PN				PN	CN	CN	CN
Campion			P														
Lake Louise	None known																
Point Lay		C!	C	C!	C!	C!	C! (haulout)								CN	C	C
Point Lonely		C!	C!	C!		C!	P			PN				PN	CN	C	P
Wainwright#		C!	P	C!	C!	C!	C! (haulout)			CN				CN	CN	CN	CN
Excess Sites																	
Anvil Mountain		P	P	P	C!	C!	CN!		PN	PN				PN	PN		
Bear Creek	None known																
Beaver Creek	None known																
Bethel		P	P														
Big Mountain		P	P		P												
Driftwood Bay	P	P	CN!	C!	C!			CN!	P		PN	PN	PN	PN	PN		
Granite Mountain		P	P														
Kalakaket Creek	None known																
Naknek Rec Camps		P	C (1992 winter record)		P												
Nikolski	P	P	CN!	C!				CN!	PN		PN	PN	PN	PN	PN		
Nome Field POL		P	P	P	C!	C!	CN!		PN	PN				PN	PN	PN	PN
North River		C!	P			C!	CN!		PN	PN	PN	PN	PN	PN	PN		
Port Heiden		P	CN!	P	C!		CN!	PN	PN		PN			PN	PN		

* Southwest Alaska Population
** Western Population
*** Arctic subspecies
**** Beringia Distinct Population Segment
! Confirmed by USFWS (Judy Jacobs e-mail to Matt Moran, May 5, 2012)
The endangered sei whale, *Balaenoptera borealis*, may also occur in off-shore waters of Wainwright site (ICF Technology, Inc. 1996f)

Codes:

Species Status

T - Threatened: A species that is likely to become endangered within the foreseeable future.

E - Endangered: A species that is in danger of extinction.

CAN - Candidate: A species for which the USFWS has on file sufficient information on biological vulnerability and threat(s) to support proposals as threatened or endangered.

PRO – Proposed for Listing

Species Occurrence

C - Confirmed occurrence in the area.

CN - Confirmed in area (Near), but not on site.

P - Potential occurrence in the area.

PN - Potential occurrence in area (Near), but not on site.

Eareckson AS sources:

Alaska Natural Heritage Program 1993
Byrd and Scharf 2003
Frost *et al.* 2008
Frost *et al.* 2010
Schwitters 2008
Schwitters 2010
Shaw, L. 1993
Shirley and Schwitters 2010
USFWS 2004b, 2010, and 2012
www.alaska.fws.gov 2006

King Salmon Airport source:

Steller's Eider observation made by USFWS (1993a).

Long Range Radar Sites sources:

Alaska Natural Heritage Program 1993
Bridges 2001
Day *et al.* 1995
Day and Rose 2000
Frost *et al.* 2007
ICF Technology, Inc. 1996 (a, c, and g)
Kendal *et al.* 2001
McCaffery 2000
Oasis Environmental, Inc. 2008
Ritchie *et al.* 2003
USFWS 1993b, 1997b, 2004b
Woodward-Clyde 1995 (c, d, e, and f)
Wynn 1993
USFWS website:
Alaska.fws.gov/fisheries/endangered/consultation_guide.htm

Inactive Sites sources:

Alaska Natural Heritage Program 1993
Arctic Slope Technical Services 1982
Day *et al.* 1995
Frost *et al.* 2007
ICF Technology, Inc. 1996e and 1996f
Jones Technologies, Inc. and Gene Stout and Associates 1999 (a, b, c, and d), 2000a
Oasis Environmental, Inc. 2008
USAF 1997
USFWS 1993b, 1997 (a and b), 2000, 2001, 2007a
Woodward-Clyde 1995b

The range of the blue whale, humpback whale, North Pacific right whale, and the sperm whale in Alaska includes the Bering Sea, Gulf of Alaska, and the North Pacific. The range of the bowhead whale in Alaska includes the Chukchi and Beaufort seas. The fin whale range in Alaska includes the Chukchi Sea, Bering Sea, Gulf of Alaska, and the North Pacific (USFWS 2004a). These threatened or endangered marine mammals do not occur on 611 ASG sites proper, but they may occur in marine waters near sites.

The range of the federally-listed northern sea otter in Alaska includes the Aleutian Islands, Alaska Peninsula coast, and the Kodiak Archipelago. Surveys indicate sea otters have declined along both the northern and southern sides of the Alaska Peninsula with the southwest stock of sea otters declining dramatically (USFWS 2004b). Cold Bay LRRS is near offshore waters used by the southwest Alaska stock of northern sea otters.

The range of the steller sea-lion in Alaska includes the Bering Sea and the North Pacific (USFWS 2004a). Critical habitat has been designated for the steller sea-lion which includes 20 nautical mile aquatic zones surrounding rookeries and haulouts. Nikolski Site occurs within the northern portion of a steller sea-lion aquatic zone for a rookery, and Driftwood Bay Site occurs near the western edge of an aquatic zone for a haulout and a rookery (www.fakr.noaa.gov 2008).

Cape Lisburne, Point Barrow, Oliktok, Barter Island, Kotzebue, and Tin City LRRSs and Bullen Point, Point Lay, Point Lonely, Wainwright, Anvil Mountain, Nome Field POL, and North River sites are within the range of the polar bear (Bridges 2001, Ohms 2008, Judy Jacobs e-mail to Matt Moran, May 5, 2012), and Cape Romanzof is potential polar bear habitat. The polar bear is discussed further in Section 7.4.5, *Polar Bear Interaction Reduction*.

The ringed seal (Threatened, effective February 26, 2013, U.S. Department of Commerce 2012a) occurs on or near 10 611 ASG sites; it is potentially near or on three other sites. The bearded seal (Threatened, effective February 26, 2013, U.S. Department of Commerce 2012b) occurs on or near eight 611 ASG sites; it is potentially near or on five other sites.

5.4.3 Candidate and Proposed for Listing Species

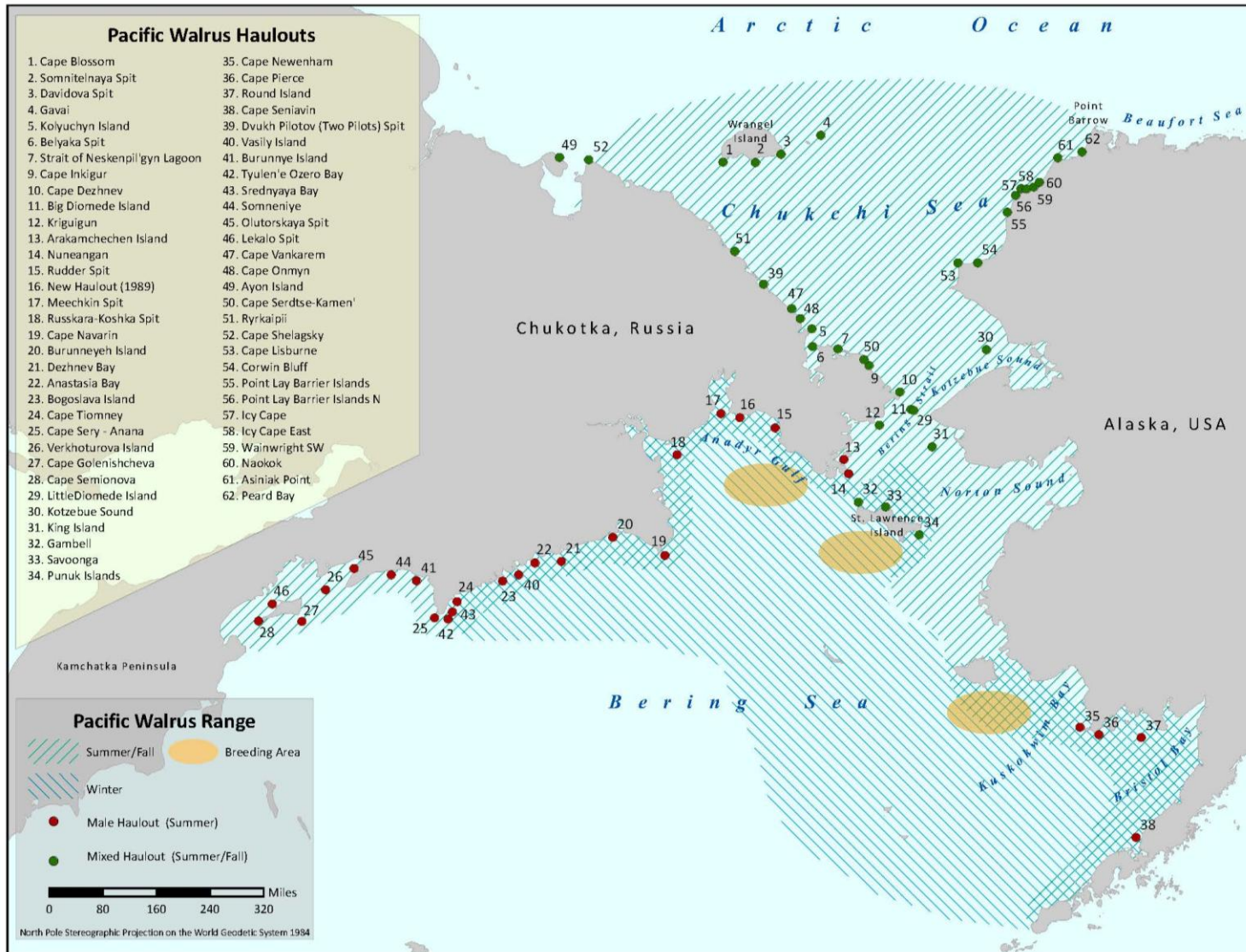
Candidate species (USFWS definition) are species with sufficient information on biological vulnerability and threat(s) to support a proposal to list as threatened or endangered OR (NMFS definition) a species NMFS has accepted a petition to list and are in the process of a status review. Proposed for listing are those species for which a proposal rule to list as either threatened or endangered has been published in the Federal Register. The focus of the Candidate Conservation program is to evaluate at-risk species and to work with partners to conserve these species so they do not decline to the point where they need to be listed under the ESA.

The Yellow-billed Loon (Candidate) occurs on 13 611 ASG sites; it is potentially on or near six other sites. The Kittlitz's Murrelet (Candidate) occurs on 12 611 ASG sites; it is potentially on or near five other sites. The Pacific walrus (Candidate) occurs on 15 611 ASG sites; it has confirmed haulout sites at or near Cape Lisburne, Cape Newenham, Point Barrow, Point Lay, and Wainwright (Judy Jacobs, USFWS, e-mail to Matt Moran on May 3, 2012), which potentially include 611 ASG sites; and it is potentially on or near Point Lonely site. Figure 5.4.3 shows Pacific walrus haulouts.

5.4.4 Bald and Golden Eagle

A former federally listed threatened species, the Bald Eagle, and Golden Eagles are sighted periodically on or near many 611 ASG sites. Eagles receive protection under both federal (Bald and Golden Eagle Protection Act) and state law.

Figure 5.4.3. Pacific Walrus Haulouts



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5.4.5 DoD Partners in Flight Species of Concern

The DoD Partners in Flight has developed a Strategic Plan to accomplish its mission, *To conserve migratory and resident birds and their habitats on Department of Defense lands*. The DoD Partners in Flight has also developed a species of concern database, which identifies priority species. 611 ASG sites are within DoD Partners in Flight Bird Conservation Region 2, Region 3, and Region 4. Appendix 5.4.4 lists DoD Partners in Flight Species of Concern that occur or may occur on 611 ASG sites (www.dodpif.org accessed 8 January 2012).

5.5 Wetlands

Wetland delineation is used to identify and map areas under the jurisdiction of the Clean Water Act. Most current definitions, including the Corps of Engineers *Wetland Delineation Manual* (Environmental Laboratory 1987), generally characterize wetlands by the presence of wet (or hydric) soils, wetland hydrology, and the presence of plants specifically adapted to habitats that are inundated or saturated (hydrophytic vegetation).

National Wetlands Inventory (NWI) mapping and field work were completed for 611 ASG sites during 2000-2005. The USAF provided funding to the USFWS to intensively ground-truth satellite imagery for these sites. Final reports and maps were completed at scales appropriate for each site. Maps are located in the 611 611 CES/CEAN office, the U.S. Army Corps of Engineers Alaska District Regulatory office, and the USFWS Alaska Regional National Wetlands Inventory office. These maps provide the primary means to identify threats to wetlands on 611 ASG sites, but individual delineations may be required for specific demolition or construction activities. NWI mapping was updated by the USFWS in 2011.

Appendices 3.0, sections 5.5, *Wetlands* include site-specific wetland information. Most wetland information within these sections was taken from wetland mapping (Schick *et al.* 2004 and Frost *et al.* 2005a and 2005b). The National Wetlands Inventory classification scheme (Cowardin *et al.* 1979) was followed during habitat mapping performed for each site. Detailed explanations of their methodologies are explained in Gene Stout and Associates and Blythe & Trousil Inc. 2007a, 2007b, 2008, and 2009 (based on original publications by Schick *et al.* (2004) and Frost *et al.* (2005a and 2005b).

Section 7.7.1, *Wetlands* discusses management of these wetlands. Appendices 3.0, sections 5.5, *Wetlands* include site-specific wetland maps for active 611 ASG sites. These maps were created from 2011 NWI data for Alaska.

An additional wetland resource for King Salmon airport is a report by B and B Environmental Inc (1997) titled *Wetland Delineation and Site Characterization of FAA Stations Alaska – King Salmon*.

Considering the relatively small size, remote locations, and number of 611 ASG sites, the only cost-effective means to survey and monitor wetlands is via remote imagery. It is important to recognize limitations with use of aerial photography and satellite imagery.

Imagery is rapidly changing in methodology and quality. Thus, for example, wetland calculations made using 2000-2005 NWI data cannot be precisely compared with 2011 NWI imagery data. By the very nature of better technology, 2011 data are likely more accurate.

Scale is also an important consideration. Maps and data that include wetland data created by Schick *et al.* (2004), Frost *et al.* (2005a and 2005b), Roth and Macander (2009), and Wells *et al.* (2010) are on a more detailed scale than NWI data and in some cases were ground-truthed. Thus, wetland data from these efforts cannot be directly compared to NWI data from either 2000-2005 or 2011.

Table 5.5 is a list of wetland acreages (2011 NWI data) on most active sites and inactive 611 ASG sites. Recent data are not available for Eareckson AS or Cold Bay LRRS.

Table 5.5 Wetlands on Active and Most Inactive 611 ASG Sites

Active Sites	Wetlands Acreage	Inactive Sites	Wetland Acreage
Eareckson Air Station	1,794.36	Bullen Point	656.69
King Salmon Airport	295.09	Campion	909.32
Barter Island LRRS	50.55	Point Lay	1,373.11
Cape Lisburne LRRS	500.96	Point Lonely	1,808.63
Cape Newenham LRRS	380.90	Wainwright	1,112.93
Cape Romanzof LRRS	1,952.10		
Cold Bay LRRS	No recent data		
Fort Yukon LRRS	17.85		
Indian Mountain LRRS	1,951.58		
Kotzebue LRRS	556.86		
Murphy Dome LRRS	157.40		
Oliktok LRRS	719.39		
Point Barrow LRRS	243.37		
Sparrevohn LRRS	136.50		
Tatalina LRRS	2,721.08		
Tin City LRRS	113.92		

5.6 Other Natural Resources Information

Appendices 3.0, sections 5.6 describe other site-specific information pertinent to natural resources management on 611 ASG sites. Most of this information involves subsistence use and outdoor recreation.

6.0 Military Mission and External Impacts on Natural Resources

This section describes mission impacts on natural resources and related issues and concerns relevant to the protection and management of natural resources on 611 ASG sites. Identification of natural resource concerns, including those generated from the partner agencies, ADFG, and the Air Force, is essential for evaluating alternatives when planning future development. Emphasis is placed on identifying those natural resource protection concerns that have the potential to pose a constraint to future development and mission expansion.

6.1 Land Use

Maps and photographs showing site 611 ASG site facilities (now or past) and in some cases, natural areas are in appendices 3.0, sections 3.1 (*Location and Area*). Wildlife habitat maps showing land use categories, emphasizing vegetated land, for active sites (*i.e.*, Eareckson AS, King Salmon Airport, and remaining LRRSs) and former LRRSs/SRRRs are in appendices 3.0, sections 5.2 (*Vegetation*). Land uses are described on a site-specific basis for active 611 ASG sites in appendices 3.0, sections 6.1 (*Land Use*).

In most cases there have not been analyses of land use in terms of improved, semi-improved, and unimproved lands. With exception of Eareckson AS, King Salmon Airport, Lake Louise Recreation Site, and Naknek Recreation Camps, these sites have similar features. There is (was) a landing strip or road for access, living quarters and support facilities, and radar and/or radio structures, often on a high point, separate from the airstrip, living quarters, and other support facilities.

Many of these sites, especially the LRRS and SRRS, originally supported a small military contingent (100 or so personnel), which required complex living and support facilities, including recreation facilities. As communications and radar improved, the sites' radar information was transmitted directly to Elmendorf AFB, and the need for the RRSs became obsolete as did the need for operational personnel at the sites. More recently, the SRRSs were also closed and became inactive.

Today, Base Operational Support (BOS) contracts are used to provide manning for maintenance of real property facilities at remaining 611 ASG active sites. Support facilities for the few BOS contractor personnel needed to maintain LRRS sites have been greatly reduced and compacted, often including a single living, dining, and operations, dome-shaped facility. Cold Bay LRRS, Kotzebue LRRS, Murphy Dome LRRS, and King Salmon have no on-site living quarters.

The major land use at most Inactive and Excess sites involves remnants of military support facilities, including roads, runways, and waste disposal areas. At some sites some buildings and other structures may remain even after Clean Sweep activities have been completed. For example, at Point Lay, building demolition and debris removal occurred in 2005, but an aircraft hanger and a small storage building were not removed. Another example is the Anvil Mountain site where tropospheric antennas were left standing as a landmark. The Clean Sweep program is nearly complete with work remaining at Cape Newenham LRRS (minor), Indian Mountain LRRS (minor), Point Barrow LRRS (hangar), Lake Louise (finish-up), Point Lonely site, Wainwright site, and Driftwood Bay site (minor) (Steven J. Mattson, February 2012 e-mail to Matt Moran).

The Draft *Land Use Control Management Plan 2012, 611th Air Support Group Installations* (USAF 2012) summarizes the current status of land use controls associated with Environmental Restoration Program sites at 611 ASG installations in Alaska and at Wake Island Airport with land use controls in effect, and provides a comprehensive strategy for implementation, maintenance, monitoring, enforcement,

and modification or termination of land use controls. The Plan is a dynamic planning document and represents the current, and reasonably forecasted, status of land use controls at Environmental Restoration Program sites as of its publication date.

6.2 Current Impacts

Current mission impacts are primarily associated with facilities and other features of development on what otherwise would likely be undeveloped land. Obviously, these impacts will continue as long as human-related activities or facilities occur on 611 ASG sites.

The Installation 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 IRP 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. Operation Clean Sweep (see Section 7.14, *Installation Restoration Program, Demolition Program, and Related Concerns*) is part of IRP used by the 611 ASG to remove structures and remediate lands at sites classified as Inactive or Excess.

IRP activities generally have a positive effect on natural resources. However, care must be taken with timing of demolition and debris removal to not adversely affect wildlife. Site restoration strives to return the surroundings to its original state, contouring terrain and using native species for revegetation. Section 7.14, *Installation Restoration Program, Demolition Program, and Related Concerns*) briefly summarizes IRP and related activities at 611 ASG sites during the past years.

6.2.1 Eareckson AS and King Salmon Airport

Eareckson AS

Active mining operations (*e.g.*, extraction of precious minerals or coal) do not exist at Eareckson AS. Prior to the drawdown completion on 1 April 1995 and the start of BOS contractor operations, gravel was stockpiled for use. The rock crusher was removed from the island, and the stockpile has since been depleted. Historically, the following locations have been used:

Quarry Description	Location
East Quarry, South	West of Current Landfill
East Quarry, North	West of Current Landfill
North Beach Quarry	Behind Building 3050
Grand Canyon Lagoon Quarry	North of Cross Island Road
Seal Point Quarry	Southwest End of Runway (last used in 1987)
	North of Landfill at Road Intersection

These facilities once produced sand and gravel for concrete and other mixtures for construction and road surface preparation.

Material was removed from the Seal Point Quarry for construction of the two GMD buildings in 2004. Seal Point Quarry is not active, and available material at the quarry is close to being depleted (personal communication, P. Mealer 2006).

The previous landfill was closed in 2005, and a new landfill was opened after being contracted out in 2004. The current landfill occupies 4.35 acres; 3.35 acres for general landfill material and a separate 1-

acre area for asbestos. Material removed during development of the current landfill was used to cover the old landfill during closure of that area (personal communication, P. Mealer 2006).

An area of previously contaminated soil from a soil remediation cell located along the southern portion of abandoned Runway B was cleared by the Alaska Department of Environmental Conservation for reuse. Since summer 2006, soil from this cell has been used for landfill cover material. Clearance for reuse of second and third soil remediation cells located along southern portions of abandoned Runway B was approved by the Alaska Department of Environmental Conservation. The soil also will be used for landfill cover material (e-mail to Matt Moran from Pam Mealer 2012).

Sand blown onto Eareckson AS roads near beach areas is cleared and stockpiled in convenient locations along the road for future use. Phases one, two, and three of the Waste Heat project used sand from such stockpiles for backfill of trenches (personal communication, P. Mealer 2006). However, system leaks remain an issue. Additional sand stockpiled along roads near beach areas is available for backfill use. Some soil cells along the old runway have also been cleared for use as backfill material in non-sensitive areas (e-mail to Matt Moran from Pam Mealer 2012).

The wastewater system has been upgraded, including replacement of old sewage lines and manhole repairs to bring the system up to modern environmental standards. The project did not significantly negatively impact natural resources as it was within the existing wastewater system footprint (e-mail to Matt Moran from Pam Mealer 2012).

In 2004 two Missile Defense Agency buildings were constructed on a new footprint. Other related construction included Cobra Dane upgrading, upgrading the power plant, adding a fire storage tank and pump house, and renovating various buildings for dorms. Beyond actual facilities and their effects on habitat, operation of the GMD is not anticipated to have significant impacts on wildlife. Since then, there has been some demolition of inactive facilities at Eareckson AS.

The 381st Air Intelligence Squadron removed its antenna array on Eareckson AS during 2007. This array had about 20 antennas (height varies between 70-90 feet depending on terrain) and the supporting infrastructure. A currently unknown amount of guy wire and interconnecting wire between the main clusters of antennas were also removed. Antennas at the GATR site were consolidated down to two antennas on a new support structure (e-mail to Matt Moran from Pam Mealer 2012). The removal of antennas had a positive effect for birds at Shemya Island since antennas and supporting infrastructure are hazards to birds.

King Salmon Airport

King Salmon Airport was drawn-down to a contractor-operated support base due to the reduced threat from the former Soviet Union and reductions in DoD budgets. Thus, the mission and staffing of military personnel at King Salmon Airport are expected to remain at current levels during the next five years.

IRP sites have been located, and the primary restoration activity at this time is long-term monitoring (personal communication, T. Fickel 2006). Most facilities on King Salmon Airport requiring removal were demolished over five years ago (personal communication, R. Homan 2006).

6.2.2 Long Range Radar Sites

The most recent changes at several LRRSs (Cape Lisburne, Tin City, Indian Mountain, Sparrevohn, and Cape Newenham) are the installation of non-directional beacons (personal communication, N. Hilton 2006). In some cases this facility change has created a new footprint at these sites. Beyond actual

facilities and their effects on habitat, operation of the beacons is not anticipated to have significant impacts on natural resources.

Landfills at many sites have been managed by installing lifts instead of establishing new landfills. However, new landfills at some sites have been necessary. Generally the policy is to use landfill lifts instead of developing new landfills (personal communication, J. Fife 2006).

Reinforcement of the seawall and runway at Cape Lisburne requires blasting in the USFWS quarry adjacent to the site. In 1999 a several-year supply of material was blasted free and made available. Blasting and seawall repair have been ongoing since 2005. Blasting is done in accordance with a permit issued by the USFWS (February 2102, e-mail communication from Nick Hilton to Matt Moran).

Electrocution of large birds that perch on power lines is a potential impact particularly for large raptors. They are generally electrocuted when making simultaneous contact between (1) the ground wire and a hot lead on a transformer pole, (2) the ground wire and a phase conductor on a primary pole, or (3) two phase conductors carrying different amperages on a primary pole. Therefore, any power line is potentially hazardous if ground wires, hot leads, and phase conductors are spaced so that a bird might make simultaneous contact between them (Nickerson 1975). Most electrocutions occur on small electrical distribution lines with phase conductors spaced only 3-4 feet apart and with lightning-arrester ground wires extending to the top of the poles.

Woodward-Clyde (1995f) included recommendations for minimizing this threat. For detailed modification plans to power line structures, consult *Suggested Practices for Raptor Protection on Power Lines: The State of Art in 1996* (Avian Power Line Interaction Committee 1996).

Habitat changes were instituted at Indian Mountain, Tatalina, and Sparrevohn LRRS following the establishment of the Bird Hazard Working Group for the 611 ASG in 1997 and review of caribou-Aero Club aircraft accidents at LRRSs along with reports of other near wildlife/aircraft incidents. These habitat changes comply with safety requirements where shrubs and trees were predominant in the areas around three airfields prior to 1998. The strategy is to have naturally-occurring grasses replace alders and willows, providing less moose and caribou food as well as less cover to hide large mammals from pilots and ground personnel.

The 2007 INRMP (Gene Stout and Associates and Blythe & Trousil, Inc.) includes descriptions of brush clearing and maintenance of grass buffer strips along airfields at Indian Mountain LRRS, Tatalina LRRS, and Sparrevohn LRRS. At Indian Mountain and Sparrevohn LRRSs, BOS contractor personnel maintain 600-foot wide strips on each side of the airfield on an as-needed basis. At Tatalina LRRS, BOS contractor personnel maintain 250-foot wide strips on each side of the airstrip.

An area near the Oliktok LRRS was historically used for storage of whale meat, and the proximity of the storage site and the LRRS was a factor in polar bear-human encounters. That storage practice was discontinued due to safety concerns. Most of the whale meat harvested is from subsistence whaling at Cross Island, which has in recent years been barged directly to Prudhoe Bay then transported by air to the Village of Nuiqsut. The only other portion is a smaller amount of the first meat harvested from a whale, known as tavsi, or the captain's share. This is taken from Cross Island by boat directly to Nuiqsut to share with the village as soon as possible after the harvest of each whale (personal communication, M. Galginaitis 2007).

6.2.3 Inactive and Excess Sites

At most Inactive and Excess sites, structures and debris have been removed, and revegetation of disturbed areas has occurred. Long-term management continues at several sites. There is no military use of Inactive or Excess sites.

6.3 Potential Future Impacts

Section 7.14, *Installation Restoration Program, Demolition Program, and Related Concerns*) briefly summarizes IRP and related activities planned for 611 ASG sites during 2013-17. Some of these may directly or indirectly impact natural resources. Others involve building demolition and debris removal, which will also affect natural resources, generally by creating improved wildlife habitat.

6.3.1 Eareckson AS and King Salmon Airport

Eareckson AS

The mission and staffing at Eareckson AS are expected to remain at current levels during the next five years.

Due to the present maintenance program and future developments, the need for rock and borrow material, primarily for road maintenance, is expected to continue on Eareckson AS, which may involve new sites. Plans are ongoing to operate a rock crusher for road repair materials (e-mail to Matt Moran from Pam Mealer 2012). However, a specific location for operation is undetermined (personal communication, J. Castle 2006). The 611 CES/CECO should not have any future requirements to access rock quarries on Shemya Island (electronic communication, R. Lurk to G. Augustine 2007).

King Salmon Airport

Few or no natural resources exist within the main cantonment area. As a result of the drawdown, the military presence at King Salmon Airport was significantly reduced, and demand on natural resources both within the cantonment and surrounding area correspondingly decreased.

Military use of Lake Camp and Rapids Camp (Appendix 3.0-Naknek) has become insignificant, and no facilities remain other than the NPS dock at Lake Camp. A dock at the former marina on the Naknek River is still used, but the marina is closed. Hunting recreation by military personnel is limited to those who arrange for flights into King Salmon Airport or those who fly commercial. This is not nearly as large of a use as prior to 1994.

6.3.2 Long Range Radar Sites

Staffing at LRRSs has been reduced to low levels in response to the reduced military threat from the former Soviet Union and reductions in DoD budgets. Therefore, the mission and staffing of these sites are likely to remain at current levels during the foreseeable future.

Due to the present maintenance program, the need for crushed rock, primarily for road and airfield maintenance, is expected to continue on LRRSs. A rock crusher is moved to and operated at 611 ASG sites on an as needed basis (personal communication, N. Hilton 2006).

During storm events in 2000 and 2003 the road from the adjacent Oliktok Point Seawater Treatment Facility to the LRRS was severely damaged and was replaced. Fill material was lost and impacted adjacent wetlands of the estuarine marsh. The USAF is investigating the possibility of a new road leading

southeast from the radar site to an existing oil field road that is located just south of the hangar or former summer water point access road (February 2012 e-mail communication from N. Hilton to Matt Moran).

An environmental assessment for the road project has been completed (HDR Alaska, Inc. 2005). The preferred alternative would construct an approximately one mile long road from an inland portion of the existing road system to the LRRS, providing year-round, unimpeded access. The existing coastal road section would be removed to the level of the existing beach berm, encouraging equilibration between the salt marsh lagoon and the beach area. Most impacts will be minimized with winter construction of the new access road, though there will be a loss of wetland habitat including high value Spectacled Eider nesting habitat. A source for the fill material for the new road may be the inactive runway at Oliktok LRRS. If this source is used, that area would be returned to wetlands.

Discussions between the 611 ASG, state of Alaska, North Slope Borough, and other parties indicate the road project at the Oliktok LRRS may take on a different dimension, and the runway may be put back into use, with the hangar being used in the oilfield support industry or the North Slope Borough. In that event, the fill material for the new road would likely come from another source.

Because of its potential as a renewable energy source and its feasibility as an economical alternative to diesel fuel for remote villages and facilities, interest in wind-energy generation in Alaska has increased in recent years. The Alaska Energy Authority and rural utilities have constructed windpower energy-generation fields in Kotzebue and Wales and have plans to construct windfarms at more than 100 villages across Alaska (personal communication, D. Meiners, Alaska Energy Authority in Boisvert and Day 2006).

After appropriate studies on wind energy's impact on wildlife, particularly birds (Boisvert *et al.* 2003 and Boisvert and Day 2006), the USAF installed a small, single turbine at Tin City LRRS. The wind turbine at Tin City LRRS is not expected to pose a significant increase in avian mortality rates (Boisvert and Day 2006). Regardless, Boisvert and Day (2006) recommended pursuing all actions available to increase visibility, decrease perching suitability, and potentially reducing avian species collisions with the turbine by addressing issues such as turbine height, tower design, and color patterns of the rotors. The USAF is considering installing wind turbines at other 611 ASG sites (*e.g.*, Cape Cape Lisburne, Cape Romanzof, and Eareckson AS), but issues regarding turbine maintenance at Tin City are significant.

6.3.3 Inactive and Excess Sites

The future plan for some sites, *e.g.*, North River, Naknek Recreation Camps, and Lake Louise, is to transfer these properties to the appropriate adjudicating agencies.

6.4 Natural Resources Needed to Support the Military Mission

The 611 ASG's military mission depends upon the availability of natural resources to perform the mission. A land base is perhaps the most basic aspect of natural resources support for the mission.

Proper management of soils, vegetation, water resources, etc. plays a vital role in the sustainment of the military mission. Natural resources are managed to minimize aircraft-wildlife conflicts and human conflicts with dangerous animals. In addition, the military mission relies on natural resources to provide relaxation and recreation opportunities for those training or working on 611 ASG sites. Implementation of an ecosystem-based management plan ensures that natural resources will provide the proper arena for supporting the military mission and personnel. Maintaining the health of the natural ecosystem ensures that the 611 ASG complies with USFWS and NMFS regulations to conserve federally-listed or otherwise protected species. The extent of subsistence use of remote 611 ASG facilities has been investigated and is

documented in the *Traditional Land Use Survey Characterizations for Remote Air Force Facilities in Alaska* (Braund and Associates 2004).

6.4.1 Eareckson AS and King Salmon Airport

Eareckson AS

Since Eareckson AS's land base is Shemya Island, this aspect is all the more important. There is a finite amount of area and resources on an island. On Shemya Island the management of natural resources, particularly to reduce the BASH risk not only around the airfield but over the entire island, is of primary importance to maintaining all missions at Eareckson AS. All persons and most supplies depend upon safe air transportation to and from Shemya Island, and the loss of air transportation to Eareckson AS would impact all missions.

All IRP sites have been located and mapped, and no significant remediation is occurring at this time. There are several sources of aggregate on the island, although some sources have been partially depleted by past construction activity. The sand found in dunes, which are located on the eastern, western, and southern parts of Shemya Island, is suitable for some construction purposes and is poorly graded.

There have been several aggregate sources used for construction. The main quarry is just north of the center of the island. Drilling and blasting would likely be required for removal of suitable rock material, even though the rock is highly fractured. The rock would require processing (*i.e.*, crushing) to enable its use as construction aggregate.

Eareckson AS has little potential for increased demand on wildlife other than for protection and enhancement of threatened and endangered species as long as the military installation maintains active status.

King Salmon Airport

There is a finite amount of area and resources available to the Air Force at King Salmon. At the King Salmon Airport the management of natural resources particularly to reduce the BASH risk, not only around the airfield but over the surrounding area, is of primary importance to maintaining all the missions at King Salmon Airport. All persons and most supplies depend upon safe air transportation to and from King Salmon Airport, and the loss of air transportation to King Salmon Airport would impact all missions.

Management issues were identified during site visits conducted in 1993 (Woodward-Clyde 1995b); these issues were reexamined, including discussions with USAF and contract personnel and representatives from the ADFG and the USFWS (Anchorage offices), in 1998 (Jones Technologies, Inc. and Gene Stout and Associates 1999b) and 2005 (Gene Stout and Associates and Blythe & Trousil, Inc. 2008). General issues consist of the following:

- coordinated land use to improve the environment,
- maintenance of land resources,
- revegetation of disturbed areas,
- fishery and wildlife management,
- threatened and endangered species,
- community relations, and
- consumptive and nonconsumptive natural resources uses.

Some of these issues are also demands on natural resources and may directly or indirectly affect those resources.

6.4.2 Long Range Radar Sites

Future demands on land use that may directly or indirectly affect natural resources at LRRSs include restoration of IRP sites, development of aggregate for maintenance, building demolition and debris removal, and construction of new facilities. Natural resources are needed to support these demands of the military mission, and some are of a finite quantity (*e.g.*, rock for aggregate, material to cover landfills, and area for new facilities).

The IRP continues to locate, map, and remediate sites. Sources of aggregate at some sites are more readily available than at other sites. Care must be taken when developing/ using these sources to minimize disturbance to vegetation and natural resources.

Military mission support is expected to be the primary concern at LRRSs. These sites have little potential for increased demand on wildlife, other than for protection and enhancement of threatened and endangered species, as long as the sites maintain in active status.

6.4.3 Inactive and Excess Sites

The primary future demand on land use that may directly or indirectly affect natural resources at Inactive and Excess sites will be remedial actions at IRP sites. Most other mission-related activities at these sites in the future will be related to long term management of IRP sites.

6.5 Natural Resources Constraints to Missions and Mission Planning

There are inherent physical and biotic components of the widely dispersed and ecologically varied landscape of 611 ASG sites that may present constraints to military mission support. Most limitations involve wetlands protected by executive order, federal and state laws, and Air Force policies, but also include limitations resulting from species at risk, special interest areas, outdoor recreation, and site clean-up. The 611 ASG has been successful in de-conflicting potential constraints by ensuring advanced planning and maintaining an open dialogue between mission planners, natural resources staff, and outside regulatory agencies.

6.5.1 Eareckson AS and King Salmon Airport

Eareckson AS

The primary natural resources constraint to missions and mission planning on Eareckson AS is associated with BASH reduction. The natural resources management program contributes to reducing this constraint by controlling birds near the runway. Without such control, catastrophic loss of personnel and aircraft due to a bird strike caused by an unexpected increased BASH would affect transportation of personnel and equipment to Eareckson AS. The loss of air transportation to Eareckson AS would impact all missions.

Eareckson AS's location in the North Pacific and proximity to the former USSR and Far East air routes afford it substantial strategic importance. It is one of the most suitable locations for an airfield in the western part of the Aleutian Islands. At the same time, development on the island is confronted by a host of constraints. While these limitations do not mean Shemya Island cannot be developed, they do suggest development and operation of facilities must incorporate design measures to mitigate constraints and

many activities at Eareckson AS are likely to be significantly more expensive than in a more typical environment. Development constraints include:

Wetlands. Shemya Island is mostly wetlands. Wetland determinations are used to facilitate decisions regarding facility siting. The Fish and Wildlife Coordination Act (P.L. 85-264) requires federal agencies that propose, or are authorized, to undertake the impoundment, diversion, deepening, or other control or modification of any stream or body of water (including wetlands), or which are asked to approve such activities, to provide equal consideration to wildlife conservation throughout the planning and decision-making process. The Act requires such agencies to first consult with state and federal wildlife agencies.

Habitat Limits. Shemya Island's large interior lakes are used by gulls and waterfowl and shorebirds (Schwitters *et al.* 2005). Asian birds not seen elsewhere in the United States are blown off course by storms during migration and are apparently attracted by airfield lights located in the vicinity of the lakes. The lakes provide a favorite resting place (CH2M Hill 1990).

Unsuitable Soils. Soil limitations are widespread on Shemya Island, and most areas where soil exploration and analysis efforts have been undertaken have one or more potentially significant constraints. Shemya Island's relatively small size and limited alternatives may require that less than ideal sites be selected in some cases. Careful verification of subsurface conditions and specially tailored design efforts to overcome constraints are frequently necessary (CH2M Hill 1990). Institutional controls (no digging) are in place on Eareckson AS, thus protecting soils (personal communication, K. Barnack 2005).

Slopes Exceeding 10 Percent. Steep slopes rim the island, especially where bluffs rise above the Bering Sea coast to the northeast. Less severe slopes that present more moderate constraints are found at a number of island locations (CH2M Hill 1990).

Flood Hazards. The Tsunami Line is at the 100-foot elevation contour, less than one mile inland. Rocky headlands and sandy, gravelly beaches are found along the island's perimeter. These areas are generally unsuitable for construction because of coastal flooding hazards associated with storm surges (CH2M Hill 1990).

Prehistoric and Historic Sites. Five of the 11 prehistoric sites recorded on Shemya Island have been determined eligible for inclusion in the National Register of Historic Places (Center for Environmental Management of Military Lands 2004a). These sites must be protected under the National Historic Preservation Act.

The military role of Eareckson AS during World War II, the Korean Conflict, and the Cold War has affected nearly every acre of the island. The entire surface of the island is pock-marked with remains of old bunkers, quonset huts, and buried command posts. Artifacts of this period are found throughout the island, including old soda bottles and occasional unexploded ordnance. Two Russian graves, which are marked and fenced, are along West Beach Road (CH2M Hill 1990). There are some known sites discovered by the USFWS, and these are off-limits to all personnel. Many historic sites were destroyed during the 1980s as part of a larger effort to cleanup the Aleutian Islands where facilities had become safety hazards (Hoffecker and Whorton 1999). The *Integrated Cultural Resources Management Plan (2004-2009), Eareckson Air Station, Alaska* (Center for Environmental Management of Military Lands 2004a) includes provisions for the protection and evaluation of prehistoric and historic sites on Shemya Island.

Safety Areas. Safety areas include explosive safety clearance distances, potential radio frequency hazards immediately in front of the Cobra Dane array face, airfield clear zones, approach/departure zones, and other applicable imaginary surfaces. An air installation compatible use zone study has not been conducted

for Eareckson AS. Consequently, noise exposure forecasts and potential accident zones have not been identified. Eareckson's isolation from civilian communities minimizes off-installation noise impacts.

Watershed. The watershed area for the gallery infiltration and collection system should support only passive uses that would not adversely affect water quality (CH2M Hill 1990).

Seismic Activity. Virtually the entire Aleutian Island Chain is in a seismically active area, warranting special attention in design and construction (CH2M Hill 1990).

Materials Extraction. Materials extraction areas (quarries) provide a critical element for construction projects, while at the same time imposing a constraint to facilities development in the immediate vicinity. Extraction areas can, however, be reclaimed for other uses once materials are exhausted or no longer usable (CH2M Hill 1990).

In spite of these constraints, there are other areas that would require only limited restrictions to their development. Previously disturbed areas, such as the abandoned airfield on the western edge of the island and other formerly developed sites, offer potential because site preparation has already occurred. Eareckson AS is unusual because it was previously much more intensively developed than at present.

King Salmon Airport

Natural resource management options at King Salmon Airport are limited. The land pattern and location of land uses at King Salmon Airport and climatic and other natural factors limit the installation's potential for management of natural resources (Woodward-Clyde 1995b). The following natural resource-related constraints were identified:

- BASH reduction,
- landfill areas,
- severe climate,
- short growing season, and
- soil limitations associated with tundra soils.

6.5. 2 Long Range Radar Sites

Military mission support is expected to be the primary concern at LRRSs. The foremost constraint to the mission is maintaining personnel safety from wildlife threats. This involves reducing BASH risks as well as conducting routine site operations in a manner that ensures personnel safety.

The most common natural resource threat is from interactions with wildlife. Through quality assurance inspections, there must be vigilance of all site personnel and a focus on treating refuse carefully. Site operations are to prevent domestic refuse from being accessible to wildlife. Refuse is to be incinerated at sites with a functioning incinerator then disposed of properly. At sites with an operating landfill, refuse must be buried in the landfill with adequate cover material frequently to prevent domestic refuse from being accessible to wildlife. Prior to refuse burial or being hauled offsite, food refuse must be stored in a bear-proof dumpster or kept in the building until being hauled off if there is a chance bears could be in the vicinity. The updated *Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan* (Stout 2012) (Appendix 7.4.5) is particularly appropriate to minimizing this constraint.

Other issues that could be considered constraints to missions and/or planning at LRRSs include revegetation of disturbed sites, including future demolition sites; preservation of wetlands; monitoring

surface water quality related to IRP sites; minimization of erosion; the occurrence of threatened or endangered species on or near the sites; affects of ATV use; general installation cleanup; and careful consideration of placement of stockpiled materials. The completion of Clean Sweep at LRRSs will reduce or eliminate many of these concerns.

The pattern and location of land uses at LRRSs, as well as climatic factors, limit the potential for expansion of natural resources at these sites. Constraints on the potential for expansion of natural resources at LRRSs include IRP sites, severe climate, short growing season, and soil limitations.

6.5.3 Inactive and Excess Sites

Since Inactive and Excess sites no longer fulfill a military mission, there are no significant natural resources constraints to missions and mission planning. The occurrence of birds and large mammals on runways, creating a BASH issue for personnel visiting these sites, requires consideration during mission planning. Likewise, the possible occurrence of bears at some sites requires mission planning to include hazing of these animals. The updated *Polar Bear Interaction Management Plan* (Appendix 7.4.5) is particularly appropriate to minimizing this constraint.

7.0 Natural Resources Program Management

7.1 Natural Resources Program Management

7.1.1 U.S. Air Force

The USAF is responsible for management and stewardship of natural resources within confines of 611 ASG Alaska sites and minimization of adverse impacts to natural resources outside the installations. Section 2.3, *Responsibilities* lists 611 ASG elements responsible for development, implementation, and oversight of the INRMP.

The following other Air Force organizations or persons provide oversight and guidance for the preparation and implementation of the INRMP:

- The Assistant Secretary of the Air Force for Installations, Environment, and Logistics;
- The Civil Engineer, Headquarters United States Air Force;
- Air Force Civil Engineer Center; and
- Pacific Air Forces.

7.1.2 Other Agencies and Organizations

Section 2.4.2, *Interdisciplinary INRMP Development* discusses cooperative management relationships between the USAF and other agencies and groups. Accredited conservation representatives of these organizations furnishing professional advice and technical assistance under this plan will be allowed access to 611 ASG sites, in accordance with appropriate arrangements.

7.1.3 Tribal Governments

The United States has a unique legal relationship with Indian and Alaska Native governments as set forth in the U.S. Constitution, treaties, statutes, executive orders, and court decisions. The United States recognizes Indian and Alaska Native tribes as domestic dependent nations under its protection. Executive Order 13175 and the *American Indian and Alaska Native Policy* (Department of Defense 1998) establish regular and meaningful consultation and collaboration with Indian tribal governments and Alaska Native Corporations. The 611 ASG provides a process that permits elected officials and other representatives of Indian and Native Alaskan 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.

The North Slope Borough has been interested and involved in the preparation of 611 ASG INRMPs. The Borough has considerable expertise in natural resources on the North Slope, and its professional natural resources staff has provided information useful to the preparation of these plans.

7.1.4 Universities

The 611 ASG develops partnerships with universities for natural resources management expertise. Experts from universities have provided specialized knowledge needed to effectively manage natural resources on 611 ASG lands. The University of Alaska, Fairbanks has accomplished various studies on 611 ASG lands.

The Center for Environmental Management of Military Lands at Colorado State University was contracted for preparation of this INRMP via a contract administered by the U.S. Army Corps of Engineers, Alaska District. This organization provided preparation assistance for this INRMP.

7.1.5 Contractors

Private contractors are important to all facets of military installation management. 611 ASG sites, some of which have no onsite military personnel, are maintained and operated by BOS contractors. The 611 ASG uses contractors for many programs associated with natural resources, such as NEPA documentation, surveys, support of the BASH program, and INRMP preparation.

7.2 Ecosystem Management

7.2.1 Ecosystem Management (General)

DoDI 4715.03 (February 14, 2011) identifies DoD policy to include, *DoD shall follow an ecosystem-based management approach to natural resources-related practices and decisions, using scientifically sound conservation procedures, techniques, and data.*

DoDI 4715.03 defines ecosystem management as, *A goal-driven approach to managing natural and cultural resources that supports present and future mission requirements; preserves ecosystem integrity; is at a scale compatible with natural processes; is cognizant of nature's timeframes; recognizes social and economic viability within functioning ecosystems; is adaptable to complex and changing requirements; and is realized through effective partnerships among private, local, State, tribal, and Federal interests. Ecosystem management is 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).*

DoDI 4715.03 states that within the context of ecosystem-based management, natural resources management will include the following:

- Avoid single-species management and implement an ecosystem-based multiple species management approach, insofar as that is consistent with the requirements of the Endangered Species Act.
- Use an adaptive management approach to manage natural resources, such as effects of climate change.
- Evaluate and engage in the information of local or regional partnerships that benefit the goals and objectives of the INRMP.
- Use best available scientific information in decision-making and adaptive management techniques in natural resource management.
- Foster long-term sustainability of ecosystem services.

DoD's goal with regard to ecosystem management is, *To ensure that military lands support present and future training and testing requirements while preserving, improving, and enhancing ecosystem integrity. Over the long term, that approach shall maintain and improve the sustainability and biological diversity of terrestrial and aquatic (including marine) ecosystems while supporting sustainable economies, human use, and the environment required for realistic military training operations (Leslie et al. 1996).*

7.2.2 Biodiversity

DoDI 4715.03 includes the below biodiversity directives. Biodiversity conservation on DoD lands and waters should be followed whenever practicable to:

- maintain or restore remaining native ecosystem types across their natural range of variation;
- maintain or reestablish viable populations of native species on an installation, when practical;
- maintain ecological processes, such as disturbance regimes, hydrological processes, and nutrient cycles, to the extent practicable; and
- manage and monitor resources over sufficiently long time periods to allow for adaptive management and assessment of changing ecosystem dynamics (i.e., incorporate a monitoring component to management plans).

The DoD Biodiversity Management Strategy (The Keystone Center 1996) identifies the INRMP as the primary vehicle for implementing biodiversity protection on military lands.

7.2.3 Adaptive Management and Decision Making

Adaptive management is a process for managers to address and handle uncertainties and complexities inherent in natural systems by treating ecosystem management as an experiment (Leslie *et al.* 1996). In an adaptive management mode, resource managers monitor results of management activities, observing and recording the outcome. Management activities are then adjusted accordingly.

611 CES/CEAN recognizes that current management is adaptive and uses monitoring to measure effects and efficiency of management techniques. Results of monitoring management activities can change future management both for the 611 ASG and/or other natural resources managers.

7.2.4 Integrated Natural Resources Management Planning

This INRMP must be reviewed annually by 611 ASG, in coordination with its signatory partners, in accordance with AFI 32-7064. This will be accomplished using goals, objectives, inhouse actions, and associated projects in this plan, as summarized in Chapter 8, as well as work plans included in Appendix 9.1. Yearly reviews and revisions will allow managers to adapt the plan 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; and
- additional concerns from stakeholders.

A major review of this plan is required every five years at a minimum. If significant changes are required, this INRMP must be revised.

7.3 Geographic Information System

7.3.1 Policy and Background

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. A Geographic Information System (GIS) is a vital tool for assisting land managers with decision-making and monitoring results 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 natural resource managers in conflict resolution and mission enhancement and sustainment. A 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.

Implementation of GIS throughout the Air Force is through the GeoBase program, the accepted Air Force GIS. The 611 CES is responsible for maintaining the 611 ASG GeoBase system. Data gathered through inventory and monitoring on 611 ASG sites are stored as digital data within a computer database and on paper as hard copy of the digital data.

7.3.2 Natural Resources Spatial Database

GIS data management is critical to successful implementation of this INRMP. Spatial data for various elements of the natural resource 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 location of topographic features, aerial extent of coverage of a certain resource or problem area, monitoring those resources or problems, and modeling probable scenarios, all of which assist in optimizing resource utilization.

GIS takes into consideration many of natural resources elements: land use/cover, soil, hydro-morphology, terrain slope, drainage, wildlife habitats and population parameters, etc. It combines these with human-created features (structures, recreation facilities, transportation features, etc.) and mission aspirations to provide various choices of action plans for sustainable development or use of land and water after scientific analysis of spatial and non-spatial data.

The 611 CES natural resources database is stored in the GeoBase enterprise geodatabase. Layers that have been developed from scientifically collected data sets include but are not limited to ecological land classifications (geomorphology, surface form class, vegetation class, disturbance class, and ecotype). Wetland and habitat change analyses are important aspects of the 611 CES database.

611 ASG Squadrons use GeoBase data and information to support numerous mission objectives including improvement of land and resource management decisions. GIS incorporates field locations and data for various inventory and monitoring activities to make data more accessible to natural resource managers. GeoBase is providing and will continue to provide a variety of maps for managing and monitoring impacts of military and other land uses and natural resources projects. GeoBase will be used to produce maps that include such features as military facilities, transportation networks, drainage, vegetation, wetlands, elevation, soils, etc.

GeoBase supports natural resources management to evaluate development and use impacts on natural resources and to document and track resource management actions. This type of analysis will help prioritize projects for natural resources management. Maps available through the GeoBase program provide a readily available resource for field activities that provide relevant ecological, geomorphic and development details to field crews.

7.3.3 GIS Maintenance and Use

611 CES/CEAN will continue to coordinate and exchange data with 611 CES/CEPT through the GeoBase program. New contracts that go to outside agencies or contractors include a clause that requires any spatial data developed from the study to be incorporated into a compatible GIS format, and CEAN will get digital (in a format compatible with current GeoBase software) and hard copies of data. The potential also exists for out-sourcing or contracting for additional data layers. Partnering agencies should be solicited for additional relevant data layers of natural resources.

The GeoBase program is an Air Force program created to centralize mapping for a given installation. The Geobase program is run by the Geo Integration office, a fused environment of enlisted personnel, civilians, and contractors working together to best meet the requirements in accordance with AFI 32-10112, *Installation Geospatial Information and Services* (October 2007). GIS coverage supports presentation of natural resources in E-Plan INRMP.

The 611 CES Geo Integration Office utilizes a diverse collection of hardware for information collection and analysis. This office currently maintains one file server for data, one server for the Oracle 10g enterprise geodatabase, and one server for the 611 ASG GeoBase website. File and base section servers reside on Joint Base Elmendorf-Richardson Network and are administered directly by the Geo Integration office staff in coordination with 673 CES GeoBase administrator. The database and application web servers are in the storage area network and are administered by the Geo Integration office staff with assistance from 673 Communications Squadron personnel. Update of software, patches, and time compliance network order directives are maintained by the GeoBase administrator. A service level agreement between the 673 Communications Squadron Network Control Center and 673 CES defines the roles each organization plays in the administration and support for the servers.

The GeoBase program has multiple software holdings. Mapping software, raster enhancement, and remote sensing software are held and maintained by the GeoBase administrator. ESRI is the core software vendor used by the Geo Integration office. ESRI GIS products provide advanced spatial analysis, displays, and storage of geographically referenced information. The 611 Geo Integration office also shares a license for a ERDAS Imagine software package across the network for advanced raster processing.

7.4 Fish and Wildlife Management

7.4.1 Policy and Background

The fish and wildlife management program provides for the regulation and conservation of fish and wildlife populations and their habitats. These management practices are consistent with accepted scientific principles and comply with the Endangered Species Act and all other applicable laws and regulations. Management goals are consistent with the total natural resources program. Fish and wildlife management on 611 ASG sites supports and is supported by most programs detailed in sections 7.4.2 through 7.17.

Emphasis is placed on maintenance and restoration of habitat favorable to the production of indigenous fish and wildlife. Nongame (species not hunted), as well as game, species are considered when planning activities. Maintaining functional ecosystems is now the primary goal of the 611 ASG natural resources management program. However, supporting the military mission has always been and continues to be the primary land use.

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

Population management includes working with ADFG, which establishes hunting, trapping, and fishing regulations and harvest objectives; conducts habitat enhancement; and coordinates other projects to conserve and enhance game and nongame populations. Wildlife populations on 611 ASG sites will be managed in accordance with the objectives set forth in this INRMP.

AFI 32-7064 specifically requires descriptions of the following topics:

- Enforcement of Fish and Wildlife Laws (Appendix 2.4.2 plus an inhouse action to develop an agreement with Joint Base Elmendorf-Richardson to support 611 ASG natural resources needs)
- Hunting and Fishing Program Organization and Management (not specifically applicable)
- Hunting and Fishing Policy, Regulations and Fee Structure (Section 7.11, Appendix 2.4.2, fee structure not applicable)
- Permitted Access for Hunting, Fishing and Wildlife Related Outdoor Recreation (Section 7.11, Appendix 2.4.2)
- Demand for Hunting, Fishing and Non-Consumptive Resource Uses (Section 7.11 and site-specific appendices 3.0, sections 5.6)
- Fish and Wildlife Monitoring (Section 7.4.2)
- Migratory Bird Management (Section 7.4.3 and 7.4.4)
- Watchable Wildlife Areas (not applicable)
- Wildlife Education and Interpretive Programs (Section 7.13)
- Wildlife Pest Problems and Techniques Used for Wildlife Control (Sections 7.4.5, 7.4.6, 7.4.11, 7.4.12, and 7.10 and Appendix 7.4.5, *Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan*)
- Policies, Programs, and Methods Used to Control Feral Animals (Section 7.4.12)

7.4.2 Monitoring

The 611 ASG, through the development of this and previous natural resources management plans and special projects, has conducted a variety of baseline inventories of natural resources at Active, Inactive, and Excess sites. The ADFG and North Slope Borough conduct inventories of fish and wildlife resources within the general area of former SRRSs and LRRSs, and the USFWS monitors migratory birds and threatened and endangered species and regulates subsistence hunting in these areas. Additionally, the USFWS monitors and inventories fish and wildlife within the NWR system. The NMFS monitors species protected under the Marine Mammal Protection Act as well as other marine species not assigned to the USFWS. Vegetation and wildlife surveys were performed at Inactive Sites in 1999 in association with development of previous INRMPs covering Inactive Sites (Universe Technologies, Inc. and Gene Stout and Associates 2001b-e).

An ecosystem monitoring program began in the early 2000s at 611 ASG sites, based upon wildlife habitat mapping and regular comparisons with available remote sensing images. More recent mapping which shows site-specific changes for active sites and former SRRSs Bullen Point and Wainwright updated this monitoring. In addition, preparation of this INRMP included updated wildlife habitat maps for active 611 ASG sites. See Section 5.2 for more information on these efforts. Appendices 3.0, sections 5.2 have site-

specific vegetation information for all 611 ASG sites and maps for active and formerly inactive LRRS and SRRS sites.

Habitat mapping at other Inactive sites and Excess sites has not occurred, nor is there a need for such intensive mapping at these sites. Changes in vegetation on these sites in the future will not likely involve USAF activities.

The use of habitat mapping specifically for Spectacled Eider protection is discussed further in Section 7.5.1, *Threatened Eiders*. Wetland monitoring is discussed in Section 7.7.1, *Wetlands*.

A draft Memorandum of Understanding between 11 government and non-government agencies has been developed to establish a framework for collaboration among the cooperators to fully implement the Alaska Landbird Monitoring System (ALMS). Cooperators recognize the importance of tracking landbird populations breeding in Alaska and that a partnership will be required to implement the ALMS across vast roadless areas of the state, which are under the administration of an array of agencies and private land owners. The USAF would be interested in being a cooperator in this effort should an ALMS monitoring location include or be near a 611 ASG site.

With regard to Eareckson AS, the National Marine Mammal Laboratory periodically conducted Steller sea lion and other marine mammal counts in the Near Islands beginning in 1959 (National Marine Fisheries Service 1992). Most bird surveys have grown out of the work of D. Gibson (1981) who published the first paper that documented diversity of migrant birds using Shemya Island. At the request of the 611 ASG, the USFWS conducted winter wildlife surveys from 1994 through 1997 (Meehan 1997a, Meehan and Krom 1997, Meehan *et al.* 1996), from 1999-2002 (Byrd and Scharf 2003), and 1999-present (publications by Schwitters and co-workers, as presented in Appendix 3.0-Eareckson, Section 5.3, Table 5.3). Byrd and Scharf (2003) summarized survey data for 1988-2002. Schwitters (2008) summarized bird survey data for 1999-2007.

These surveys provide a valuable baseline from which to measure long-term population trends in biodiversity at Eareckson AS. They are particularly important for imperiled species, such as the Steller sea lion. These winter surveys better define preferred wildlife use areas of Shemya Island during winter, which helps with decisions regarding siting future facilities and operations. For example, nearshore marine environments are far more important during winter for most species of wildlife in the area than are freshwater or open marine waters.

The first Christmas Bird Count at Eareckson AS occurred on 1 January 2007. The Shemya Island survey recorded 21 species for a total of 1,621 individual birds (Robert Trotter, Count Summary 2 January 2007). Continuation of this survey depends on the willingness of volunteers to conduct the survey. The Christmas Bird Count is a useful additional source of information to the Eareckson AS natural resources program.

Christmas Bird Count and Breeding Bird Survey data are among the information used to generate the Bird Avoidance Model (BAM). USAF BAM information can be accessed at www.usahas.com/BAM. BAM is discussed further in Section 7.10, *BASH Management*.

The minimization of disturbance to native vegetation with regard to military mission accomplishment and IRP activities is an important aspect of biodiversity conservation. 611 CES/CEAN personnel periodically check the installations for new potential revegetation sites and are responsible for monitoring the success of revegetation projects.

Movements and behavior of eiders with regard to possible bird strikes associated with an antenna array at Point Barrow were monitored (Day *et al.* 2001). It was concluded that the probability of collision of migrating eiders with the existing structures is low.

The avifaunal inventory by McCaffery and Harwood (1997) was a major baseline inventory accomplishment by the USAF and USFWS for Cape Romanzof LRRS. In 1997 a two-part study was completed by USFWS for the USAF on Spectacled Eider migration and landbirds (McCaffery *et al.* 1998). In association with 1996 and 1997 inventory and studies, two related papers were completed on the Caspian Tern (*Sterna caspoia*) and Slaty-backed Gull (*Larus schistisagus*) (McCaffery *et al.* 1997a, 1997b). The *Population Ecology and Nesting Biology of Yellow Wagtail (Motacilla flava) Breeding at Cape Romanzof, Alaska* (Moore 1998) was completed as a progress report. In 2000 USFWS personnel returned to the site to monitor bird populations as the third of three years of bird studies funded by the USAF.

7.4.3 Bird Conservation Plans

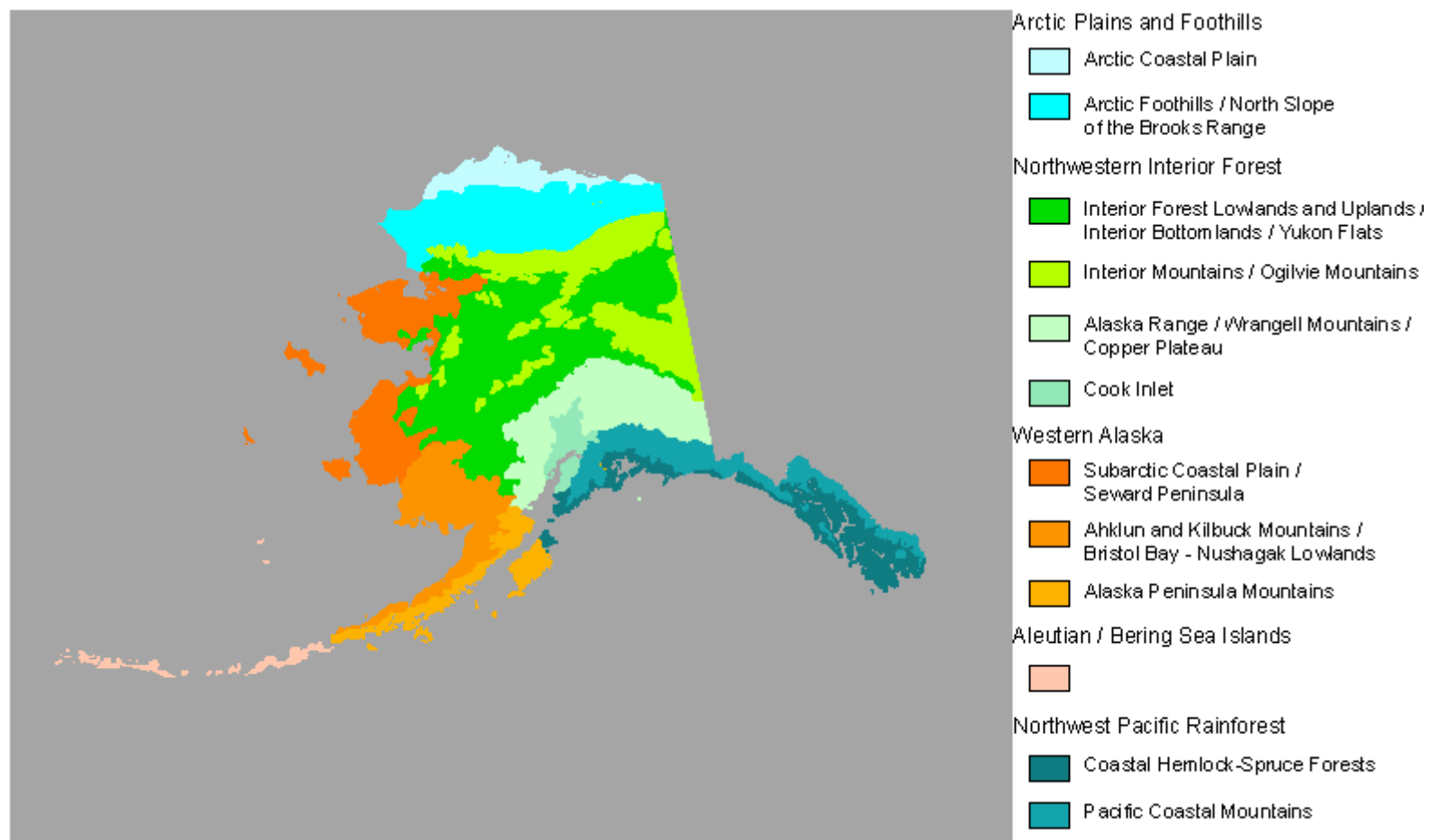
Landbird Conservation Plan for Alaska

The *Landbird Conservation Plan for Alaska*, written by Boreal Partners in Flight Working Group, identifies priority landbird species and habitats, establishes objectives for bird populations, and recommends conservation actions. Conservation planning for landbirds occurs within five Bird Conservation Regions, based on Kessel and Gibson (1978), as updated from original six Biogeographic Regions (<http://alaska.usgs.gov/science/biology/bpif/conservation/index.php>) (Figure 7.4.3). Four of these regions include 611 ASG sites.

Point Barrow, Oliktok, and Barter Island LRRSs and Bullen Point, Point Lay, Point Lonely, and Wainwright sites lie within the **Arctic Plains and Foothills Bird Conservation Region**. The Northern Alaska Biogeographic Region is predominantly influenced by tundra and marine habitats. A number of breeding Old World and Aleutian species penetrate the region from the west, and species regularly breeding in the Canadian arctic penetrate from the east. Taiga birds reach the region casually or rarely along drainage systems from the Brooks Range. An impressive number of interior Canada species has been recorded at Point Barrow, birds that probably reached the arctic coast via the Mackenzie River Valley and then worked their way westward along the coast (Boreal Partners in flight Working Group 1999). Priority landbird species in the Northern Alaska Biogeographic Region are the Gyrfalcon, Gary-cheeked Thrush, Hoary Redpoll, Snowy Owl, and Smith's Longspur.

King Salmon Airport; Cold Bay, Cape Lisburne, Tin City, Kotzebue, Cape Romanzof, and Cape Newenham LRRSs; and Granite Mountain, Nome Field POL, Anvil Mountain, North River, Bethel, Naknek Recreation Camps, Big Mountain, and Port Heiden sites lie within the **Western Alaska Bird Conservation Region**. This region is predominantly influenced by tundra and marine habitats. Most Old World bird species that have become well-established as breeders have done so in this region. Other Old World species occur only as accidentals or casual migrants and summer visitants. Pack ice covers much of the sea surface in winter, and birds associated with its face are winter visitants (Ivory Gull and Black Guillemot) (Boreal Partners in Flight Working Group 1999). Priority landbird species in Western Alaska Biogeographic Region are the Gyrfalcon, Blackpoll Warbler, Rusty Blackbird, Gary-cheeked Thrush, Golden-crowned Sparrow, Hoary Redpoll, Varied Thrush, and McKay's Bunting.

Figure 7.4.3 . Bird Conservation Regions in Alaska.



Indian Mountain, Murphy Dome, Fort Yukon, Tatalina, and Sparrevohn LRRSs and Kalakaket Creek, Champion, Bear Creek, Lake Louise, Beaver Creek, sites lie within the ***Northwestern Interior Forest Bird Conservation Region***. This region is dominated by taiga habitats, especially white spruce; alpine tundra occurs above 2,500 feet in the foothills and mountain systems. Interior Canada bird species reaching the northwestern extremity of their ranges, either breeding or migration, often extend into the eastern portions of central Alaska, usually via the major river systems - upper Yukon, upper Tanana, and upper Copper River drainages - but sometimes via the alpine tundra of the mountain systems (Boreal Partners in Flight Working Group 1999). Priority landbird species in the Central Alaska Biogeographic Region are the Gyrfalcon, Hammond's Flycatcher, Townsend's Warbler, White-tailed Ptarmigan, Northern Shrike, Blackpoll Warbler, Sharp-tailed Grouse, American Dipper, Golden-crowned Sparrow, Great Grey Owl, Gray-cheeked Thrush, Smith's Longspur, Boreal Owl, Varied Thrush, Rusty Blackbird, Black-backed Woodpecker, Bohemian Waxwing, White-winged Crossbill, and Olive-sided Flycatcher.

Eareckson AS, Driftwood Bay, and Nikolski sites lie within the ***Aleutian/Bering Sea Islands Bird Conservation Region***. This region is predominantly influenced by tundra and marine habitats. A number of Old World species are regular migrants and visitants, and occasional breeders (Wood Sandpiper); they are more numerous in western portions of the region. Southern Hemisphere procellariiforms occur regularly in the offshore waters during summer. Some Aleutian species breed only in this region (Red-legged Kittiwake and Whiskered Anklet); others reach their range limits in this region in winter (Emperor Goose and McKay's Bunting) (Boreal Partners in Flight Working Group 1999). Priority landbird species in the Southwestern Alaska Biogeographic Region are the Gyrfalcon, Blackpoll Warbler, Rusty Blackbird, Gary-cheeked Thrush, Golden-crowned Sparrow, Hoary Redpoll, Varied Thrush, and McKay's Bunting.

Andres *et al.* (1999) advocate strong management consideration for riparian habitats in northern and western Alaska. Shrub and deciduous riparian corridors often differ markedly from the surrounding tundra and have a unique bird assemblage. Therefore, riparian habitat and bird disturbance should be minimized. Tundra riparian habitats support the highest diversity of birds in this part of the state.

Conservation Plan for Alaska Shorebirds

A *Conservation Plan for Alaska Shorebirds*, written by the Alaska Shorebird Working Group, identifies priority bird species and habitats, establishes objectives for bird populations, and recommends conservation actions. Conservation planning for shorebirds occurs within five Bird Conservation Regions, roughly following Biogeographic Regions defined by Kessel and Gibson (1978).

Point Barrow, Oliktok, Barter Island, and Cape Lisburne LRRSs and Bullen Point, Point Lay, Point Lonely, and Wainwright sites lie within the ***Arctic Coastal Plain Sub-region of the Arctic Coastal Plain/Foothills Region***. Because of thick, continuous permafrost, surface water dominates the landscape (20-50% of the land surface on the Coastal Plain). The ocean surface, except for leads, is frozen 9-10 months a year, and the ice pack is never far from shore. Waterfowl and shorebirds dominate the breeding avian community and passerines are scarce. Old World shorebird species penetrate the region from the west (*e.g.*, Bar-tailed Godwit), and shorebird species regularly breeding in the Canadian Arctic penetrate from the east (*e.g.*, White-rumped Sandpiper) (Alaska Shorebird Working Group 2000). Priority shorebird species in the Arctic Coastal Plain of Alaska are the Wandering Tattler, Dunlin (only the subspecies *Calidris alpina arctica*), Whimbrel, Buff-breasted Sandpiper, and Bar-tailed Godwit.

Kotzebue, Tin City, and Cape Romanzof LRRSs and Granite Mountain, Nome Field POL, and North River sites are within the ***Subarctic Coastal Plain and Seward Peninsula Sub-region of the Western Alaska Lowlands/Uplands Region***. King Salmon Airport, Cape Newenham and Cold Bay LRRSs, and

Bethel, Big Mountain, Naknek Recreation Camps, and Port Heiden sites are within the ***Ahklun and Kilbuck Mountains and Bristol Bay-Nushagak Lowlands Sub-region of the Western Alaska Lowlands/Uplands Region***. Permafrost is continuous in this region except for southern parts. Sea cliffs are present as are mountains that exceed 3,300 feet in elevation. Wet and mesic graminoid herbaceous communities dominate lowlands, and numerous ponds, lakes, and rivers dot the landscape. Tall shrub communities are found along rivers and streams, and low shrub communities occupy uplands; forests of spruce and hardwoods penetrate the region from the east. Western Alaska has a unique breeding shorebird component that is largely restricted to Beringia (e.g., Black Turnstone, Bristle-thighed Curlew, and Pacific Golden-Plover). Several Old World species also regularly breed in or migrate through this region (e.g., Sharp-tailed Sandpiper). High densities of breeding waterfowl and shorebirds are found on the coastal plain of the Yukon and Kuskokwim rivers. Intertidal areas in this area and lagoons along the north side of the Alaska Peninsula support millions of shorebirds during migration (e.g., Dunlin, Western Sandpiper, and Red Knot). (Alaska Shorebird Working Group 2000). Priority shorebird species in the Western Region of Alaska are the Pacific Golden-Plover, Wandering Tattler, Whimbrel, Bristle-thighed Curlew, Hudsonian Godwit, Bar-tailed Godwit, Black Turnstone, Surf-bird, Marbled Godwit (*Limosa fedoa beringiae*), Dunlin (subspecies *Calidris alpina arctica*), Rock Sandpiper, Black Oystercatcher, and Short-billed Dowitcher (only the subspecies *Limnodromus griseus caurinus*).

Indian Mountain, Murphy Dome, Fort Yukon, Tatalina, and Sparrevohn LRRSs and Kalakaket Creek, Champion, Bear Creek, Lake Louise, and Beaver Creek sites are within the ***Interior Forested Lowlands and Uplands, Interior Bottomlands, and Yukon Flats Sub-region of the Interior Forests/Mountains Region***. A mosaic of vegetation communities arise from the interplay of elevation, permafrost, surface water, fire, and aspect. All forest types (needleleaf, deciduous, and mixed) are found in the region and are dominated by white spruce, black spruce, poplars, and paper birch. Tall shrub communities occur along rivers, drainages, and near treeline. Bogs, consisting of low shrubs and shrub-graminoid communities, are common in the lowlands. Alpine dwarf scrub communities are common in Interior Highlands and throughout mountainous regions; highest elevations are generally devoid of vegetation (Alaska Shorebird Working Group 2000). Despite the varied size of the region, many bird species are shared among sub-regions. Lowlands support many species of migrating and breeding waterfowl and breeding shorebirds (e.g., Greater and Lesser Yellowlegs, Solitary and Spotted Sandpipers, and Common Snipe). American Golden-plovers and Surf-birds are found in alpine habitats in the Interior Highland and mountainous ecoregions (Alaska Shorebird Working Group 2000). Priority shorebird species in the Interior Forests/Mountains Region are the Wandering Tattler, Whimbrel, and Surf-bird.

Eareckson AS and Driftwood Bay and Nikolski sites are within the ***Aleutian/Bering Sea Islands Region***. Sea ice does not extend to the Aleutians, and permafrost is generally absent. Vegetation at higher elevations consists of dwarf shrub communities, mainly willow and crowberry. Meadows and marshes of herbs, sedges, and grasses are plentiful, and some islands have ericaceous bogs. Seabirds are a dominant component of this region's avifauna; several species breed only in this region. Breeding diversity of shorebirds is relatively low; primary species include Black Oyster Catcher, Dunlin, Ruddy Turnstone, and Rock Sandpiper. Numerous Old World species are regular migrants or visitants, and some species regularly breed in the region in small numbers (e.g., Common Ringed Plover, Wood Sandpiper). Rock Sandpipers have differentiated into three races among islands within the region (Alaska Shorebird Working Group 2000). One subspecies breeds in the Aleutians (G.V. Byrd, 2007, comments on Gene Stout and Associates and Blythe & Trousil, Inc. 2007b)).

The USFWS report, *High Priority Shorebirds - 2004*, lists seven highly imperiled shorebird taxa and 23 of high concern. Highly imperiled shorebirds are: Global species - Piping Plover, Mountain Plover, Long-billed Curlew, and Buff-breasted Sandpiper; North American populations - Snowy Plover, Black-necked

Stilt (Hawaiian population), and Red Knot (Canadian Arctic-Atlantic Coast population) (USFWS 2004a). None of the listed species regularly occur in the Aleutians (G.V. Byrd 2007, comments on Gene Stout and Associates and Blythe & Trousil, Inc. 2007b)).

DoD Partners in Flight

The DoD Partners in Flight program sustains and enhances the military testing, training, and safety mission through proactive, habitat-based management strategies that maintain healthy landscapes and training lands. The DoD Partners in Flight has also developed a species of concern database, which identifies priority species.

611 ASG sites are within three DoD Partners in Flight Bird Conservation Regions. Appendix 5.4.4, tables a, b, and c list bird species of concern for each region (www.dodpif.org 2007). Various projects and surveys associated with the BASH reduction program and other wildlife concerns have identified/monitored populations of these species of birds on 611 ASG sites and will continue within budget limitations. The DoD Partners in Flight Program manager assisted with the development of a species list pamphlet for Eareckson AS and assisted in the development of INRMPs for 611 ASG sites (Gene Stout and Associates and Blythe & Trousil 2007a-b, 2008, 2009).

The DoD Partners in Flight has developed a Strategic Plan to accomplish its mission... *To conserve migratory and resident birds and their habitats on Department of Defense lands*. This Strategic Plan identifies actions that support and enhance the military mission while also working to secure bird populations. Partners in Flight migratory bird conservation strategies adopted for 611 ASG site management are below.

Inventory and Monitoring

- Use national standardized protocols and assess the status and trends of bird populations and habitats, including migrating, breeding, and wintering birds.
- Monitoring data will be maintained in secure and accessible systems.
- Identify habitat conditions needed by applicable species of special concern and understand interrelationships of co-existing species.
- Evaluate the effects of management activities on habitats and populations of migratory birds through National Environmental Protection Act processes and Air Force Forms 813 and 332.
- Identify bird movement/migration patterns and habitat selection within 611 ASG sites.

Habitat Conservation (protection, restoration, and enhancement)

- Manage habitat within bird and wildlife exclusion zones around airfields to reduce the bird-aircraft strike hazard and minimize unnecessary destruction of birds and nests, which will include:
 - managing vegetation, as outlined in AFAPM 91-212, Bird/Wildlife Aircraft Strike Hazard (BASH) Management Techniques;
 - coordinating with facility managers and building designers to minimize bird nesting sites on structures, and coordinate pre-egg laying nest destruction but establish alternative nesting sites outside the wildlife exclusion zone;
 - minimizing standing water and open water ponds that attract waterbirds; and
 - restricting bird feeding and emphasizing proper garbage management.

Collaboration

- Collaborate with other federal and state agencies to develop reasonable and effective conservation measures for actions that affect migratory birds and their natural habitats, and share inventory, monitoring, research, and study data.

Cooperation

- Allow the USFWS and other partners reasonable access to military lands to conduct sampling or survey programs.
- Encourage the use of qualified volunteers from local bird clubs to assist in survey and monitoring programs.
- Use existing partnerships and explore opportunities for expanding and creating new partnerships to facilitate combined funding for inventory, monitoring, management studies, and research.

Outreach and Public Access

- Provide outdoor recreation and wildlife viewing opportunities, where appropriate.
- Update and reprint, as needed, the bird checklist for Eareckson Air Station.

Integrate the above strategies with initiative partners, the North American Waterfowl Management Plan, U.S. Shorebird Conservation Plan, North American Waterbird Conservation Plan, Alaska Wildlife Action Plans, and DoD Partners in Flight Strategic Plan.

Regulations

- Obtain state and federal permits for depredation activities, scientific collection, and live/dead eagle exhibit.
- Follow DoD Migratory Bird Guidance to ensure compliance with obligations in the National Environmental Protection Act, the Migratory Bird Treaty Act, and the Final Rule on Take of Migratory Birds by the Armed Forces (50 CFR Part 21).

7.4.4 Migratory Birds

Migratory Bird Treaty Act

The Migratory Bird Treaty Act is an international agreement initially among the United States, Canada, and Mexico, and later amended as treaties were made with other countries (*i.e.*, Japan and Russia) to conserve birds. The Act protects designated families and species of birds. Many bird species are protected under the Migratory Bird Treaty Act. Birds classified as migratory include species that occupy 611 ASG sites throughout the year. A complete list of species of migratory birds protected by the Migratory Bird Treaty Act is in 50 CFR 10.13.

The Migratory Bird Treaty Act controls the taking of these birds, their nests, eggs, parts, or products. The Act states that it is unlawful “*at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, attempt to capture, or attempt to kill, purchase, offer to purchase, deliver for shipment, ship, export, import, cause to be shipped, deliver for transport, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, possess, offer for sale, sell, offer to sell, barter, offer to barter, any migratory bird, any part, nest, or egg of any such bird, or any part, nest, or egg thereof;*” unless and except as permitted by regulations in the Migratory Bird Treaty Act.

All persons, organizations, and agencies, are liable for prosecution for violations and must follow permitting requirements for taking migratory birds. Special purpose permits may be requested and issued that allow for the relocation or transport of migratory birds for management purposes. The Migratory Bird Treaty Act is the basis for requirements for permits associated with the “take” of birds for Bird Aircraft Strike Hazard (BASH) reduction purposes on 611 ASG sites.

Vegetation clearing, site preparation, or other construction activities not conducted during military readiness activities that may result in the destruction of active bird nests or nestlings would violate the Migratory Bird Treaty Act. Whenever possible, the 611 ASG schedules these activities during periods when nesting does not occur to help comply with the Migratory Bird Treaty Act. Some species and their nests have additional protections under other federal laws, including those listed under the Endangered Species Act and Bald and Golden Eagles (protected under the Bald and Golden Eagle Protection Act).

Federal agencies are required to support the intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory birds when conducting agency actions. The DoD exemption of the Migratory Bird Treaty Act for training for military readiness does not apply for CERCLA cleanup.

Executive Order 13186

Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* required the DoD and the USFWS to establish a memorandum of understanding (MOU) that will promote the conservation of migratory bird populations (Federal Register, Volume 71, Number 168, 51580-51585, August 30, 2006).

This MOU specifically pertains to natural resource management activities, installation support functions, operation of industrial activities, construction or demolition of facilities, and hazardous waste cleanup. Both DoD and the USFWS agree to emphasize an interdisciplinary, collaborative approach to migratory bird conservation within the geographic framework of the North American Bird Conservation Initiative, Bird Conservation Regions; protect, restore, enhance, and manage habitat of migratory birds, and prevent or minimize the loss or degradation of habitats on DoD-managed lands; work with landowners to minimize the loss or degradation of migratory bird habitats on lands near military installations; provide training opportunities to DoD natural resources personnel on migratory bird issues; and promote and undertake ecologically sound actions to curb the introduction in the wild of exotic or invasive species harmful to migratory birds.

DoD agrees to follow all migratory bird permitting requirements for non-military readiness activities; encourage incorporation of comprehensive migratory bird management objectives in the preparation of DoD planning documents; incorporate conservation measures addressed in Regional or State Bird Conservation Plans in INRMPs; allow the USFWS and other partners reasonable access to military lands for conducting sampling or survey programs; prior to starting any activity that is likely to affect populations of migratory birds, assess and document the effect of the proposed action on species of concern and engage in early planning and scoping with the USFWS to proactively address migratory bird conservation and to initiate appropriate actions to avoid or minimize the take of migratory birds; manage military lands and non-military readiness activities to support migratory bird conservation; develop and implement new and/or existing inventory and monitoring programs to evaluate the effectiveness of conservation measures to minimize or mitigate take of migratory birds; and promote timely and effective review of INRMPs with respect to migratory bird issues with the USFWS and respective state agencies.

The USFWS agrees to provide recommendations to minimize adverse effects upon migratory birds from DoD actions, maintain a Web page that provides links to all offices responsible for issuing permits for take of migratory birds, provide essential background information to the DoD to ensure sound management decisions, identify special migratory bird habitats to aid in collaborative planning, provide technical assistance on migratory bird species and their habitats, work with DoD in the development, review and revision of INRMPs, and review NEPA documents and other planning documents forwarded by military installations.

Both DoD and the USFWS understand the following.

- This MOU will not change or alter requirements associated with the Migratory Bird Treaty Act, Endangered Species Act, NEPA, Sikes Act, or other statutes or legal authority.
- Responsibilities established by this MOU may be incorporated into existing DoD actions; however, DoD may not be able to implement some responsibilities identified in the MOU until DoD has successfully included them in formal planning processes. This MOU is intended to be implemented when new actions are initiated as well as during the initiation of new, or revisions to, INRMPs, Pest Management Plans, and non-military readiness elements of Bird Aircraft Strike Hazard plans. It does not apply to ongoing DoD actions for which a NEPA decision document was finalized prior to, or within 180 days of the date this MOU is signed.
- This MOU in no way restricts either Party from participating in similar activities with other public or private agencies, governments, organizations, or individuals.
- An elevation process to resolve any dispute between the Parties regarding a particular practice or activity is in place and consists of first attempting to resolve the dispute with the DoD military installation and the responsible Ecological Services Field Office. If there is no resolution at this level, either Party may elevate the issue to the appropriate officials at the applicable Military Service's Chain of Command and USFWS Regional Offices. In the event that there is no resolution by these offices, the dispute may be elevated by either Party to the headquarters office of each agency.
- This MOU is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement, contribution of funds, or transfer of anything of value between the Parties will be handled in accordance with applicable laws, regulations, and procedures, including those for government procurement and printing. Such endeavors will be outlined in separate agreements that shall be made in writing by representatives of the Parties and shall be independently authorized by appropriate statutory authority.
- The Parties shall schedule periodic meetings to review progress and identify opportunities for advancing the principles of this MOU.
- This MOU is intended to improve the internal management of the executive branch and does not create any right or benefit, substantive or procedural, separately enforceable at law or equity by a party against the United States, its agencies or instrumentalities, its officers or employees, or any other person.
- Modifications to the scope of this MOU shall be made by mutual consent of the Parties, through issuance of a written modification, signed and dated by both Parties, prior to any changes.
- Either Party may terminate this instrument, in whole or in part, at any time before the date of expiration by providing the other Party with a written statement to that effect.

Final Rule – Migratory Bird Permits; Take of Migratory Birds by Department of Defense

Section 315 of the 2003 National Defense Authorization Act provides that, not later than one year after its enactment, the Secretary of the Interior (Secretary) shall exercise authority under Section 704(a) of the

Migratory Bird Treaty Act to prescribe regulations to exempt the Armed Forces for the incidental taking of migratory birds during military readiness activities authorized by the Secretary of Defense or the Secretary of the military department concerned. The Authorization Act further requires the Secretary to promulgate such regulations with the concurrence of the Secretary of Defense.

The USFWS published a final rule (50 CFR Part 21, Federal Register Volume 72, Number 39, February 28, 2007, pp 8931-8950) that basically exempts the Armed Forces for the incidental taking of migratory birds during military readiness activities. This rule ... *authorizes such take, with limitations, that result from military readiness activities of the Armed Forces. If any of the Armed Forces determine that a proposed or an ongoing military readiness activity may result in a significant adverse effect on a population of a migratory bird species, then they must confer and cooperate with the Service (USFWS) to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects.*

This rule only includes military readiness activities. It specifically does not include routine operation of installation operating support functions (*e.g.*, administrative offices, military exchanges or commissaries, water treatment facilities, storage facilities, schools, housing, motor pools, laundries, recreation activities, shops, mess halls), operation of industrial activities, or construction or demolition of facilities relating to these routine operations.

The rule does not authorize take under the ESA (Endangered Species Act). If a military readiness activity may affect a listed species, the Armed Forces retains responsibility for consulting with the Service under section 7(a)(2) of the ESA. Similarly, if a military readiness activity is likely to jeopardize the continued existence of a species proposed for listing, the Armed Forces retain responsibility for conferring with the Service in accordance with section 7(a)(4) of the ESA.

Withdrawal of authorization may be proposed if the Secretary determines that failure to do so is likely to result in a significant adverse effect on a population of a migratory bird species and one or more of the following circumstances apply: (A) The Armed Forces have not implemented conservation measures that (i) are directly related to protecting the migratory bird species affected by the proposed military readiness activity; (ii) would significantly reduce take of migratory birds species affected by the military readiness activity, (iii) are economically feasible, and (iv) do not limit the effectiveness of military readiness activities. (B) The Armed Forces fail to conduct mutually agreed upon monitoring to determine the effects of a military readiness activity on migratory bird species and/or the efficacy of the conservation measures implemented by the Armed Forces. (C) The Armed Forces have not provided reasonably available information that the Secretary has determined is necessary to evaluate whether withdrawal of take authorization for the specific military readiness activity is appropriate.

The rule assumes that installations will use the NEPA process to determine whether an ongoing or proposed military readiness activity is *likely to result in a significant adverse effect on the population of a migratory bird species of concern*. If such significant adverse effects are likely, an installation would be required to confer with the USFWS to develop appropriate conservation measures to minimize or mitigate such significant adverse effects.

In summary the rule requires the 611 ASG to:

- engage in close coordination with USFWS for migratory bird conservation;
- maintain current information on migratory bird populations and trends;
- document migratory bird conservation in the INRMP;

- incorporate migratory bird population goals and habitat objectives into INRMPS;
- conduct annual INRMP reviews with USFWS and ADFG to:
- solicit their input concerning INRMP effectiveness of bird conservations and
- analyze effectiveness of INRMP measures to avoid, minimize, or mitigate take;
- analyze project effects, especially any new military readiness activity, via NEPA documentation; and
- if impacts may significantly affect a population of migratory bird species, confer early with USFWS.

General Measures for 611 ASG Projects that May Affect Migratory Birds

The following measures are typically implemented for construction, cleanup, and demolition projects on 611 ASG sites.

- If a nest is encountered, the 611th Natural Resource Program Manager will be immediately notified. A permit for “take” through USFWS will be pursued if the project is unable to avoid and protect the nest.
- To avoid destruction of nesting passerines, any vegetation clearing activities should be conducted outside of the nesting period of passerines.
- Care should be taken not to provide nesting habitat for birds during or as a result of cleanup actions.
- Garbage and human refuse should be routinely cleaned-up and maintained so it does not attract birds and other wildlife.
- Encourage seeding or revegetation about the end of spring migration, which provides seeds with the entire growing season to mature.
- Best Management Practices will be taken so that no new noxious or invasive species are introduced to areas where they are not already found.
- Construction Best Management Practices will include restrictions for dewatering basins in and around site flight lines as to not attract birds.

During a review of this INRMP, the USFWS recommended (letter in Appendix 2.5.2) that lighting should be designed as to not attract birds. Since radiant lights at facilities could be an attractant to birds, especially during periods of inclement weather and/or increasing darkness, shielded lighting will be required at project facilities to lessen the potential for episodic collision events. Low radiant lighting should be used, and lighting should be directed downward or inward wherever possible to prevent “star” effects when viewed offsite. Only lighting necessary for safety should be directed offsite.

The 611 ASG will implement this recommendation to the best of its ability, considering safety and operational needs.

Site-specific actions involving migratory birds

Below are some site-specific 611 ASG actions and issues involving migratory birds. Activities involving listed species are described in Section 7.5, *Management of Threatened and Endangered Species and Habitats*. Activities involving BASH-related birds, especially the Aleutian Cackling Goose, are in Section 7.10, *BASH*.

Barter Island LRRS

Black Brant are not often observed from other Beaufort Sea coastal locations during the fall migration, and Barter Island may be a good location for bird migration studies.

Raven nesting has occurred in various structures and pose a threat to indigenous ground-nesting birds. To protect indigenous ground-nesting birds that are vulnerable to Raven predation, discouragement of Raven use at the LRRS is being implemented. During 2005 at Barter Island LRRS eight nests were removed from three of the four inactive tropospheric towers (historically preferred nest building structure), as authorized by an ADFG public safety permit. Three of the nests showed remnants of six or seven previous nests, stacked one on the other. In preparation for site demolition and environmental restoration, a separate permit was issued to the 611 CES in July 2006 for removal of one Rough-legged Hawk nest that became inactive at Barter Island LRRS.

Oliktok LRRS

The USAF funded a study, *Brant Use of the Oliktok LRRS and Movements in the Kuparuk Oilfield*, (Stickney 1997) to radio-track female Brant from their nesting colonies within the Kuparuk and Milne Point oilfields to brood-rearing locations. This study, summarized in Gene Stout and Associates (2007a), provided recommendations, which are summarized as follows:

Timing of Activities

- 25 June - 15 July - No heavy equipment use at the site and no movement to or from site. No demolition or cleanup activities.
- 16 July - 15 August - Minimize impacts by starting with buildings and the sea wall most distant from the lagoon.
- 25 June - 15 August - No ground disturbance activities, high-noise activities, or extensive foot traffic on the tundra within 300 yards of the lagoon.
- If any cleanup activities are planned near the lagoon (e.g., picking up old barrels) and require tundra travel, they should be planned in accordance with policies established by the ADNR, Division of Lands to minimize tundra damage by restricting most travel to the period after freeze-up and before spring thaw.

Reduction of Disturbance Types

- Light vehicle traffic is to remain at less than one small truck per half-hour.
- The following guidelines will minimize disturbance to Brant:
 - disperse light vehicle traffic over time to spread out potential chronic impacts;
 - maintain a steady speed when driving light vehicles to and from the LRRS;
 - minimize stopping and starting of light vehicle engines, but shut engines off if stops are longer than 10 minutes;
 - compress heavy vehicle activity into as short of a time period as possible;
 - avoid exiting vehicles and walking within line-of-sight of brood-rearing geese as much as possible; and
 - if necessary to exit vehicle, do so from the side facing away from the geese.

The USAF implements these recommendations as much as possible during operations, construction, and IRP at Oliktok LRRS. Though winter construction is the norm, it should be noted that winter is not a suitable time for cleanup and often demolition activities due to snow cover and adverse weather. Thus, using cold weather months for tundra travel will not likely be feasible.

The marshy area east of the facility is important to the Brant population of the area (Stickney 1997). Storm surges occasionally cause salt water to move across the gravel road and into this marsh, providing important habitat for Brant. Salt marshes are scarce and high value habitat on the North Slope. This road

should be maintained in a manner that ensures that the marsh continues to receive marine waters from the Beaufort Sea. In response to concerns discussed in a previous INRMP (Gene Stout and Associates and Blythe & Trousil, Inc. 2007a), the Alaska District Army Corps of Engineers conducted a study with the USAF of the salt marsh adjacent to Oliktok LRRS and its relationship to the road to the site with regard to the periodicity of salt water inundation. A field investigation by a hydrologist and a wetland specialist was accomplished in August 2003 and found that culverts beneath the oil company maintained road were adequate for the exchange of saline water from the Beaufort Sea and wetland plant species were very similar to other estuarine communities that were not restricted by culverts.

The salt marsh adjacent to the Oliktok site is used by brood-rearing Brant from early July until mid-August when adults and young are flightless and sensitive to disturbance. Activities eliciting the greatest response are people on foot. LRRS employees should direct their recreational activities to the west of the site during early July to mid-August to avoid repeated disturbances to brood-rearing Brant. Predators attracted by negligently or purposely placed food to attract predators would impact Brant and ground nesting birds.

Point Barrow LRRS

Bird mortality from wire strikes is a concern in the Barrow area (North Slope Borough and USFWS), particularly during foggy conditions when fast-flying birds often hit wires associated with antennas and power/communications systems. About 70 dead birds were once picked up by a Borough employee along the sea road following such conditions (personal communication, Craighead George, Wildlife Management Department, North Slope Borough in Jones Technologies, Inc. and Gene Stout and Associates 1999c). Both Spectacled and Steller's Eiders may be affected. The DoD erected an antenna array near the main facilities on Point Barrow LRRS. Even though these antennas were relatively low, they had support cables, which could have imposed a significant hazard to birds during poor visibility conditions. These antennas were removed in 2011. A study conducted in 2000 (Day *et al.* 2001) of movements and behavior of eiders migrating past towers at the National Oceanic and Atmospheric Administration's Climate Monitoring and Data Laboratory and Point Barrow LRRS determined that the probability of collision of migrating eiders with existing structures is low.

Ravens are an efficient nest predator and can significantly impact nesting success. However, there is also some evidence that Ravens may not use the area immediately around its nest for foraging. Thus, nesting in facilities at the sites may provide protection for nesting birds in the immediate vicinity of the facilities. Ravens use a tower at Point Barrow LRRS for nesting, and this could affect nesting success in the area of other species, especially the Steller's Eider. The North Slope Borough, Wildlife Management Department actively controls Ravens by killing chicks using a USFWS permit. The USFWS program to control Ravens at the Point Barrow LRRS and in the surrounding area began in 1999. Towers at Point Barrow LRRS were removed as part of Clean Sweep in 2011. The Ravens will likely move elsewhere to nest, so this may not alleviate the problem. When such nesting structures are removed, it is important to schedule removal for times when the nests are not used (July 15 through April 1).

The USAF will, to the extent possible, minimize the overall availability of nesting sites for Ravens by avoiding the construction of facilities attractive to Ravens. There are significant issues involving the elimination of nest sites. Hazing (auditory and visual deterrents) can be effective, but it involves considerable manpower and hazing techniques must be regularly changed. Chemical deterrents (*e.g.*, methyl anthranilate) are short lived and may have undesirable side-effects. Using spikes and other physical barriers on potential nesting sites has potential, but Ravens use a broad variety of potential human and natural perches. If a given perch is altered, and Ravens are strongly attracted to the area, they

will most likely switch to an alternative perch type nearby. Thus, broad application of anti-perch devices may not keep birds out of a general area; it may only keep them from an immediate site (*e.g.*, buildings, towers). Minimizing human-caused food sources (*e.g.*, garbage, landfills) can be effective if such food sources are sustaining the birds (Boarman 1992).

Birds may use abandoned buildings and structures for nesting at Point Barrow LRRS. Power lines present a collision hazard for birds using the LRRS area (personal communication, R. Suydam, Wildlife Management Department, North Slope Borough 2002); power lines associated with these buildings were removed to eliminate the hazard or marked to lessen the probability of collision. Demolition of structures was timed to avoid destroying active nests. Only one abandoned hangar and a storage building remains at the LRRS with exception of active radar and support facilities.

Cape Lisburne LRRS

An issue at Cape Lisburne was the potential disturbance of nesting seabirds by blasting at rock quarries located on site (Denlinger *et al.* 1994). During 1995 contracted rock blasting shock effects were substantially minimized by using a low level shock technique. Blasting, if required, will continue to be done in accordance with the USFWS permit. The current policy of not allowing blasting during July and August to minimize disturbance to nesting seabirds will be strictly followed.

There is concern regarding effects of planes on nesting seabirds on the shore cliffs (Denlinger *et al.* 1994). Certain approaches to the runway can disturb these birds. There are other places where runway approaches could create seabird or marine mammal disturbance removal (*e.g.*, Point. Lay in Aug-Sep to avoid walruses, Newenham as discussed below, etc.). In these cases, flight patterns are modified to protect nesting seabirds and haulout sites.

Cape Newenham LRRS

Woodward-Clyde (1995e) noted that aircraft flying along the cliffs can disturb breeding seabird colonies, potentially causing nest and egg failure, which allows predators, such as ravens, to depredate temporarily abandoned nests. There is a need to avoid disturbances to seabirds that nest along the Cape Newenham peninsula from April through October. In the past (prior to 1993), USAF aircraft were documented flying below 1,000 feet AGL, both around the cliffs of Cape Newenham and in the surrounding area on approach to and departure from the Cape Newenham landing strip. Air taxis from Dillingham, Anchorage, Bethel, and Nome were documented flying below 1,000 feet AGL in the area when chartered for Cape Newenham business (Archibeque 1993). This was still an issue in 1998 (personal communication, Rappoport and Wheeler 1998 in Jones Technologies, Inc. and Gene Stout and Associates 2000).

The issue of aircraft disturbance to nesting seabirds and haulout sites will continue to be addressed. The issue involves both stewardship and compliance. Pilots can be assessed civil and criminal penalties and imprisonment. USFWS personnel, as well as installation personnel, regularly observe the area for violations and will report violations to the USFWS, NMFS, and/or FAA enforcement personnel. Aircraft servicing the site should avoid flight below 2,000 feet AGL except on arrival and departure from the landing strip, and should remain east of the site (left traffic for arrivals, right traffic for departures).

The Air Force is educating pilots who use the runway about the sensitive nature of breeding seabird colonies in the Cape Newenham area. Pilots are discouraged from approaching too closely to these haulout and nesting areas. The Air Force will continue to work to minimize disturbance, consistent with aircraft safety requirements.

There was on the part of the USFWS (personal communication, Rappoport and Wheeler 1998 in Jones Technologies, Inc. and Gene Stout and Associates 2000) regarding potential contamination of seabirds from hazardous wastes at Cape Newenham. The USFWS was concerned that the material covering hazardous materials at an IRP site may be too thin.

The cap over PCB-contaminated soils at Upper Camp will continue to be maintained, and there are no PCBs outside the cap at the top of the mountain on the down slope. Operation Clean Sweep in 2011-12 and other IRP actions resolved these issues; long term management of the site (scheduled during 2013-17) will ensure conditions that resulted in closure of IRP will be maintained.

An updated ecological risk assessment using the latest sampling data and a technical feasibility study are scheduled for 2013 (e-mail from K.J. Barnack, Remediation Project Manger to Matthew Moran, December 7, 2011).

Fort Yukon LRRS and Indian Mountain LRRS

Cliff Swallows nest USAF structures at both LRRSs. While creating maintenance and base operations problems, swallows also consume large numbers of mosquitoes and are beneficial to the installation. State and federal regulations require various permits for the removal or disturbance of migratory birds. Nests are not to be disturbed during the nesting periods when eggs or nestlings are in nests (typically May 1- July 15). Nest materials may be removed prior to egg-laying if nests are in a location that impacts the mission.

Woodward-Clyde (1995f) observed Savannah Sparrows at Indian Mountain LRRS in artificial grasslands maintained by periodic mowing. These grasslands occur along the airfield and areas surrounding the housing/industrial domes. Changes in mowing could adversely affect this species.

Tin City LRRS

The Tin City LRRS gravel pit area frequently is used by shorebirds. Gravel areas should be regraded after excavation to provide gentle slopes and foraging habitat for shorebirds. Several old utility poles south of Lower Camp provide hunting perches for resident and migrant raptors. A minimum of four or five poles should be left intact, particularly at higher elevations which provide good viewpoints. All old utility poles should be free of wires that could entangle raptors or other perching birds.

Operation of the recently installed wind turbine on Tin City LRRS could impact migratory birds. This is further discussed in Section 6.3.2, *Potential Future Impacts*. Consideration of wind turbines at other sites is ongoing.

7.4.5 Polar Bear Interaction Reduction

The Marine Mammal Protection Act (MMPA) of 1972, as amended, gave the USFWS responsibility for managing polar bears in Alaska. The MMPA prohibits take of polar bears except for specified purposes. Take is defined as *to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill* polar bears. In addition, polar bears were listed as a threatened species by the USFWS in 2008 (73 Federal Register 28212 [May 15, 2008]), thus they are subject to the Endangered Species Act.

The USFWS issues an authorization to take polar bears, a federally-threatened species, to the BOS contractor on an annual basis following submittal of a request by the contractor. The authorization allows the take, by harassment (deterrent activities), of polar bears during the operation and maintenance of some northern Alaska 611 ASG sties. The authorization is restricted to harassment activities. Authorized individuals are responsible for documenting and reporting to the USFWS instances involving harassment

activities as soon as possible and not later than 24 hours from the occurrence. A final report of all encounters and hazing events is required no later than 60 days after the expiration of the authorization. Additionally, a Letter of Authorization for the intentional take of polar bears on the North Slope of Alaska is appropriate for specific sites with planned Clean Sweep and other Installation Restoration Program activities.

Personnel operating in polar bear habitat must avoid any activity that could threaten or kill a bear without just cause. The MMPA allows a polar bear to be killed if the action is necessary in self-defense or to save the life of a person in imminent danger. Such actions must be reported to the USFWS within 48 hours.

Due to fall whale butchering on beaches close to the **Point Barrow LRRS**, the risk associated with polar bears is higher than in many other places. As a means to reduce interactions with polar bears, fence material was placed under the active facilities (Train A, Train B, and the garage), and exterior lighting has been improved. During fall 2003 a polar bear was, for the first time, raiding the dumpster at the site. The animal would not leave the site and was subsequently lethally taken by local authorities. The 611 ASG has taken corrective measures regarding waste management at this site. Since that time, the polar bear has been listed, and such take would not be allowable unless human life was in imminent danger.

Polar bears have damaged LRRS buildings in the past and can harm or kill LRRS personnel. Polar bears frequent **Cape Lisburne LRRS** during winter and scratch at buildings, particularly the kitchen grease vent.

Polar bears often follow the shoreline to get from one area to the other and often pass through the **Oliktok LRRS** area. Polar bear activity in this area historically has been high during whaling season from the Village of Nuiqsut. A polar bear-human mauling occurred at Oliktok LRRS in October 1993. Denning polar bears may be present in the area of drifting snow from November to March (Bridges 2001). As a means to reduce interactions with polar bears, fence material was placed under the active facility (Train), and exterior lighting has been improved. Food garbage is not placed in the dumpster; it is incinerated.

Natives of Kaktovik conduct customary whale hunts each year, and when a whale is killed, it is brought to the beach and butchered. Whale remains are disposed of at the seaward side of the eastern end of the **Barter Island LRRS** runway, on USAF property. Polar bears tend to congregate at the end of the runway at the disposal site. Polar bears are likely to be in the general area of the LRRS (Bridges 2001). As a means to reduce interactions with polar bears, fence material was placed under the active facility (Train A) and the side of the adjacent inactive facility (Train B). Train B was subsequently removed in 2006. Exterior lighting has been improved. During fall 2003 polar bears were, for the first time, raiding the dumpster at the site. Food garbage was not placed in the dumpster following the incident but taken directly to the landfill. Polar bears have destroyed runway lights at the LRRS.

More recently, guided polar bear tours and other tourists to this disposal site have increased the risk of human-polar bear interactions. The USFWS has studied bear behavior at this site using radio collars and is working with the Kaktovik community to ensure responsible viewing of these threatened bears (Susi Miller, USFWS Polar Bear Biologist, Gene Stout personal telephone communication March 27, 2012).

Historically, **Kotzebue LRRS** polar bear activity, including denning activity, is not as great as expected at USAF sites further north, such as Barrow or Barter Island. Safety issues related to waste disposal and attraction to bears has not been an issue. The LRRS does not have an incinerator available. Very little waste is generated. The LRRS lacks kitchen or dining and billeting facilities; therefore, the quantity of

domestic refuse is low and not the type that attracts wildlife. If any food waste is generated, it should only be placed outside the existing building in wildlife-proof containers until removal to the landfill.

Since *Tin City LRRS* lies on the Bering Sea coast at the tip of the Seward Peninsula, polar bears are likely to be present in the area during the winter season. Likewise, polar bear denning is probable from November to March (Bridges 2001). Safety concerns related to waste disposal and attraction to bears has become an issue at Tin City LRRS. Other wildlife, small mammals, and birds could become a concern of ecological balance, or increase the BASH risk, if an opportunity to feed on refuse occurs. Complete incineration of all food waste and proper disposal in the LRRS landfill is necessary. Any food waste placed outside buildings must be in wildlife-proof containers until removal to the landfill. Refuse placed in the landfill must be covered as soon as possible. Personnel in the vicinity of the landfill should exercise extreme caution.

Point Barrow, Cape Lisburne, Oliktok, Barter Island, Kotzebue, and Tin City LRRSs and Bullen Point, Point Lay, Point Lonely, and Wainwright sites (Bridges 2001, Ohms 2008), as well as Anvil Mountain and Nome Field POL, and perhaps Cape Romanzof LRRS, are within the range of the polar bear, a species with proven potential for harm to humans. Personnel working at or visiting these sites should:

- document all human-polar bear interactions, including maulings, threats, and damage to facilities and runways, particularly as required by the USFWS authorization to take;
- evaluate site facilities and operations for compatibility with polar bears;
- enforce rules prohibiting the feeding of wildlife, as established in the ASG 611 policy prohibiting wildlife feeding and poisoning on 611 ASG installations;
- reduce or eliminate activities and operations that attract polar bears; and
- establish a site-specific procedure for dealing with polar bear encounters, considering requirements of the USFWS authorization to take polar bears and recommendations of the *Polar Bear Interaction Management Plan* (Bridges 2001) and its 2008 update (Ohms 2008).

The USAF developed a polar bear interaction plan in cooperation with the USFWS and endorsed as a Coastal America project (Bridges 2001). The plan included procedures to minimize polar bear encounters and bear-proof facilities and education programs for site personnel and visitors. A video, *Polar Bear Awareness at Air Force Sites* and brochure, *Guidelines for Radar Site Operations in Polar Bear Habitat* were also developed. Each 611 ASG site within the range of polar bears has a copy of the video for viewing by visitors. All personnel receive copies of the brochure and are required to view the video. All visitors to these sites receive the brochure and are encouraged to view the video.

The *Polar Bear Interaction Management Plan* was updated in 2008 (Ohms 2008). Concurrent with revision of this INRMP, another update of this plan is being accomplished. This revised plan, which includes avoidance of Pacific walrus haulout sites, (Stout 2012) is in Appendix 7.4.5.

7.4.6 Eareckson AS Rat Eradication

Roof or ship rats (*Rattus rattus*) are established on Shemya Island, and these pests can have negative impacts on native ecosystems, as well as have economic and potential health impacts on the Air Force facilities and personnel.

Meehan and Byrd (1996), following an extensive search, concluded that there were no Norway rats (*Rattus norvegicus*) or ship (or roof) rats (*Rattus rattus*) on Shemya Island. USFWS refuge personnel found limited signs of rats on Shemya Island in spring 1999 but were unable to trap any rats. Jones

Technologies, Inc. and Gene Stout and Associates (1999a) indicated that USAF and contractor personnel occasionally sighted rats at Eareckson AS, and residential rat traps had been set in living and food storage areas with no trapping success.

An increase in rat sightings prompted renewed trapping effort with traps being set by U.S. Department of Agriculture, Wildlife Services personnel. In fall 2005, 10 snap traps were set in boxes with entrances too small for foxes and bait that would not attract birds. The boxes were distributed around the island perimeter since reported sightings were along the beach and near the dock. Many shipments to Eareckson AS originate in Seattle, Washington or pass through Dutch Harbor; both rat infested. The largest number, 29 roof rats, were trapped during fall 2005; successively fewer were found in 2006 and spring of 2007 (Schwitters and C. Schwitters 2005, 2007; Schwitters and L.E. Schwitters 2006; Schwitters and Martinka 2006).

It appears that the relatively warm winter of 2004/05 resulted in a successful year for roof rats on Shemya Island. Roof rats are known to be much less tolerant to cold than the Norway rat. The 611 CES intends to continue eradication and monitor the roof rat situation as needed.

There remains concern that Norway rats could invade the island, which would be a much greater challenge to eradicate (personal communication, G. Augustine 2005). The 611 CES/CEAN Manager will continue to gather information and seek assistance in rat control and to prevent introduction of Norway rats on Shemya Island. Rats are an issue of importance to both the USAF military mission and native wildlife on the island.

The 611 CES, with the USFWS, is developing a biosecurity plan for all 611 ASG sites, as required by DODI 4715.03. This plan, to be completed in 2012, will be the basis of minimizing the risks of introduction of invasive plants, and animals, controlling such species on 611 ASG sites, and minimizing ecological and other effects of such invasive species on sites where they exist.

7.4.7 Eareckson AS Fox Health

Arctic foxes on Shemya Island are descendants of foxes that were introduced roughly 100 years ago. Shemya Island foxes now play an important role in the Eareckson Air Station BASH program as their presence discourages gulls and geese from nesting or roosting on the airfield. It is therefore desirable that the fox population persists on Shemya Island. When concerns were raised regarding the health of Shemya's foxes, it prompted an investigation by arctic fox specialists, Dr. Paula White and Dr. Terry Spraker, to evaluate the status and viability of Shemya Island's arctic fox population (White and Spraker 2012).

To date, three field visits have been performed (June-July 2006, June-July 2008, and February-March 2011). Island-wide surveys were conducted to count and map fox dens and record denning activity. Behavioral observations of foxes during site visits assessed dietary breadth and preferences. Thus far, 14 dens have been detected and monitored, and 76 foxes have been captured, examined, tagged, sampled, photographed and released. An additional 13 foxes salvaged after death (most struck by vehicles) have been necropsied and sampled; 6 moribund foxes have been euthanized and full necropsies performed. Blood, body measurements, and photographs were obtained from live foxes. Sampling of a full array of tissues (brain, organs, tissues, skin, bone) was performed on dead foxes (White and Spraker 2012).

Foxes were observed foraging primarily on the island's coastlines. Foxes were observed hunting along the edges of the airfield and road network as well as around the island's small interior ponds. The presence of human refuse attracted foxes that foraged regularly around building dumpsters and at the island's garbage

pit. Natural food items common to Shemya fox diet included sea urchins, fish, octopus, seabirds, and terrestrial birds and sand hoppers (invertebrates). Remains of introduced rodents were also detected in fox scats (White and Spraker 2012).

Most foxes were in poor physical condition. Body fat index was fair-to-emaciated. Most striking was the excessive tooth wear, damage and loss seen in virtually every adult fox regardless of age. Tooth damage was often associated with chronic gum disease and injury to the soft tissues of the mouth. Possible causes of excessive and premature tooth wear include mechanical abrasion from the coarse food items (*e.g.*, sea urchins and large amount of sand consumed incidentally). However, the observed condition greatly surpasses anything seen previously in arctic fox populations on other islands where foxes forage on sandy beaches. Patterns of tooth wear were systematically photographed and are being scored and graded to better quantify this unusual condition. Histological slides of teeth and sections of jaws have been prepared so that the affected tissues may be further examined at a cellular level (White and Spraker 2012).

A possible second contributing factor to excessive and premature tooth wear would be exposure to and/or ingestion of an environmental toxin. Dioxins have been linked to developmental dental defects (*e.g.*, enamel deficiencies in human children). Additionally, a high percentage (75%) of necropsied foxes obtained during the first field season had tumors consistent with toxin exposure. Although this finding was not duplicated in the second field season, the initial finding of tumors warranted an in-depth assessment of potential fox exposure to environmental toxins. All sampled tissues are currently being analyzed for a broad range of toxins. Preliminary results to date report no significant levels of any toxin in Shemya foxes. However, full laboratory analyses are still underway (White and Spraker 2012).

DNA obtained from blood samples for genetic analysis yielded a surprising result: Shemya Island's foxes originated from Commander Island (Russia) stock. Because Commander Island foxes are endemic subspecies, the Shemya Island foxes may represent an important gene bank for fox conservation. Further laboratory analysis is being conducted to determine from which specific Commander Island the Shemya foxes originated (White and Spraker 2012).

Blood samples from each captured fox are undergoing full blood panels to assess health, including screening of blood titers to test for fox exposure to a variety of diseases. No evidence of contagious diseases known to pose health threats to humans (rabies, distemper) has been found (White and Spraker 2012).

To gauge the long-term viability of Shemya's fox population, it is necessary to track the fate of individual animals. All foxes captured and released on Shemya during this study were fitted with permanent plastic ear tags. Many foxes were tagged as yearlings and thus are known-aged animals. Shemya's tagged foxes represent a cohort of animals whose subsequent recaptures will figure prominently in assessing etiology and progression of the pathological conditions that have already been observed. Furthermore, once a course of action to improve or mediate the poor physical condition of Shemya's foxes has been established and implemented, tagged foxes will be instrumental in providing follow-up documentation and confirmation of program success. Follow-up site visits to recapture and examine Shemya's tagged foxes be conducted at regular intervals of from two to three years; the next site visit should be conducted either in summer 2013 or winter 2013-2014 (White and Spraker 2012).

Schwitters (2010a) made many observations of tagged foxes during BASH surveys. He reported that the fox population was quite large (perhaps as high as 100), and that the animals had a good reproduction year in 2010. He also reported that annual survival rate for the class of 2006 was about 0.724 and the class

of 2008 was just 0.578 surviving to the following year. He reported one case of fox feeding at the sewage treatment plant.

7.4.8 Eareckson AS Kelp Management

According to J. Estes, University of California, Santa Cruz, who has studied sea otters on Shemya Island (Estes and Konar 1996), there are no eelgrass beds around Shemya Island. Kelp beds, however, are important ecological habitats that should be protected to the maximum extent possible.

Sea otters are known as a keystone species because of their ability to transform sea urchin-dominated communities into kelp-dominated communities by preying on sea urchins and thus reducing the intensity of herbivory (Konar 2000a). Other kelp and urchin studies relevant to Shemya Island include Konar (2001), Konar (2000b), and Konar and Estes (2003). These marine habitats should be delineated and protected. However, the only marine water use related to the USAF at Shemya Island is occasional barge traffic in Alcan Harbor. The possible impacts to kelp are therefore minimal.

7.4.9 Eareckson AS Harlequin Duck Study

The USFWS expressed concern regarding the possibility of oil contamination on diets and body condition of Harlequin Ducks around Shemya Island, which led to a USAF-sponsored USFWS study to investigate this concern (Fischer 1998). Study results suggest that Harlequin Ducks are not contaminated with petroleum hydrocarbons via the food chain. However, benzo(a)pyrene, a byproduct of incomplete combustion, was detected in levels comparable to those found in some urban/industrial regions. This study also examined winter feeding ecology and body condition of Harlequin Ducks at Eareckson AS.

7.4.10 Eareckson AS Barge Operations

Four sets of Leach's Storm-Petrel wings were collected at the pier on Shemya Island. This is likely the result of being injured at night flying into the lights and then being scavenged by foxes (Schwitters and Martinka 2006). Sodium vapor lights are used during barge operations (loading/ off-loading) at the dock. Barges dock at Shemya Island about three to four times annually. Fuel barges generally are docked for about 48 hours for off-loading, and the timeframe at the dock for other barges varies depending on what is being loaded/ off-loaded. Lights are only used at night and must be on during barge operations (personal communication, S. Bradford 2007). Use of the lights on the dock should be limited to only those times when necessary for barge loading/ off-loading operations that must be performed after dark.

7.4.11 Ground Squirrel Conflicts

Ground squirrels caused problems in the past with the electrical switching posts and transformer areas at King Salmon Airport, digging in containment systems at Fort Yukon LRRS, damage at Murphy Dome LRRS, and burrowing that threatened the integrity of the runway, helipad, and other fill areas at Wainwright site (Gene Stout and Associates and Blythe & Trousil, Inc. 2007a and 2008). These problems have been resolved for the most part.

Ground squirrels are furbearers regulated as a game species in Alaska. Control of ground squirrels may be accomplished by mechanical means (*i.e.*, trapping or shooting) whenever possible to decrease operation hazards due to ground squirrels, in accordance with ADFG regulations. Use of poisons is prohibited except with the written consent of the Board of Game (Part 3 Game, Chapter 92 Statewide Provisions, Article 4 Methods and Means 5 AAC 92.080).

In the event that ground squirrel removal by mechanical means are not successful and the situation merits approval by the Board of Game, then the following shall be adhered to.

- In areas where poisoning of ground squirrels may be necessary, only Environmental Protection Agency-registered rodenticides will be used. Poisons that have been shown to be effective in controlling other ground squirrels, such as prairie dogs, include aluminum phosphide (phostoxin) or zinc phosphide. Zinc phosphide may be obtained as treated grain bait, while phostoxin is a fumigant available in tablet form.
- Ground squirrels may be poisoned or otherwise controlled within buffer areas only on an as-needed basis. All poisons must be applied according to their label instructions by certified staff. The extent of ground squirrel control will be limited to areas where the animals pose a threat to operations of the installation or to human health. No ground squirrel measures should occur on unimproved lands. Care will be taken to prevent mortality to non-target species. Due to the sensitive nature of surrounding areas, risk of secondary poisoning, and requirements of AFI 91-212, all pesticide applications are subject to prior approval by the HQ PACAF entomologist.

7.4.12 Brown/Black Bear Conflicts

Brown bears and/or black bears are commonly found in and around most 611 ASG sites. Below are a few specific issues caused by these potentially dangerous bears.

Brown bears use USAF lands at *King Salmon Airport*. The potential remains for brown bear-human encounters/conflicts brought about by (1) improper disposal or storage of fish and wildlife carcasses, (2) improper refuse storage and disposal, and (3) casual, chance encounters, not necessarily food related. Many of these causes were greatly reduced with the reduction in number of personnel. While no formal bear management program is in place, measures are taken to minimize human-bear encounters. Dumpsters on the property have “No Fish” signs on them; base-generated food wastes are properly disposed; base personnel and visitors are warned of potential bear encounters; and efforts are made to minimize carcass disposal on base lands during hunting seasons.

A brown/grizzly bear in poor physical condition was killed at *Cape Lisburne LRRS* during 2004 while attempting to enter the main composite building (this was not a planned management action. Survival shelters along the road between Lower and Uppers Camps at *Indian Mountain LRRS* have been damaged by porcupines and grizzly/brown bears in the past. Emergency food is carefully stored and has not been found by the wildlife. Damage is infrequent and not an issue; repair costs have been minimized by covering most shelters with sheet metal.

Safety concerns related to waste disposal and attraction to bears could be an issue at *Cold Bay LRRS*. A large number of brown/grizzly bears can be found on refuge lands surrounding the LRRS. Waste is incinerated on-site in a smart ash incinerator and shipped to Anchorage for disposal (personal communication, P. Cooley 2007). The LRRS has a kitchen for the one BOS contract staff, and no dining and billeting facilities are available for visiting personnel. Therefore, the quantity of domestic refuse is low and not the type that attracts wildlife. If any food waste is placed outside the existing building, it must be in wildlife-proof containers until removal.

It is beyond the scope of this INRMP to provide extensive information regarding the prevention of bear encounters and minimization of risks associated with such encounters. Information in the *Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan* (Stout 2012, Appendix 7.4.5) is helpful for personnel working, visiting, or stationed at any 611 ASG site where bears may be encountered, especially means to avoiding attracting bears to the sites, such a food and garbage management. The following may be useful when working or visiting such sites (adapted from http://www.bigskyfishing.com/National_parks/glacier/bears2.shtm).

In general, such persons should:

- not venture outside alone;
- always be mindful of the potential for bear encounters; be alert; and
- avoid “smelly” colognes, sunscreens, food odors, etc..

If a bear, especially a brown bear is encountered, the following options may be useful.

- Never run; they can and often will try to catch you.
- If the bear appears curious (rearing on its hind legs, ears up), stand your ground and see if it leaves.
- If the bear appears aggressive (ears laid back), you have several options.
 - Attempt to slowly back away; drop a pack or something (not food) as the bear may stop to investigate it.
 - Drop and play dead, but be aware that even if a bear is simply checking out the “body,” it is likely to roll you over and bite you; this is a tough option, but it is time-proven. (Note. Do not attempt this with a black bear as they may decide to feed on you).
 - Hold your ground, which is not easy.
 - Climb a tree (brown bear only as black bears can climb), but trees must be VERY close and easily climbed.
 - Get off the trail; you may simply be in the way of a bear going down the trail.
- Other aggressive bear options include:
 - shooting the bear, but be aware that sidearms are virtually useless unless you have superb nerves and are an excellent shot; or
 - using bear spray in the face of the bear, but do not use if there is a head wind and be sure to close your eyes to protect them from the spray. This method has proven itself on many occasions.

7.4.13 Other Human-Wildlife Conflicts

Several potential human-wildlife conflicts exist at 611 ASG sites. The artificial feeding of predators (*e.g.*, foxes, bears, gulls) can have detrimental impacts on ground-nesting birds when predator populations become elevated or concentrated around a food supply. Impacts to predators are often lethal when animals become pests and must be destroyed. The USAF has a policy prohibiting its BOS contract staff, other contractors and subcontractors, military and civilian employees, employees of other agencies, and visitors to the 611 ASG sites from feeding and poisoning all wildlife. Personnel violating this policy can be barred from all 611 ASG sites, thus, resulting in loss of work. The prohibition of feeding and poisoning wildlife is also a violation of state law, and 611 ASG personnel will assist law enforcement agents in prosecuting offenders. This program will also help minimize bear encounters. McCaffery (2000) pointed out that personnel at *Cape Romanzof LRRS* fed wildlife in the past.

Similarly, dog and/or cat pets on a site can destroy nests and capture and kill unfledged young birds. Cats, in particular, have been documented to have a significant effect on bird and other wildlife mortality. Pet food left outdoors is an attraction to predators as well as a violation of state law. Pets are allowed at 611 ASG remote sites, but such pets require 611 ASG/CC approval. Pet owners are held accountable to ensure the animals do not engage in any wildlife harassment or take. There are plans to completely remove pets from 611 ASG sites.

Complete incineration of all food waste and proper disposal in the LRRS landfill is necessary. If any food waste is placed outside the existing buildings, it must be in wildlife-proof containers until removal to the landfill. Refuse placed in the landfill must be covered as soon as possible. Personnel in the vicinity of the landfill should exercise extreme caution.

Aircraft and sea vessels operating in the vicinity of the shoreline may disturb certain marine mammals at *Cape Newenham LRRS*. Injury and/or death often results due to trampling in response to such disturbances. Low-flying aircraft disturb marine mammals, sending them into the water from haulout sites. There is a need to avoid disturbances to marine mammals that haulout and nest along the Cape Newenham peninsula from April through October. In the past (prior to 1993), USAF aircraft were documented flying below 1,000 feet AGL, both around the cliffs of Cape Newenham and in the surrounding area on approach to and departure from the Cape Newenham landing strip. Air taxis from Dillingham, Anchorage, Bethel, and Nome were documented flying below 1,000 feet AGL in the area when chartered for Cape Newenham business (Archibeque 1993). This was still an issue in 1998 (personal communication, Rappoport and Wheeler 1998 in Jones Technologies, Inc. and Gene Stout and Associates 2000).

The issue of aircraft disturbance to marine mammals will continue to be addressed. The issue involves both stewardship and compliance. Pilots can be assessed civil and criminal penalties and imprisonment. USFWS personnel, as well as installation personnel, regularly observe the area for violations and will report violations to the USFWS, NMFS, and/or FAA enforcement personnel. Aircraft servicing the site should avoid flight below 2,000 feet AGL, except on arrival and departure from the landing strip, and should remain east of the site (left traffic for arrivals, right traffic for departures).

The following procedures are typically imposed on 611 ASG projects that could affect whales.

- The operator of a vessel inadvertently positioned within 1/4 nautical mile of a whale must immediately slow the vessel to ten knots or less, without shifting into reverse unless impact is likely. The operator must direct or maintain the vessel on as steady a course as possible away from the whale until at least 1/4 nautical mile of separation is established. Failure to take such action is prohibited.
- The operator of a vessel or seaplane positioned within 1/2 nautical mile of a whale is prohibited from altering course or speed in a manner that results in decreasing the distance between the whale and the vessel or seaplane.

The Air Force is educating pilots who use the runway about the sensitive nature of marine mammal haulout areas in the Cape Newenham area. Pilots are discouraged from approaching too closely to these haulout and nesting areas. The Air Force will continue to work to minimize disturbance, consistent with aircraft safety requirements. Walrus haulout site disturbance is addressed in the *Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan* (Stout 2012) (Appendix 7.4.5).

7.5 Management of Threatened and Endangered Species and Habitats

7.5.1 Policy and Background

The Endangered Species Act (Title 16 USC, sections 1531-1544) requires protection and conservation of federally listed threatened and endangered plants and animals and their habitats. Conservation includes the use of all methods and procedures that are necessary to bring any threatened and endangered species to the point where the measures pursuant to the Endangered Species Act are no longer necessary.

The goal of the 611 ASG threatened and endangered species management is twofold: (1) conserve and maintain self-sustaining populations of threatened and endangered species, consistent with military policy, mission sustainability, and carrying capacity of the ecosystem; and (2) avoid jeopardizing the continued existence of threatened and endangered species within 611 ASG sites.

Maintaining the environmental health of the landscape is essential for realistic and sustainable military training. A healthy ecosystem (including healthy populations of rare plant and animal species) is better able to withstand both natural and man-made disturbances. The focus is to maintain mission flexibility through the conservation and management of federal and state-listed species. Appendices 3.0, sections 5.4, *Threatened and Endangered Species* discuss the occurrence of rare, threatened, and endangered species on or near 611 ASG sites.

The minimization of disturbance to native vegetation with regard to military mission accomplishment and IRP activities is an important aspect of biodiversity conservation. The 611 ASG will consider federally-listed and other sensitive species with regard to activities occurring on 611 ASG lands, and the 611 ASG will coordinate with the USFWS to implement appropriate recommendations to the best of its capability with the understanding that critical military missions will not be compromised.

Table 5.4, *Threatened and Endangered Species Known to Occur or Potentially Occur on or near 611 ASG Sites* summarizes the distribution of threatened and endangered species on 611 ASG sites. Consultation with USFWS or NMFS regarding listed species will only be conducted by a qualified USAF biologist in the GS-0486 Wildlife Biologist or GS-0400 Biological Sciences position.

7.5.2 Threatened Eiders

Two species of Eiders, the Spectacled Eider and the Steller's Eider have undergone substantial population declines in Alaska. As a result, both species are listed as threatened under the Endangered Species Act. Historically, both species have bred in northwestern and northern Alaska in the general vicinity of 10 remote USAF radar sites (Day *et al.* 1995, Day and Rose 2000). More recent surveys suggest that the current range of the Steller's Eider in northern Alaska has been reduced primarily to the vicinity of Barrow (USFWS 1996; Larned *et al.* 1999; Quakenbush *et al.* 2000, 2002; Obritschkewitsch *et al.* 2001; Ritchie and King 2002).

USAF sponsored a study of threatened Spectacled and Steller's Eiders in 1994 (Day *et al.* 1995) and monitored sites with likely nesting areas in 2000, 2001, 2002, 2003, 2006, and 2007. During these surveys at 611 ASG sites in northern Alaska, only four active Spectacled Eider nests have been confirmed (Oasis Environmental, Inc. 2008). Of these, two nests have been observed at Point Lonely former SRRS. In 1994 a nest was located near the Point Lonely former SRRS facilities (Day *et al.* 1995). The second nest recorded at Point Lonely former SRRS was in 2003 (Schick *et al.* 2004). Also in 2003, the first confirmed Spectacled Eider nest at former Wainwright SRRS was documented near the southern property boundary (Schick *et al.* 2004). An active Spectacled Eider nest was found in the same wetland complex at Wainwright site in 2006 (Frost *et al.* 2007). A fifth Eider nest, possibly constructed by either a Spectacled or King Eider, was identified in 1994 at Oliktok LRRS (Day *et al.* 1995). No Spectacled Eider nests have been recorded during any of the five survey years at Point Lay former LRRS or former Bullen Point SRRS in 1994, 2000, 2002, 2003, 2006 (Day *et al.* 1995, Day and Rose 2000, Ritchie *et al.* 2003, Schick *et al.* 2004, Frost *et al.* 2007).

However, Oasis Environmental, Inc. (2008) found a failed Spectacled Eider nest at Point Lay former LRRS and one at Bullen Point former SRRS in 2007, as well as observed a Spectacled Eider hen at Bullen Point site and flushed four hens at Wainwright site. This 2007 monitoring effort did not locate any

active nests or observe Spectacled or Steller's Eiders at Oliktok LRRS, Point Barrow LRRS, or Lonely site. The Oasis Environmental, Inc. (2008) report includes a summary of Eider surveys at 611 ASG sites through 2007.

Aerial surveys regularly record Spectacled Eiders in the Oliktok LRRS area (personal communication, B. Anderson, ABR, Inc. in Schick *et al.* 2004; Ritchie *et al.* 2003). They also have been recorded at Bullen Point, Point Lonely, and Wainwright sites (Day *et al.* 1995, Ritchie *et al.* 2003). A possible Spectacled Eider brood was recorded at Point Lay site in 1994 (Day *et al.* 1995) (Schick *et al.* 2004).

Steller's Eiders have not been recorded nesting during five years of surveys at five radar sites beginning in 1994 (Day *et al.* 1995, Day and Rose 2000, Ritchie *et al.* 2003, Schick *et al.* 2004, Frost *et al.* 2007). Two Steller's Eider nests were found just to the southwest of USAF lands at the Point Barrow LRRS in 1995 (Quakenbush *et al.* 2000). No Steller's Eider nests have been found at Point Barrow LRRS during ground surveys conducted by USFWS since 1995, although nests have been found elsewhere in the Barrow area in some years (Frost *et al.* 2007).

A historical record of a nest near Pitt Point, which is adjacent to the Point Lonely site, is the closest record of Steller's Eider nesting for USAF sites in northern Alaska, other than Point Barrow LRRS. Recent observations of adults or their broods also are limited in the vicinity of 611 ASG sites in northern Alaska. A pre-nesting pair was observed at Point Barrow LRRS in June 2000 (Day and Rose 2000). A pair of molting females was recorded at Point Lonely site in August 1994 (Day *et al.* 1995), and a single male was recorded about five miles south of Point Lonely site in June 1995 (ABR, Inc. unpublished notes). In northern Alaska, the Point Barrow LRRS is the only 611 ASG site where Steller's Eiders are regularly recorded (Frost *et al.* 2007). However, Steller's Eiders have not been found nesting at the Point Barrow LRRS.

Guidelines from the USFWS for threatened and endangered species (USFWS 2004b) are included below to avoid disturbance to nesting Spectacled and Steller's Eiders. Below guidelines were intended to extend five years from the last observed occupation:

- Assess whether Spectacled or Steller's Eiders are likely to use the project area for nesting or brood-rearing. Contact USFWS for assistance. For projects conducted during the breeding season, a Service-approved survey for Spectacled and Steller's Eiders should be conducted in the year of construction, prior to initiation of activities.
- If Spectacled or Steller's Eiders nests are in the project area, the following activities require special permits within 200 meters (656 feet) of nest sites:
 - vehicle and foot traffic from May 20 through August 1, except on existing roads;
 - construction of permanent facilities, placement of fill, or alterations of habitat; and
 - introduction of high noise levels from May 20 through August 1, including but not limited to noise from airports, blasting, and compressor stations.

Eiders are present on breeding grounds from mid-May through mid-September, but activities any time of year may affect them through habitat modification.

The 611 ASG will coordinate with the USFWS and implement above recommendations to the best of its capability with the understanding that critical military missions will not be compromised. Above guidelines provide exceptions for existing roads, but not for existing USAF facilities, such as introduction of high noise at airfields and construction, maintenance, and demolition of radar sites. Coordination via review of the INRMP will also occur with NMFS since they are responsible for certain marine threatened

and endangered species. In the event a project may affect a marine threatened and endangered species USAF will coordinate in accordance with ESA.

As listed in the prior INRMP for the North Warning radar sites, Day *et al.* (1995) had several recommendations for future study of eiders on USAF remote sites. The recommendations have been satisfied.

Recommendation: The study should be extended for two additional years. **Response:** The 611 CES/CEVQ conducted eiders surveys at remote radar sites in 2000 (Day and Rose 2000), 2001 (Kendall *et al.* 2001), 2002 (Ritchie *et al.* 2003), and 2003 (Schick *et al.* 2004). The most recent Eider survey at 611 ASG sites in northern Alaska occurred in 2006. An active Spectacled Eider nest was found at Wainwright site in 2006 (Frost *et al.* 2007).

Recommendation: Future sampling should concentrate on only the “best” and “most suitable” habitats for eiders. **Response:** The USAF agrees with this recommendation. However, Wainwright site has not been eliminated from study of eiders although suitable habitats cover little of the site. Barter Island, Tin City, Kotzebue, and Cape Lisburne LRRSs have been eliminated for future study of Steller’s and Spectacled Eiders.

Recommendation: The USAF should prepare maps that delineate areas of “high”, “moderate”, and “low” suitability for nesting Spectacled Eider and Steller’s Eider. **Response:** Figures 5.4 in appendices 3.0 for Oliktok and Point Barrow LRRSs and Bullen Point, Point Lonely, Wainwright, and Point Lay sites, sections 5.4, *Threatened and Endangered Species* show this information. These figures are taken from the *Spectacled and Steller’s Eiders Surveys and Habitat Mapping at U.S. Air Force Radar Sites in Northern Alaska* (Schick *et al.* 2004).

Day *et al.* (1995) specifically included Tin City, Kotzebue, and Cape Lisburne LRRSs. The USAF has no confirmed nesting Spectacled or Steller’s Eiders at these sites, and Day *et al.* (1995) concluded, *there is little chance for Spectacled Eiders (or Steller’s Eiders) to nest at any of the three southernmost sites and there are few suitable habitats for nesting or brood-rearing (for either species) at any of the three southernmost sites.*

Cape Romanzof LRRS is in the migration route of Steller’s Eiders and in the current breeding range of Spectacled Eiders. Steller’s Eider critical habitat occurs about 10 miles south of Cape Romanzof. Steller’s Eider wintering and molting areas occur about 12 miles east and 14 miles northeast of Cape Newenham LRRS. Cold Bay LRRS lies about 2-3 miles east of Steller’s Eider critical habitat (wintering and molting) Izembek Lagoon Unit (USFWS 2004b).

Wildlife habitat maps developed as part of surveys discussed above have been used as a starting point in a program geared towards an ecosystem approach to land management of USAF properties. These wildlife habitat characterizations at 611 ASG sites on the North Slope led to delineation of high value Spectacled Eider nesting habitats on six 611 ASG sites (above paragraph). This has become an effective management tool for scheduling work and ensuring project actions affecting the nesting of threatened eiders.

This approach could be augmented by monitoring efforts for a few additional, select species, such as the Steller’s Eider. Although there is not enough information to establish and delineate Steller’s Eider high value habitat, Point Barrow LRRS habitats for nesting Steller’s Eiders could be characterized, as has been done for Spectacled Eiders. However, this would require inferences for Point Barrow LRRS based on data

collected at other North Slope sites, or in the case of Steller's Eiders, inferences based on the work of the USFWS and others in the Barrow area (Frost *et al.* 2007).

The wildlife habitat maps could have several uses in an ecosystem management program, including, but not limited to, (1) determining the aerial extent of habitats that are suitable for monitoring certain species of conservation concern, (2) determining the aerial extent of habitats that are in need of restoration because they have been altered by human activities, and (3) serving as base map layers for an overall land management protocol (Schick *et al.* 2004). Data on habitats of nests collected during ground surveys at these sites may be used in conjunction with habitat maps produced in 2003 (Schick *et al.* 2004) and 2005 (Frost *et al.*, 2005a and 2005b) to identify 611 ASG lands that are of relatively high value to nesting birds, including, but not limited to, threatened eiders.

ABR Inc. explored the use of wildlife habitat maps to analyze patterns of habitat use for 12 waterbird species that regularly nested in habitats that are prioritized during ground surveys for nesting eiders using 2006 survey data. Such analysis may be valuable in developing management protocols for these sites. By associating nest locations with wildlife habitats in a GIS database, summaries of nest-habitat associations for five USAF remote radar sites have been produced (Frost *et al.* 2007).

Frost *et al.* (2007) had the following recommendations.

- To minimize the overall impact to nesting waterbirds, including threatened eiders, future USAF activities should minimize disturbance to habitats with relatively high nesting use, particularly those with relatively low areal extents (e.g., Shallow Water with Islands or Polygonized Margins, Lowland Aquatic Grass Marsh). Also, because the areal extent of mapped waterbodies is far greater than the actual extent of potential nest sites associated with shorelines and islands, future USAF activities should minimize disturbance to waterbody shorelines.
- Management protocols prioritize certain locations on USAF lands at which recurring use by birds of conservation concern has been observed. For example, recent nest records of Spectacled Eider in a single Old Basin Wetland Complex at Wainwright site suggest that this specific habitat patch should be prioritized.
- Specific habitat patches that are regularly used by birds of conservation concern during life cycles other than nesting are prioritized. For example, coastal habitats in the eastern portion of Oliktok LRRS, although used irregularly by Brant for nesting, are regularly used by Brant for brood-rearing.

It is anticipated that future surveys for threatened eiders at 611 ASG North Slope sites will help identify particular habitat patches on USAF lands for which recurring patterns of avian use exist and will establish more robust waterbird nest-habitat associations in general. Used in conjunction with existing wildlife habitat maps, this information should assist in the development of sound management protocols for ecosystems at USAF radar sites in northern Alaska (Frost *et al.* 2007).

The mapped delineation of high value Spectacled Eider nesting habitat has become an effective management tool for scheduling work and ensuring project actions avoid affecting the nesting of threatened eiders. Included are Clean Sweep (demolition and environmental restoration) projects and maintenance at Oliktok LRRS (2006-2007), Point Barrow (2011), Bullen Point (2007), Point Lay (2005 and 2006), and Point Lonely (2006-2010), as cited in Gene Stout and Associates and Blythe & Trousil 2007a, 2009.

Future activities at these 611 ASG sites within 200 meters of the nesting habitat will consider measures to avoid adversely affecting pre-breeding and nesting threatened eiders. Measures include covering the habitat with geo-fabric prior to 1 June and twice daily using heavy equipment on the adjacent developed area as well as personnel walking the perimeter of the landfill expansion twice daily until the nesting period is completed. By using this method within 200 meters of nesting habitat prior to the start of earthmoving and other heavy construction noise that can only begin after the spring thaw, tolerant eiders would acclimate to human activity and other less tolerant eiders would be discouraged from nesting near the activities.

Steller's Eider Critical Habitat

Critical habitat has been designated for the Steller's Eider in one terrestrial and four marine areas of Alaska: the Yukon-Kuskokwim Delta Nesting Unit, the Kuskokwim Shoals Unit, the Seal Islands Unit, the Nelson Lagoon Unit, and the Izembek Lagoon Unit. These areas contain physical and biological elements essential for the conservation of the species [*Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for the Alaska-Breeding Population of the Steller's Eider* (Federal Register, Feb 2, 2001, Vol. 66, Number 23, P. 8849-8884)]. The Alaska breeding population of Steller's Eider was federally-listed as threatened in 1997 (USFWS 2004a).

No 611 ASG sites occur immediately adjacent or within designated Steller's Eider critical habitat. Cold Bay LRRS is within the Pavlof Unit of Alaska Peninsula NWR, five miles northwest of the community of Cold Bay and 2-3 miles east of the Izembek Lagoon Unit of critical habitat. There may be a record of a Steller's Eider hitting the radome since it was moved. At this site, as with other 611 ASG sites, as lighting is upgraded, there will be considerations to install green lights and/or to either shield lights or orient them downward to minimize such risks.

Port Heiden Site is about 33 miles north of the Seal Islands Unit. The Seal Islands Unit includes all waters enclosed within the Seal Islands Lagoon and marine waters ¼ mile offshore of the islands and adjacent mainland between 159 deg. 12' W and 159 deg. 36' W. Thousands of Steller's Eiders molt in the Seal Islands Unit, including at least one individual known to be from the listed, Alaska-breeding population (Federal Register, Feb 2, 2001, Vol. 66, Number 23, P. 8849-8884).

Known Steller's Eider winter and molting distribution (USFWS 2004a) includes areas near Port Heiden, Driftwood Bay, and Nikolski sites. Steller's Eiders do not occur on the sites proper; rather, they may occur in the marine waters near the sites.

7.5.3 Marine Mammals

Section 5.4.2, *Species Protected by the Marine Mammals Protection Act* lists threatened and endangered marine mammals occurring near 611 ASG sites. These marine mammals, with exception of polar bears and ringed and bearded seals (haulouts), do not occur on 611 ASG sites proper; rather they may occur in the marine waters near the sites. These seals were listed (effective February 26, 2013) as this INRMP was being signed. The 611 ASG will be developing and implementing any measures not already being taken to avoid significant effects on these seals.

In addition, the USFWS completed a finding that concluded listing the Pacific walrus as an endangered or threatened species is warranted (76 Federal Register 7634 [February 10, 2011]), but precluded by the need to address higher species priorities nationwide. The USFWS is scheduled to consider the walrus for listing in 2017. The Pacific walrus has haulouts on some 611 ASG sites (Table 5.4).

7.5.4 Aleutian Shield-Fern

The federally-endangered Aleutian shield-fern (*Polystichum aleuticum*) is a small tufted fern which grows to about six inches tall. The Aleutian shield-fern is known to exist only on Adak Island in the central Aleutian Islands (USFWS 2004a). No 611 ASG sites are located on Adak Island.

7.5.5 Candidate Species

Kittlitz's Murrelet

The Kittlitz's Murrelet (*Brachyramphus brevirostris*) was federally-listed as a candidate species in May 2004 (personal communication, C. Sterne, USFWS 2004). Kittlitz's Murrelets are small diving birds related to Puffins, Murres, and Auklets; however, they are one of the rarest and least known seabirds in North America. Most of the world's population occurs in Alaska's waters, migrating between winter offshore and summer inshore regions. Kittlitz's Murrelets winter range appears to include mid-shelf waters offshore and occasionally near shore in a few Southcoastal Alaska locations. Main breeding locations are from the lower Kenai Peninsula to an area near Brady Glacier in Southeast Alaska (Kuletz 2004). These main breeding locations do not occur near any of the 611 ASG sites. Day and Stickney (1996) describe the life history, nesting habitat, and known distribution of the Kittlitz's Murrelet in the vicinity of four remote USAF sites in Alaska.

Kittlitz's Murrelet was confirmed on 14-18 July 1995 by Day and Stickney (1996) as a nester at the Tin City LRRS. One nest was located on the western side of Paulina Creek and contained a chick. One bird was flushed from another, unlocated nest. Nesting habitat at Tin City LRRS was rated as good to excellent, with the best nesting habitat below 1,600 feet above msl. They found no evidence of previous use, suggesting no reuse. It is in the USAF's best interests to voluntarily protect this species and its habitat at Tin City (Day and Stickney 1996). Maintenance on the tram and road to Top Camp passes through nesting elevations but does not disturb the nesting habitat.

Cape Lisburne was examined for Kittlitz's Murrelets on July 18-20, 1995. The presence of brown bears and extreme winds at Upper Camp made it impractical to sample that area. No nests were found, but one bird was observed flying down Selin Creek and out to sea. Nesting habitat at Cape Lisburne LRRS was rated as marginal by Day and Stickney (1996), but greater expanses of suitable habitat apparently occur inland from the LRRS. The Kittlitz's Murrelet probably does not nest on the LRRS but does nest nearby. No protective measures or further research were recommended for Cape Lisburne LRRS.

No nests were found by Day and Stickney (1996) during their Cape Romanzof visit on July 8-10, 1995. Nesting habitat at Cape Romanzof LRRS was rated as unsuitable. The Kittlitz's Murrelet almost certainly does not nest on the LRRS. They have not been recorded anywhere in or near the Askinuk Mountains. No protective measures or further research were recommended for Cape Romanzof LRRS.

Cape Newenham was visited on July 5-8, 1995 by Day and Stickney (1996). No nests were found. Nesting habitat at Cape Newenham LRRS was rated as unsuitable. The Kittlitz's Murrelet almost certainly does not nest on the LRRS. They have not been recorded at or near Cape Newenham LRRS. No protective measures or further research were recommended for Cape Newenham LRRS.

Day and Stickney (1996) proposed protective measures for nesting Kittlitz's Murrelets, specifically for Tin City LRRS. The bird can nest successfully within 1,600 feet of existing facilities and can possibly nest as close as 600 feet if disturbance levels are low. Proposed protective measures are as follows:

- Minimize ground-level activities within identified areas of suitable nesting habitat during June-August.
- If ground-level activities must occur during this period, conduct ground-based surveys for nesting birds prior to such activities to verify nesting, and map areas to be avoided. Surveys should be conducted by a qualified biologist.
- If ground-level activities must occur during this period, minimize ground-level disturbance within a protective distance of known or probable nests. This distance will vary, depending on the type of disturbance and the level of visual and/or auditory disturbance that it causes. For example, walking humans should stay at least 300 feet from these locations, whereas small truck driving should occur no closer than 600 feet. Extreme visual and auditory disturbance (e.g., heavy equipment operation) should be kept at least 1,300 feet from a known or suspected nest.
- If a previously used nest occurs within an area to be disturbed and the nest is unoccupied in a particular year or has reproductively failed, ground-level activities may proceed as if no nests occur in that area. However, habitat modification should be minimized within suitable nesting habitat, particularly within 300 feet of such a location.
- If possible, permanent facilities should not be constructed within suitable nesting habitat. If such construction must occur, it should be at least 300 feet from known or probable nest sites. Tramway cables may be strung closer than 300 feet from nests. Construction should occur before June or after August, if possible.

The Kittlitz's Murrelet study was recommended for an additional year at Tin City LRRS by Day and Stickney (1996). They cite the LRRS as one of the best sites in North America, if not the world, to study this species. The nest found at Tin City LRRS in 1995 was only the 19th known nest documented in the world; a few nests have been found at locations mostly in the Gulf of Alaska and Southeast Alaska in the past decade (personal communication, R. Day 2007).

7.5.6 Rare Plant Species

Lipkin (1999) described in detail the three rare plant species at Tin City LRRS; Bering Sea wormwood (*Artemisia senjavinensis*), Arctic springbeauty (*Claytonia arctica*), and Chukchi primrose (*Primula tschuktschorum*). Although none appeared to be imminently threatened by activities at the LRRS, repairs, maintenance, or demolition beneath the tramway or upstream of the water gallery could adversely impact Arctic springbeauty and Chukchi primrose populations. Prior to any activities that may impact these populations, plans are to be provided to the 611 CES/CEAN Manager, and alternatives shall be considered. Since the Bering Sea wormwood does well on disturbed roadside gravel sites, it is not expected to be adversely affected by construction activities, including demolition and road maintenance. Arctic springbeauty and Chukchi primrose are not near areas of high activity, but managers should endeavor to direct any future construction activity or vehicle traffic away from sites where these two species exist (Lipkin 1999). Demolition of abandoned facilities occurred prior to or during 2000 (personal communication, K. Barnack 2007).

An issue identified for Kotzebue LRRS in 1993 was the presence of Barneby's milkvetch (*Oxytropis arctica* var. *barnebyana*), a then Category 2 candidate species. This species was known to occur only in the Kotzebue area, and periodic surveys of the LRRS were recommended to document the presence or absence of the species. This species has since been confirmed on the LRRS. Thus, the issue has shifted from confirmation to protection. In 1996 inventories of potential habitat at No Name and North Fork tributaries of the Squirrel River located an estimated 14,282 plants at the No Name and 1,400 at the North Fork (Moran 1997). In light of the discovery, the rank of Barneby's milkvetch was reduced from critically imperiled as a rare plant to imperiled in state (Moran 1997). The USAF sponsored a study of plant

genetics on Barnaby's milkvetch (Jorgensen *et al.* 2003). Barneby's milkvetch seeds have been collected, cleaned, and stored until they were broadcast sown at the various sites in 2002. Broadcast seeding of Barneby's milkvetch appears to be the most cost effective way to enhance populations (Moore 2004). Moore (2004) recommended monitoring known populations of Barneby's milkvetch transplant and seeded areas for their viability every two to three years. These efforts should increase the success of Barneby's milkvetch in the area.

Rumex (*Rumex krausei*) is possible at Cape Lisburne and Tin City, and Chukchi primrose is possible at Tin City. These species are all former Category 2 plants. Lipkin (1999) found Chukchi primrose at two Tin City locations but did not find Rumex at either Cape Lisburne or at Tin City.

7.5.7 Bald Eagle

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940 and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Federal agencies are required to support the intent of the Bald and Golden Eagle Protection Act by integrating conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on eagles when conducting agency actions.

The USFWS (2007b) developed *National Bald Eagle Guidelines*. In developing these guidelines, USFWS relied on existing state and regional Bald Eagle guidelines, scientific literature on Bald Eagle disturbance, and recommendations of state and federal biologists who monitor impacts of human activity on eagles. Despite these resources, uncertainties still remain regarding effects of many activities on eagles and how eagles in different situations may or may not respond to certain human activities.

To avoid disturbing nesting Bald Eagles, USFWS makes the following general recommendations: (1) keeping a distance between the activity and the nest (distance buffers), (2) maintaining preferably forested (or natural) areas between the activity and around nest trees (landscape buffers), and (3) avoiding certain activities during the breeding season. Buffer areas minimize visual and auditory impacts associated with human activities near nest sites. Ideally, buffers would be large enough to protect nest trees and provide for alternative or replacement nest trees. The 611 ASG will consider the use of these Guidelines in any actions that might affect eagle nests on or near its sites.

The USFWS announced a final rule on two new permit regulations to allow for the take of eagles and eagle nests under the Bald and Golden Eagle Protection Act. The final rule (50 CFR Parts 13 and 22 Eagle Permits: Take Necessary to Protect Interests in Particular Localities) was published in the Federal Register on September 11, 2009. The permits authorize limited, non-purposeful take of Bald Eagles and Golden Eagles, authorizing individuals, companies, government agencies (including tribal governments), and other organizations to disturb or otherwise take eagles in the course of conducting lawful activities, such as operating utilities and airports. Most permits issued under the new regulations would authorize *disturbance*. In limited cases, a permit may authorize the physical take of eagles, but only if every precaution is taken to avoid physical take. Removal of eagle nests would usually be allowed only when it is necessary to protect human safety or the eagles. In the unlikely event that take of eagles or removal of eagle nests become necessary, the 611 ASG would apply for a take/removal permit by coordinating with USFWS for technical assistance in assembling the permit application.

7.5.8 Species at Risk

Species at risk should be proactively managed to prevent Endangered Species Act listings that could severely degrade military mission readiness. Species at risk are official candidates for Endangered Species Act listing, classified by NatureServe as critically imperiled or imperiled on a global scale, and/or a concern for Endangered Species Act listing in the foreseeable future.

7.5.9 Critical Habitat Considerations

The Endangered Species Act was revised (ESA Section 4(a)(3)(b)(i)) via the National Defense Authorization Act of 2004, which states that, “*The Secretary [of the Interior] shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation.*” The USFWS has determined that, where applicable, federal critical habitat designation is not warranted if the INRMP includes the following three criteria⁹:

1. *The plan provides a benefit to the species.* Cumulative benefits of the management activities identified in a management plan, for the length of the plan, must maintain or provide for an increase in a species’ population or the enhancement or restoration of its habitat within the area covered by the plan [*i.e.*, those areas deemed essential to the protection of the species]. A benefit may result from reducing fragmentation of habitat, maintaining or increasing populations, ensuring against catastrophic events, enhancing and restoring habitats, buffering protected areas, or testing and implementing new strategies.

2. *The plan provides certainty that the management plan will be implemented.* Persons charged with plan implementation are capable of accomplishing objectives of the management plan and have adequate funding for the management plan. They have the authority to implement the plan and have obtained all necessary authorizations or approvals. An implementation schedule (including completion dates) for the management effort is provided in the plan.

3. *The plan provides certainty that the management effort will be effective.* The following criteria will be considered when determining the effectiveness of the management effort. The plan includes (1) biological goals (broad guiding principles for the program) and objectives (measurable targets for achieving the goals); (2) quantifiable, scientifically valid parameters that will demonstrate achievement of objectives and standards for these parameters by which progress will be measured are identified; (3) provisions for monitoring and, where appropriate, adaptive management; (4) provisions for reporting progress on implementation (based on compliance with the implementation schedule) and effectiveness (based on evaluation of quantifiable parameters) of the management effort are provided; and (5) a duration sufficient to implement the plan and achieve benefits of its goals and objectives.

⁹ As stated in, Office of the Under Secretary of Defense. October 10, 2002. Memorandum. *Implementation of Sikes Act Improvement Act: Update Guidance.*

Section 7.5.2, *Threatened Eiders* describes 611 ASG actions to protect and manage Steller's and Spectacled eiders on or near 611 ASG sites. These actions include ecological studies, survey and monitoring, protection of eider habitat, regular monitoring of habitat changes, protection of eiders and their nests, and implementation of USFWS recommendations regarding these species. Section 7.4.5, *Polar Bear Interaction Reduction* and the development, updating, and implementation of the *Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan* (Stout 2012) (Appendix 7.4.5) describe 611 ASG actions to protect polar bears and minimize occurrence and impacts of human-polar bear interactions. These species-specific and other actions described in this INRMP will provide a cumulative benefit to federally listed species.

The Commander, 611 ASG has the authority to implement the plan, which will be accomplished by the Natural Resources Program Element, as scheduled and budgeted. Formal adoption of an INRMP by the Commander, 611 ASG constitutes a commitment to seek funding and execute, subject to the availability of funding, projects and activities in accordance with specific timeframes identified in Chapter 8, *Management Goals, Objectives, and Projects*. Under the Sikes Act, this INRMP must be implemented (subject to availability of funds). Failure to implement the INRMP is a violation of the Sikes Act and may be a source of litigation. Annual reporting on implementation of the current INRMP to both the USFWS and ADFG has documented the commitment of the 611 ASG to acquire funding and implement the INRMP.

Goals, objectives, and long-term ecosystem needs, based on land-use sustainability for the 611 ASG military mission, have been analyzed and considered extensively in collaboration with regulatory agencies. Section 2.4.3, *Ecosystem Management Principles* lists general 611 ASG natural resources goals and objectives used to attain them.), and program-specific goals, objectives, actions, and projects are established within the plan (Chapter 8 and Appendix 9.1, *Work Plans*). Implementation monitoring will occur jointly by the 611 ASG, USFWS, and ADFG on a regular basis, as described in Section 9.4, *Monitoring INRMP Implementation*.

Critical habitat has been designated for three threatened species that occur on 611 ASG sites, namely the Steller's Eider, Spectacled Eider, and polar bear. In all cases, 611 ASG sites were excluded from critical habitat designation, significantly based on the 611 ASG having a legally operative INRMP that benefits each of these species. This INRMP is an update and combination of four previous INRMPs and continues the protection and benefits afforded to all threatened and endangered species present on 611 ASG sites.

7.6 Water Resources Protection

Water quality monitoring and management are required to comply with the Clean Water Act and other environmental laws and regulations. Also AFI 32-7064 specifies that land management activities use applicable best management practices to minimize non-point sources of water pollution. Water quality reflects environmental pollution, including erosion. Maintaining clean water is a critical part of ecosystem management.

Section 4.5, *Hydrology* and associated site-specific appendices 3.0, sections 4.5 discuss surface water resources on 611 ASG sites. Figures 5.2 in some of these site-specific appendices show significant surface water features.

Surface water management at 611 ASG sites consists of maintaining and improving water quality. This requires the continued remediation of hazardous waste sites, particularly fuel seeps, through the IRP, discussed in Section 7.14, *Installation Restoration Program, Demolition Program and Related Concerns*.

Some sites are scheduled for Clean Sweep activities (see Section 7.14); other sites may experience construction of new facilities (e.g., potential wind turbines, new buildings); and most have experienced disturbance to one degree or another, all of which may have resulted in erosion and disturbance to vegetation. Decreasing erosion through revegetation of disturbed areas and restricting ATV use to established roads will enhance efforts to maintain and improve water quality at these sites. Maintaining and improving surface water quality will protect fisheries habitat within and near 611 ASG sites. Section 7.8, *Grounds Maintenance, including Revegetation and Erosion Control* also applies to water resources protection at sites.

Surface water management at Eareckson AS consists of limiting activities in the watershed area to those that would not adversely affect flow pattern, volume, or water quality serving the infiltration gallery and collection system. This requires the continued remediation of hazardous waste through the IRP. Recommendations provided by Woodward-Clyde (1995a) to protect the flow pattern, volume, and water quality serving the infiltration gallery remain applicable and include:

- close or severely restrict road use within the water gallery,
- develop no new facilities or activities within the watershed area, and
- use Aircraft Hangar 4 (Buildings 701 and 702), located in the center of the watershed, for storage of nonhazardous, non-contaminating materials, which is being accomplished.

Nearly half of the roads in the watershed area have been removed from use and revegetated. No new facilities or activities were added to the area. Hangar 4 is scheduled for removal in 2012, pending final approval.

Fish species in Fowler (Nilumat) Creek are not used to any great extent by Cape Romanzof LRRS personnel. It was recommended that operations at the LRRS site continue in a manner that does not negatively impact the water quality of Fowler (Nilumat) Creek. The intertidal zone of Kokechik Bay is important spawning habitat for Pacific herring (Dolezal 1993). Any disruption or construction within the intertidal zone should be discouraged.

The management of fishery resources of Kuskokwim Bay is under the jurisdiction of the ADFG. Although a fishery management plan is not necessary for Cape Newenham LRRS, the operation and maintenance of the site should be continued in a manner that does not negatively impact the water quality of the on-site stream that empties into Kuskokwim Bay (Woodward-Clyde, Inc. 1995e).

Freshwater waterways containing anadromous fish are protected through Alaska statutes. Pursuant to AS 41.14.840 and 14.870, activities impacting water bodies that are important to resident and/or anadromous fish may require a permit from the Alaska Department of Natural Resources, Office of Habitat Management and Permitting and the Army Corps of Engineers. At Cold Bay LRRS projects could include, but are not limited to, construction, road crossings, gravel removal, placer mining, culvert placement, use of vehicles or equipment in the waterway, and bank stabilization.

7.7 Wetland and Flood Plain Protection

7.7.1 Wetlands

Wetland delineation is used to identify and map areas under the jurisdiction of the Clean Water Act. Most current definitions, including the Corps of Engineers *Wetland Delineation Manual* (Environmental Laboratory 1987), generally characterize wetlands by the presence of wet (or hydric) soils, wetland

hydrology, and the presence of plants specifically adapted to habitats that are inundated or saturated (hydrophytic vegetation).

Any federal facility potentially affecting wetlands and any federal agency or department granting licenses or permits relating to wetlands must comply with Executive Order 11990 (1977) and Section 404 of the Clean Water Act. Section 1 of Executive Order 11990 states, “*Each agency shall provide leadership and shall take action to minimize destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency’s responsibilities....*”.

The Fish and Wildlife Coordination Act (P.L. 85-264) requires federal agencies that propose, or are authorized, to undertake the impoundment, diversion, deepening, or other control or modification of any stream or body of water (including wetlands), or which are asked to approve such activities, to provide equal consideration to wildlife conservation throughout the planning and decision-making process. The Act requires such agencies to first consult with state and federal wildlife agencies.

Wetlands are recognized as critical resource areas, providing the following benefits:

- breeding grounds for fish and shellfish,
- critical habitat for waterfowl and mammals,
- reduced pollution via natural filtering mechanisms, and
- lessened potential for flooding.

Under AFI 32-7064, the Air Force is instructed to comply with all federal and state regulatory requirements, as well as to inventory and monitor wetlands. The following guidelines from the *Department of Defense Management of Cultural and Natural Resources Manual* (Department of Defense 1992) are recommended for the management of wetlands at 611 ASG sites.

Step 1- Survey all USAF installation land to determine if jurisdictional wetlands are present and establish their status and condition. The USFWS can provide assistance in wetlands delineation, particularly as site-specific development projects are considered.

Step 2- Develop management plans, such as the Base Comprehensive Plan, to guarantee that current and future development will protect and enhance existing wetlands.

Step 3- Consult with the U.S. Army Corps of Engineers for a Section 404 permit whenever proposed activities potentially affect a wetland. In such cases, the Environmental Protection Agency and appropriate federal, state, and local agencies should also be consulted.

State regulations include 18 AAC 70 Alaska Water Quality Standards permits issued by the State of Alaska Department of Environmental Conservation. The State of Alaska Department of Natural Resources, Division of Land requires a land use permit when any activity occurs near or on state lands or stream beds under AS 38.05.850.

Any projects planned (expansion or demolition) should minimize impacts to wetlands. USAF policy requests pre-application meetings prior to applying for Corps of Engineers Section 404 permits. When wetlands are impacted, AFI 32-7064 requires a Finding of No Significant Impact at the conclusion of an Environmental Assessment or a Record of Decision, either of which must include a Finding of No Practical Alternative (FONPA).

Section 5.5, *Wetlands* summarizes wetland delineation work at 611 ASG sites. Appendices 3.0, sections 5.5, *Wetlands* describe wetlands at each 611 ASG site. National Wetlands Inventory mapping and field work have been completed for all 611 ASG sites (Section 5.5, *Wetlands*). These maps provide the primary means to identify threats to wetlands on 611 ASG sites, but individual delineations may be required for specific demolition or construction activities.

7.7.2 Flood Plains

Flood plain management by the 611 CES/CEAN is based primarily on Executive Order 11988, *Flood Plain Management*, and AFI 32-7064, *Integrated Natural Resources Management*. Proper flood plain management is designed to ensure the safety of USAF facilities and operations from flooding, provide for human safety, and protect the environment, particularly regarding the use and storage of POL and hazardous materials relative to flood plains.

A FONPA must be prepared before any action within a flood plain may proceed. The USAF must consider the full range of practicable alternatives which will: 1) meet justified program requirements, 2) be within legal authority of the USAF, 3) meet technology standards, 4) be cost effective, 5) not result in unreasonable adverse environmental impacts, and 6) meet other pertinent factors. After completion of the FONPA, it should be inserted into an associated Finding of No Significant Impact or Record of Decision. The Chairperson of Headquarters Pacific Air Forces (HQ PACAF) environmental protection committee is the approval authority for Findings of No Significant Impact documents containing FONPAs for flood plains.

AFI 32-7064 requires the 611 ASG to design or modify actions within flood plains to minimize the potential for harm to or within flood plains. If a proposed action alters flood hazards on a National Flood Insurance Program map, the installation must submit an analysis of those changes to the Federal Emergency Management Agency.

The U.S. Army Corps of Engineers (1998) completed flood plain identification and mapping for Eareckson AS and King Salmon Airport, and Legare (1998) did the same for LRRSs and some former SRRSs. The objective of the investigations was to determine whether flood hazards existed at each of the sites, and if a hazard existed, to determine the 100-year flood plain. Most radar sites are at remote locations where local watercourses are not gauged nor levels recorded, and most have no long-term residents who can recall a history of flood events. Detailed determinations of the flood plains of the ungauged streams and lakes would be costly. Narratives discussing flood plains and elevations of LRRSs are in appendices 3.0, sections 4.4.2, *Flood Plains* for all active and former LRRSs and SRRSs. Maps showing the flood plains of Shemya Island are in Appendix 3.0-Eareckson, Appendix A. Maps of other sites are in U.S. Army Corps of Engineers (1998) and Legare (1998). Flood plain evaluations of other sites have not yet been completed.

7.8 Grounds Maintenance, including Revegetation and Erosion Control

Grounds Maintenance in this section includes traditional functions (*e.g.*, mowing, weed and other vegetation control), and it also includes erosion control and revegetation.

7.8.1 General

In accordance with AFI 32-7064, Air Force land management activities must consider the protection and enhancement of desirable natural and man-made features in the landscape. Grounds maintenance and landscaping includes water conserving landscape design, use of native or regionally adapted plants in developed areas, reduction of fertilizer and pesticide use, and weed control. It is Air Force policy that environmentally and economically beneficial landscaping practices be used, per Executive Order 13148,

Greening the Government through Leadership in Environmental Management and as outlined in a Presidential Memorandum (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 similar practices;
- implement water efficient practices; and
- create outdoor demonstrations incorporating native plants and other similar practices.

Revegetation

The Eleventh Air Force and the Alaska Department of Natural Resources have a Cooperative Agreement for the Protection, Development, and Management of Vegetation Resources of Air Force Installations, Alaska (Nov. 5, 1996). This Agreement is a mechanism for the Department of Natural Resources to provide advice to the Air Force in matters pertaining to revegetation, reclamation, and erosion control. The Agreement reiterates the requirement for Air Force, USFWS, and ADFG approval prior to the introduction of exotic plants and animals on installations. The Air Force agreed to minimize impacts to vegetation resources on installations according to installation natural resources management plans (this INRMP). Most other items of agreement between the Department of Natural Resources and the Air Force are similar to those between the Air Force, the USFWS, and ADFG (Appendix 2.4.2).

Guidance for reseeding projects is provided in *A Revegetative Guide for Conservation Use in Alaska* (University of Alaska Fairbanks 1991). Wright (2008) prepared *A Revegetation Manual for Alaska*, which includes site planning, site preparation, methods, cultivars and species, region-specific recommendations, fertilization, equipment, mulching and matting, and natural revegetation. These guides are used by the 611 CES to determine seed mixtures, seeding rates, and site preparation on a project-by-project basis to ensure optimal results. Additional technical support is available from the Alaska Plant Materials Center, U.S. Department of Agriculture Natural Resources Conservation Service, and the University of Alaska Cooperative Extension Service.

The BLM has found that natural revegetation is easily accomplished when water and wind erosion are controlled on small or narrow disturbed areas. Larger areas may require the surface to be roughened or may require the installation of deflector dikes and staked organic materials, such as straw or excelsior pads, to provide suitable revegetative habitats for native species (Buckle 1993).

Natural revegetation of disturbed areas is recommended for areas not subject to water or wind erosion or heavy human use. Taking no action in disturbed areas can result in seeds from willow and balsam poplar germinating and sprouting, given the right conditions (Sousa 1994).

General revegetation recommendations for Interior areas, provided by the Alaska Plant and Materials Center and the BLM include:

- Revegetation materials for areas subject to water or wind erosion, such as housing/industrial areas, should use only vegetative species endemic to the area.
- Seeding rates for revegetation projects will be determined on a site-specific basis.
- Fertilizer concentrations and application rates will depend upon local conditions.
- Watering is not needed if planting can be timed with the rainy season, or the site can be planted and left without watering until there is enough moisture to promote germination. If watering is

started during the dry season, it should be continued until the seed germinates and becomes well established or until it begins to rain.

- White spruce and willows may be used for revegetation and can be planted as seedlings or sprigs.

Erosion Control

Erosion control is required to comply with the Clean Water Act and the Sikes Act, which requires “no net loss” in the capability to support the military mission. Conducting erosion control and stream bank stabilization is required by Public Law 106-65 (Military Land Withdrawal Act) as mitigation for the Land Withdrawal Legislative Environmental Impact Statement and Public Law 86-797 (Sikes Act Improvement Act) to implement the INRMP. Also AFI 32-7064 requires that land management programs include soil erosion control.

7.8.2 Invasive Species

The Committee for Noxious and Invasive Plant Management in Alaska defines an invasive species as: (1) non-native to the ecosystem under consideration, and (2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112). Laws, orders, directives, policies, and regulations that affect grounds maintenance and landscaping on 611 ASG lands include:

- Executive Order 13112, Invasive Species requires all federal agencies to prevent the introduction of invasive species, to provide for their control, and to minimize economic, ecological, and human health impacts that invasive species may cause. Invasive species can be a threat to natural resources, impact local economies, and adversely affect the military mission.
- National Invasive Species Management Plan (2001), which includes DoD goals to prevent and control invasive species as well as restore lands with native species; and
- DoD directives 4715.1 and 4715.03, which require military services to protect, preserve, and restore the natural environment using regionally native plants for landscaping.
- AFI 7064, which requires installations, to the extent practicable and permitted by law, to not authorize, fund, or carry out management actions that are likely to cause the introduction or spread of invasive species and detect, respond rapidly to, and control populations of invasive species in a cost-effective and environmentally sound manner whenever and wherever practical, per Executive Order 13112.

Regulation and control of plant pests by the Division of Agriculture is authorized under Title 3 of the Alaska Statutes. The Division of Agriculture is charged with protection of the agricultural industry and public interests through preventing the importation and spread of these pests. The Animal and Plant Health Inspection Service has authority to prohibit or restrict the importation, exportation, and interstate movement of plants through the Plant Protection Act (Comeau and Vandre 1997). In accordance with Alaska Statutes 03.05.010, 03.05.030, and 44.37.030, the Alaska Department of Natural Resources, Division of Agriculture maintains a statewide list of prohibited and restricted noxious weeds (http://www.dnr.state.ak.us/ag/ag_pmc.htm).

The 611 ASG strives to prevent the introduction and spread of noxious and invasive species through equipment cleaning practices and requirements. Biosecurity from foreign pests and/or invasive species is an aspect of noxious and invasive species prevention that the 611 ASG must address, especially with aircraft arriving from foreign countries.

Invasive weed species are often spread through purchase, transportation, and utilization of contaminated seed, forages, topsoil, gravel, and plant materials. Vehicles and water are the most common agents for spreading invasive plant species. Main options available to land managers for control of invasive species are prevention, no action, and mechanical, biological, and chemical control. Control methods for invasive species are species-specific and based on the degree and extent of infestation. No one control method or solution usually exists for invasive plant species. Methods available include biological control (using organisms to reduce populations), manually pulling, mowing, and herbicides. The 611 ASG does not use herbicides for the control of invasive plants, but the option to do so remains open, based on effectiveness of other control techniques and ecological need for individual species control.

Invasive species know no boundaries. Management should include collaborative efforts with area agencies and entities. Much work on invasive species is being conducted by the ADFG, National Park Service, University of Alaska Fairbanks, BLM, and the Alaska Committee for Noxious and Invasive Plants Management in Alaska. Recommendations from these efforts and agencies will be considered for incorporation into the development of the 611 ASG invasive species program.

Below procedures are typically conditions added for construction, demolition, and cleanup projects at 611 ASG sites.

- Best Management Practices will be taken so that no new noxious or invasive species are introduced to areas where they are not already found.
- Incorporate a strategy of integrated weed management into construction layout, design, and project alternative evaluation.
- Remove or treat seed sources and other viable reproducing plant parts that could be spread by construction disturbances or by passing vehicles or foot traffic.
- Avoid moving weed-infested gravel, rock and other fill materials to relatively weed-free locations. Gravel and fill should come from weed free sources.
- Identify existing noxious weeds along access roads and control them before construction equipment moves into the area.
- Clean off-road equipment (power or high-pressure cleaning) of all mud, dirt, and plant parts before moving.
- Use only weed-free straw and mulch.
- Follow the Cooperative Extension Service “DON’T plant in Alaska” list (CES 2006). These plants escape cultivation and threaten wild areas by displacing native vegetation and destroying wildlife habitat.
- Use only certified weed-free seed for revegetation. A list of appropriate seeds for revegetation in Alaska can be found in the Alaska Revegetation Manual (Wright 2008).
- Plant only locally grown seedlings, trees and shrubs to avoid importation of forest diseases, invasive insects and plants, or noxious weeds.

7.8.3 Eareckson Air Station

Improved Grounds

Regular maintenance of Eareckson AS involves minimal landscaping activities during summer, stabilization of sand, and seeding and revegetation of disturbed areas. Mowing around runways, taxiways, and apron of the airfield should be avoided. Geese, ravens, and gulls are known to use the vicinity of the runway; tall, uncut grass discourages them from using the adjacent areas. Due to the type of vegetation, the predominance of taller vehicles, and the large aircraft used at Eareckson AS, ground traffic safety

would not be expected to be a concern. Mowing should be restricted to areas where tall vegetation causes safety concerns or impacts the primary base mission, such as along roadways, airport facilities, and buildings.

Trimming of weeds and grasses around buildings, curbs, and poles is accomplished as needed. BOS contract personnel manually pull weeds or mechanically cut them on dikes of fuel storage areas. Generally vegetation is not controlled around the runway, with two exceptions. Vegetation has been removed where it has sprouted in paved areas.

With exception of relatively gently sloping or flat areas immediately adjacent to newly constructed installation facilities, managed lawn areas on the installation will not be increased. Steeper slopes that are seeded as part of construction activities should be designated as “no-mow” areas. This action will minimize grounds maintenance expenses and will eliminate potential safety problems associated with operation of power equipment on sloping ground.

In 1991 the Alaska Plant Materials Center received a request to assist the USAF on Shemya Island to close unnecessary roads. These roads crossed water gallery lands, and the Air Force was concerned that fuel spills could contaminate the water gallery area. Removal of road material was not practical due to communication wires buried in the road bed. Therefore, the roads were abandoned by placing excavated mounds of peat on the surface (Alaska Plant Materials Center 1992). The Alaska Plant Materials Center studied natural revegetation on these peat soils (Wright 1997). The study confirmed 90-95% natural cover by 1996. This natural revegetation of peat soils in a relatively short period provides an excellent, cost-effective option for grounds maintenance and erosion control at Eareckson AS.

The USFWS issued an advisory regarding vegetation clearing, *Land Clearing Timing Guidance for Alaska, Plan Ahead to Protect Nesting Birds* (USFWS 2009), with current timing guidelines (Table 7.8). The USAF should avoid any vegetation clearing during these times to ensure migratory bird protection.

Semi-improved and Unimproved Lands

Native vegetation covering most of the island should be avoided to the maximum extent possible. Revegetation efforts should use natural materials and grasses specifically designed to germinate in the Aleutian climate.

Snow fences that lined the lateral clear zone on the southern side of the runway have mostly been covered or their remains removed since they succeeded in stabilizing the area, which is covered with vegetation. Also, perennial grasses (red fescue and hairgrass) and native wild beach grass were planted in 1988 on the south lateral clear zone to control sand erosion and water erosion on the lateral clear zone. The sprigging project with native beach grass, combined with snow fences, successfully controlled the wind-blown sand problem (Hostman 1988).

Observation by S. Wright, Alaska Plant Materials Center, in 1998 found the area was fairly stable. No additional sprigging was needed; nor was replacement of the snow fence needed. Remaining snow fences are an eyesore and are no longer functional or needed. However, these fences must not be pulled up to prevent disturbance to the area, but the steel posts will be cut at the surface, and the above ground fence will be discarded.

Table 7.8 Recommended Time Periods for Avoiding Vegetation Clearing

HABITAT TYPE →	Forest or woodland ¹ (i.e., trees present)	Shrub or Open (i.e., shrub cover or marsh, pond, tundra, gravel, or other treeless/shrubless ground habitat)	Seabird colonies (including cliff and burrow colonies)	Raptor and raven cliffs
REGION ↓ Southeast	April 15 – July 15	May 1 – July 15 ²	May 1 – September 15 ³	April 10 – August 10
Kodiak Archipelago			April 15 – September 7 ³	
Southcentral (Lake Iliamna to Copper River Delta; north to Talkeetna)	May 1 – July 15 ²			
Bristol Bay/AK Peninsula (north to Lake Iliamna)	April 10 – July 15	May 1 – July 15 ^{2,4}	May 10 – September 15	
Interior (north of Talkeetna to south slope Brooks Range; west to treeline)	May 1 – July 15 ²		May 1 – July 20 ⁵	April 15 – August 1
Aleutian Islands		April 25 – July 15	May 1 – September 15 ³	April 1 – August 1
Yukon-Kuskokwim Delta (east to treeline)		May 5 – July 25 ^{2,4}	May 20 – September 15	April 15 – August 15
Seward Peninsula		May 20 – July 20 ⁴		
Northern (includes northern foothills of Brooks Range)		June 1 – July 31 ⁴		
Pribilof and Bering Sea Islands		June 1 – July 15	May 25 – September 1	

USFWS July 2009

¹ Owl species may begin to nest two or more months earlier than other forest birds, and are fairly common breeders in forested areas of Alaska. You may wish to survey for nesting owls (or other early spring tree-cavity nesters) prior to tree-cutting. It is your responsibility to protect active nests from destruction.

² Canada geese and swan habitat: begin April 20

³ Storm petrel burrow habitat: April 1 – October 15

⁴ Black scoter habitat: through August 10

⁵ Seabird colonies in Interior refer to terns and gulls

Revegetation

Shemya Island has been planted with the most varied seed mixes of any Aleutian Island. The island's ecology has not been severely impacted since introduced species generally are expected to lack vigor to compete with native species. The revegetation manual developed by the Alaska Plant Material Center (Wright and Moore 1994a) may be used to plan and accomplish revegetation at Eareckson AS for small projects (0.5 acres or less) in the administrative/ residential area to curb erosion and stabilize soils.

Landscape seeding tends to perform well if a maintenance (refertilization) program is followed. The standard specification for landscape work on Shemya Island consists of a mix of 40% Nugget bluegrass, 30% Boreal red fescue, 20% Arctared red fescue, and 10% annual ryegrass. This mix has performed well throughout the main installation complex and athletic fields. The recommended seeding rate for this mix is 90 pounds per acre. This mixture shall not be used in the vicinity of the airfield, approaches, and over other large areas. The mixture includes attractive goose forage. An effective fertilizer rate for low maintenance areas is 450-500 pounds of 20-20-10 fertilizer or an equivalent, providing 90-100 pounds of nitrogen, 90-100 pounds of phosphorus, and 45-50 pounds of potassium per acre. Application should occur at the time of seeding.

Erosion control or low maintenance seedings on Shemya Island point out the superiority of Norcoast Bering hairgrass and Boreal red fescue. Seedings conducted during the 1980s, usually consisting of a 60% hairgrass and 40% red fescue mix, have produced successful stands without a maintenance fertilizer program. Also, this mix has allowed for native re-invasion. Lupine, beach wildrye, and beach pea are common invading species in areas that have been seeded with the hairgrass-red fescue mix. The recommended seeding rate for this mix is 40-60 pounds per acre.

It is hypothesized that disturbances caused by regular installation operations on Shemya Island encourage naturally occurring pioneer species. These species are similar to those included in the seed mixture and also are attractive goose forage. During field observations in 2006, pioneer species were observed as being more prevalent on Shemya Island than on each of the other islands in the Near Island group (personal communication, G. Augustine 2007). To avoid compounding the problem, care must be given to operations that enhance the natural revegetation.

The Alaska Plant Materials Center (Wright 1997) found successful natural re-invasion on peat soils on Eareckson AS. This study found that 90-95% cover, comprised of 31 species, occurred from project start in 1992 through final evaluation in 1996. Natural revegetation will be a favored option in the future when peat soils are present or can be used at Eareckson AS.

Caution must be exercised when revegetating areas to ensure that Aleutian Cackling geese attraction is not enhanced. Although hairgrass and fescue seed mixes produced successful stands without a maintenance fertilizer program, these areas attract waterfowl, particularly geese. There are large areas surrounding the runway and areas within and adjacent to the runway approaches that native plants have not reestablished. A project to transplant sprigs of the less attractive native beach wildrye started in 2006 by sprigging and/or fertilizing approximately 50 acres around the runway. It is being accomplished in accordance with the Alaska Plant Material Center manual, *Revegetation Manual for Eareckson AFS, Shemya, Alaska* (Wright and Moore 1994a). This project continues to do well, and it may be applied to other areas of fescue grass..

A vegetation project related to the BASH Reduction Program on Eareckson AS is the crowberry project, which was funded by the Missile Defense Agency as part of the mitigation to wetlands lost during construction of Missile Defense facilities. The project to measure physical and chemical characteristics of

crowberry on Shemya Island to better understand what factors allow it to be successful. Once these factors are known, the USAF would consider possibilities of managing the berries either to enhance or reduce crowberries on Shemya Island. Crowberries are a high energy food source in the fall used by the Aleutian Cackling Goose prior to their fall migration to wintering grounds in California.

Erosion Control

Significant erosion occurs only where recent construction activity has removed vegetation and disturbed the soil. Revegetation projects are associated with disturbed areas resulting from construction activity.

One open drainage ditch associated with the West-End oil-water separator experienced erosion problems. Construction activities on the West-End oil/water separator have been successful in controlling the erosion in this drainage system (Hostman 1988).

Sea wave action in the past caused erosion by the dock in Alcan Harbor and at the western end of the sea wall. Efforts to mitigate this erosion by means of a sea wall composed of salvaged materials from the demolition of the White Alice Communications System antennas have had limited success in controlling the erosion. A interlocking concrete structure revetment was constructed to reinforce areas around the dock and adjacent shorelines.

One of the drains traversing the southern side of the runway in the lateral clear zone area created a severe erosion problem when drain effluent washed out a large portion of the material placed around the drain during the clear zone construction. The resultant gully was filled with rock and hard fill and is providing both the drainage path and uniform terrain necessary in this area of the island.

Most other construction-generated erosion and sediment are adequately controlled, mostly due to the filtering action of vegetation that surrounds construction sites. Borrow pits, quarry areas, and sand, gravel, and crushed rock storage areas do not appear to be releasing excessive sediment but should be operated with caution. Excessive sediment reaching individual tidal pools can significantly impact their environment (Hostman 1988).

7.8.4 King Salmon Airport

King Salmon Airport uses minimal ground maintenance activities. Regular maintenance of the base primarily involves mowing and/or removing brush during summer. In general, mowing is restricted only to areas where tall vegetation causes safety concerns or impacts the primary base mission, such as along roadways, airport facilities, and buildings.

Improved grounds grass should be maintained at 2-6 inches; semi-improved grounds grass should be maintained at 7-14 inches. Main roads should be mowed 20 feet on each side of the road; other roads should be mowed 15 feet on each side. Improved and semi-improved acreage on King Salmon Airport requires periodic mowing from May to September.

Ornamental trees and shrubs around buildings require little or no annual maintenance. Lawn sprinklers are used around main areas, and watering is done on an as-needed basis.

The initial mowing each summer should be done after ground nesting birds have fledged young (May - July 15), particularly in fields adjoining natural areas. In areas where a delayed mowing schedule cannot be implemented because of base operation or safety concerns, mowing should begin prior to the nesting season.

Table 7.8 is appropriate for vegetation clearing at King Salmon Airport, as described for Eareckson AS, above. Control of woody vegetation and herbaceous weeds adjacent to the King Salmon airport runway, aprons, and taxiways is done by the State by scarifying with a bulldozer following initial freeze-up in autumn. Brush-hogging with a tractor-mounted rotary mower is done as needed.

Revegetation

IRP restoration sites and demolition sites, such as Bunkhouse 615 and 616, have been successfully revegetated on King Salmon Airport. Revegetation recommendations provided by the Alaska Plant Materials Center, Palmer, Alaska, include the following grass cultivars for King Salmon Airport: tundra glaucous bluegrass, norcoast bering hairgrass, arctared red fescue, boreal red fescue, egan American sloughgrass (for very wet sites), Alyeska polargrass, and Fairbanks area wheatgrass (for dry sites).

Guidance for reseeding projects is provided in *Revegetation Manual for King Salmon AFB, King Salmon, Alaska* (Wright and Moore 1994b). Seed mixtures, seeding rates, and site preparation will be determined on a project-by-project basis to ensure optimal results. Technical support is available from the Alaska Plant Materials Center, U.S. Department of Agriculture Natural Resources Conservation Service and the University of Alaska Cooperative Extension Service.

Recommended seeding rates for revegetation projects are 15-40 pounds per acre. Where possible, hydroseeding should be used, which has been effective at King Salmon Airport. General fertilizer recommendations are 20-20-10 at 450-550 pounds per acre and less with established vegetation.

Other flora that might be used in revegetation and can be planted as seedlings or sprigs include white spruce, Kenai paper birch, and willows. Restoration of previously existing plant communities may require seeding native vegetation or may be accomplished by natural revegetation.

The USFWS, ADFG, and Coastal America agencies are interested in minimizing erosion of the shoreline of Naknek River near King Salmon Airport to stabilize the shoreline, improve the fishery, and improve opportunities for wildlife viewing for airport visitors. The former marina shoreline bulkhead is beginning to deteriorate. No official recreational requirement exists since the drawdown of the installation and removal of active military in 1994. The marina has been closed. If the property remains the responsibility of the USAF, then the USAF would be required to stop erosion in the event the deterioration results in failure of the bulkhead. This bank stabilization project would require a Title 16 (Alaska Statutes) permit from the ADFG due to the use of the river by anadromous fish. In the event the USAF is required to replace the bulkhead, a design would be required by ADFG that replaces the existing structure with a bio-engineering alternative. The 611 CES/CEAN manager will participate in interagency river stabilization planning.

Erosion Control

Tundra vegetation is an integral part of the local ecosystem and should be left undisturbed whenever possible. There are no severe erosion problems on the installation, although some erosion was noted by Woodward-Clyde (1995b) and by Jones Technologies, Inc. and Gene Stout and Associates (1999b), which included slopes surrounding the sewage treatment plant basins, the explosives ordnance demolition area, and behind the marina. Erosion in these areas has been addressed.

Bank erosion control was accomplished at the marina in the 1990s. In early-2006 the sewage lagoon was taken out of service, and sewage now goes to the Borough treatment plant (personal communication, T. Hammond, King Salmon Airport 2006). A line was run to use King Salmon sewage treatment several years ago, but negotiations faltered until recently.

If significant areas of tundra must be disturbed, revegetation will be required. Revegetation is difficult throughout Alaska, and emphasis should be given to using native plant materials.

Damage from the use of motorized vehicles, including ATVs and four-wheel drives, in natural areas remains an issue on King Salmon Airport and in surrounding areas. However, causes of this issue are no longer within King Salmon Airport as a result of the conversion from a military-operated site. Regardless, ATVs are damaging vegetation, and wildlife habitat may take years to recover.

Explosive Ordnance Demolition Area

King Salmon Airport includes an explosives ordnance demolition area, formerly used for demolition of unexploded ordnance. There are inherent dangers associated with such sites due to the possibility of unexploded ordnance. The area is marked with danger signs, but it is being used for recreation, presumably by local residents; thus there are liabilities for the USAF. The area is largely denuded. A site review was completed in late 2011, but the report is not yet available.

7.8.5 Long Range Radar Sites

Grounds maintenance and LRRSs is minimal to non-existent. At most sites normal activities, like mowing grass, are unnecessary. However, at some sites weeds and grass around buildings and other facilities are trimmed, as needed. Gravel areas around site buildings and runways and roads are maintained on an as-needed basis, primarily by the BOS contractor. However, exceptions exist, such as at Tatalina LRRS, where the road from Sterling Landing to the turn-off to Upper Camp is maintained by the State of Alaska.

At some sites brush is cleared from water and electrical lines, roads, surface drainage ditches, and adjacent to airstrips on an as needed basis. Cutting to limit the height of vegetation within the runway clear zone, thus, reducing the BASH risk (Section 7.10.4, *BASH, Long Range Radar Sites*) occurs at Indian Mountain, Tatalina, and Sparrevohn LRRSs. Herbicides or other pesticides are generally not used in grounds maintenance activities; however, over the counter, general use herbicides are periodically used around fuel tank farms.

Riparian habitat at Indian Mountain LRRS is along a seasonal stream flowing from tributaries originating from slopes south and east of Upper Camp. The unnamed stream flows generally parallel to the airfield, downslope of the industrial and residential domes of Lower Camp. The stream flows through drainage ditches adjacent to the southern half of the airfield. Riparian habitat was impacted by construction of the Lower Camp in the 1950s. The airfield's initial construction diverted the stream into the ditches, precluding it from flowing east of the airfield. Annual or biannual cutting of brush on each side of the airfield is required since initial cutting of willows stimulates growth of willows, but as shown in areas with repeated moose overgrazing elsewhere, repeated top growth removal eventually reduces the density of willow and its growth rates. Most riparian vegetation in the Lower Camp area is not within the cleared area. The portion impacted by brush cutting primarily includes ditched areas. Shrubs and trees providing shade and a detritus source for stream invertebrates will continue to be impacted by brush cutting. This issue is applicable to Tatalina LRRS.

The BLM prepared an Aquatic Habitat Management Plan in 1994 for the Indian River Area of Critical Environmental Concern. This plan includes objectives regarding stream morphology and ecology; however, it has not been implemented due to other higher priority requirements. A stream gauge may be installed in the Indian River to develop hydrograph information leading to an application for an instream flow reservation. Regarding the Indian Mountain LRRS, the health of riparian areas and stream channels should continue to be considered in site operations; water quality should be maintained; and maintenance

activities, such as road maintenance and installation of culverts, should be designed to maintain the stability of waterways (personal communication, C. Kretsinger 2007).

Table 7.8 is appropriate for vegetation clearing at LRRSs, as described for Eareckson AS, above.

Revegetation

Unimproved grounds at LRRSs in general are managed to disturb native vegetation as little as possible. Cape Romanzof and Tatalina LRRSs have experienced some difficulty in establishment of vegetation being slow with results often less than satisfactory. In this case, wind erosion of the landfill and other areas may best be addressed by snow fences, which may be more effective in reducing wind erosion in barren-ground areas on a temporary basis, allowing vegetation to germinate and become established. Road and runway maintenance should be conducted so as to minimally impact the tundra vegetation and water quality at LRRSs.

Erosion Control

Erosion problems at most LRRSs are limited to minor amounts associated with roads and runway areas. Periodic maintenance of these areas generally corrects such problems.

At Oliktok LRRS a gravel bag sea wall revetment was erected in 1992 to protect a fuel storage area. The projected life of the gravel bags was five years; the deterioration rate of the material is much slower than expected; however, some bags were replaced during maintenance activities. The Corps of Engineers permit for the sea wall requires maintenance of the structure. The fuel storage tanks have been removed, and therefore the need to maintain the revetment is no longer a priority. To remain in compliance with the permit, the bag material must be removed when it becomes deteriorated. The southwest extension of the revetment is not necessary; the landfill has been removed (personal communication, S. Slagle 2007).

Erosion primarily occurs only where recent construction activity or in rare cases demolition activities have removed vegetation and disturbed the soil. Revegetation projects on LRRSs are generally associated with Clean Sweep activities. Grounds disturbed by mission-related activities, demolition work, or construction will be revegetated as soon as practical. Native species will be used whenever possible.

7.8.6 Inactive and Excess Sites

Inactive and Excess sites do not have any grounds maintenance requirements. However, should a need arise to remove vegetation at one of these sites, timing guidelines within Table 7.8) should be followed.

Erosion is not a major concern at Inactive and Excess sites since most sites have undergone Clean Sweep demolition and debris removal followed by revegetation. At certain sites larger erosion issues sometimes arise. For instance, two former Bullen Point SRRS landfills threatened by erosion from a lagoon breach east of the SRRS were decommissioned during 2007 as part of Clean Sweep activities.

7.9 Integrated Pest Management Program

Herbicides and pesticides are not generally used at 611 ASG sites. Due to the sensitive nature of surrounding areas, risks of secondary poisoning, and requirements of AFI 91-21, all pesticide applications are subject to prior approval by HQ PACAF and the state and coordination with USFWS. Over the counter general use products, such as to control pests in mess facilities and maintain dikes about storage tanks can be used on 611 ASG installations with proper approval (personal communication, MSgt B. Echtenaw 2006). Any proposed future use of pesticides at 611 ASG sites must consider the cost of required storage facilities, use of certified applicators, potential effects on non-target organisms, and required approvals. No pesticides or related equipment are kept on sites. However, small quantities of

over the counter general use pesticides (Off[®], Raid[®], Uncle Ben's[®] musk oil, etc.) are kept on sites as needed (personal communication, P. Cooley 2007).

Swallows

State and federal regulations require various permits for the removal or disturbance of migratory birds. The challenge of swallow management is to maintain stable populations of swallows while reducing maintenance burdens and human-swallow conflicts. A phased management approach is appropriate, which consists of considering swallows in the design and construction of all new structures to avoid attractive nesting habitat, providing alternative nesting habitat, eliminating attractive nesting substrates from areas where swallows are not wanted, planning installation operations and training missions considering the swallow nesting season, and removing nests that interfere with the military mission of the installation.

Alternative habitat can be provided by erecting structures with protected eaves or overhangs and 90-degree angles and rough surfaces for nest attachment. These structures can be either artificial ledges placed on existing buildings or stand-alone structures.

Eliminating attractive nesting substrates can be accomplished by complete removal or enclosure of attractive substrates or the addition of structural features that decrease the attractiveness of the substrate or discourage swallows from nest building. Structural features that can be attached to existing buildings include adding smooth-surfaced curves to eaves or stringing monofilament from eaves and overhangs to discourage swallow use. The latter requires medium to heavy duty monofilament spaced at 6-8-inch intervals in front of the area to be protected (Buckman 1995).

Personnel at former Galena Airport reported (1998) good success with spraying a repellent (Bird X[®]) on nesting substrates. This repellent can be applied as a spray or with a caulking gun, and it should be applied just prior to nesting season. This material may be used at LRRSs unless a better technique is identified.

Removal of nests from structures critical to the military mission is recommended as a last resort. Physical removal of nesting material before a nest is completed by hand removal or with water jets must be completed before egg laying. State and federal permits are required and very difficult to justify when nests are active. Removal of inactive nests requires only a state permit; these are much easier to justify. Early coordination by both site personnel with the BOS contractor Environmental Manager, and 611 CES and 611 Air Support Squadron personnel with the 611 CES/CEAN Manager is needed for proper compliance.

7.10 Bird/Wildlife Aircraft Strike Hazard Management (BASH)

7.10.1 Policy and Background

The most serious wildlife-human conflict issue on 611 ASG sites is bird-aircraft strikes. To indicate the seriousness of this issue, in 1995 an E-3 Airborne Warning aircraft with 24 persons on board crashed and burned on take-off from Elmendorf AFB. There were no survivors. Post crash investigation revealed that ingestion of four geese forced two engines to shut down, causing the crash.

7.10.2 Eareckson Air Station

Eareckson AS has the greatest potential for BASH incidents due to its absolute dependence on regular air traffic to continue its mission. Although Shemya Island has a history of bird collisions with aircraft, few collisions have been reported (Schwitters *et al.* 2002). In June 1997 three gulls were struck and killed by a

C-130 aircraft at Eareckson AS. In response, permits were received to use lethal control on Common Ravens and Glaucous-winged Gulls.

Larger birds, such as gulls and geese, can create a substantial BASH concern. Large concentrations of migrant waterfowl, gulls, and shorebirds traditionally rest on Shemya Island. Gulls may represent the most significant hazard to aircraft worldwide, partially because runways provide preferred flat open resting areas. During 1999-2011 only gulls have been recorded as involved in strikes. They cross the airfield and approaches as singles or pairs and have caused minimal or negligible damage to aircraft.

A 10,000-foot runway on the southern half of the island is 97 feet above msl. Bird-aircraft strikes associated with gulls soaring along the island's southern shore and then crossing the airfield have been minimal, probably because flight elevations of the birds generally keep them below that of aircraft using the runway.

During this same period the numbers of Aleutian Cackling Geese have generally increased; in much higher numbers they prefer to return to the airfield and approaches to forage. The geese pose a heightened concern; their body is more dense than gulls; and the frequency of hourly runway crossings by geese averages more than double the average for gulls (Schwitters *et al.* 2002 [figures 20 and 32]). The risk of a catastrophic bird strike is of higher concern with geese than with gulls (Schwitters *et al.* 2005, Schwitters and Rossi 2002, Schwitters *et al.* 2001 and 2002).

In 1999 the Alaska Maritime NWR staff, Wildlife Services, and the 611 CES began an avian study in the area surrounding the Eareckson AS beginning in spring and extending through fall. This study extended through 2003 and provided data for the Bird Avoidance Model (BAM). The BASH model and BAM are sensitive to the temporal and spatial birdstrike threat from migrating waterfowl and raptors. The BAM accounts for flight routes, flight altitude, aircraft design, and seasonal and daily fluctuations in bird activity to provide maximum safety from birdstrikes. As BAM data continues to be populated, it will become more useful to the USAF in Alaska.

An evaluation of potential wildlife strike hazards at Eareckson AS began in 1999. The *Wildlife Hazard Assessment of Eareckson Air Station, Shemya Island, Alaska* (Schwitters *et al.* 2001) was conducted over three field seasons (1999, 2000, and 2001). Recommendations provided by Schwitters *et al.* (2001) were reviewed by the 611 ASG Bird Hazard Working Group; subsequently, many have been required in the BOS contract. Changes in bird use of the airfield area and consideration of various strategies continue to require refinement in an effort to reduce risks and improve the BASH Reduction Program. The 3-year study also revealed substantial differences in use of the airfield environment by Aleutian Cackling geese, which would not have been noted in a single year of study. The assessment revealed that significant wildlife hazards are present at Eareckson AS.

During spring and fall 2002 Wildlife Services evaluated deterrent/control techniques that may help reduce hazards identified by Schwitters, *et al.* (2002). The spring and fall Experimental Wildlife Control reports (Schwitters and Schwitters 2002 and Schwitters and Rossi 2002, respectively) include numerous recommendations to reduce hazardous wildlife-related situations, many of which are being implemented at Eareckson AS.

Fox removal from the adjacent islands is credited with helping restore the Aleutian Cackling Goose. As a result, this formerly listed endangered and then threatened species was delisted in 2001; a successful effort by the USFWS. Though geese have not been involved in a BASH incident, there has been an

increase in BASH risk associated with the geese visiting the Eareckson AS airfield, overshadowing the threat from gulls (personal communication, G. Augustine 2006).

The obvious lack of nesting geese and gulls is directly attributed to Arctic foxes' presence; thus, fledging geese and gulls learning to fly are not an added BASH risk during summer (personal communication, G. Augustine 2006). The Arctic fox provides population control of ground-burrowing nesting birds by preying on their eggs, young, and in some cases, adults.

The presence of crowberries is a large part of the attraction to Shemya Island and contributes to the heightened risk of BASH at the airfield. Although crowberries do not grow in areas surrounding the airfield, once they are mostly eaten by the geese, the geese start to forage more on vegetation around the airfield. In fall 2002 crowberries were very successful on the northern side of the island; thus, very few geese foraged around the airfield, but after the crowberries were exhausted as a food source (by the end of August), flocks of geese were noted with increasing frequency in the vicinity of the runway (Schwitters and Rossi 2002). Managing crowberries away from the airfield may reduce BASH potential on Shemya Island (personal communication, G. Augustine 2006). Depending on results of the crowberry project, the USAF will consider managing crowberries on Shemya Island to reduce BASH potential. Management would include various options from enhancement to removal.

Another important aspect of Aleutian Cackling Goose attraction to Shemya Island is the question of whether sufficient feeding habitat is available on other islands. In 2005 the USAF funded a pilot study of habitat distribution and habitat use in the Near Islands (Shemya, Nizki, Alaid, Agattu, and Attu) concurrent with the spring and fall BASH seasons at Eareckson AS (Frost *et al.* 2008). This study produced a habitat classification system, habitat maps, seasonal assessments of habitat availability, and preliminary conclusions about the relative importance of habitats to geese in the Near Islands in spring and fall.

Aleutian Cackling Goose Surveys and Habitat Mapping in the Near Islands, Alaska, 2006 (Frost *et al.* 2008) includes habitat classification on Shemya and Attu islands with 47 landcover classes and 43 wildlife habitat types. Table 6 in that report provides acreage and percent cover in the Semichi group (Alaid, Nizki, Shemya islands), and Figures 6, 7, and 8 are habitat maps of Shemya, Nizki, and Alaid islands, respectively.

In 2006 almost 90% of geese observed in spring on Shemya Island were in four habitats (Disturbed Meadow/Tundra Complex [35%], Disturbed Dry Grass-Herb Meadow [21%], Upland Moist Graminoid-Herb Meadow [20%], and Lowland Moist Graminoid-Herb Meadow [13%]). After aggregation of habitats into eight broader types, nearly all geese were observed in three aggregate habitats (Tall Graminoid-Herb Meadow [42%], Disturbed Meadow/Tundra Complex [35%], and Partially Vegetated Barrens [23%]). Over two-thirds of geese observed in fall on Shemya Island were in three habitats (Disturbed Barrens [31%], Upland Crowberry- Graminoid Tundra [24%], and Disturbed Partially Vegetated Barrens [11%]). After aggregation of habitats into eight broader types, almost 95% of geese were observed in four aggregate habitats (Barrens [32%], Dwarf Shrub-Graminoid Tundra [24%], Partially Vegetated Barrens [21%], and Tall Graminoid-Herb Meadow [15%]) (Frost *et al.* 2008).

In spring, geese primarily use habitats in which preferred forage species, such as *Festuca rubra*, experience early green-up. On Shemya there is also high use in spring of some partially vegetated habitats associated with human disturbance. These latter habitats do not exist on other islands in the study. Some patterns of habitat use in fall were inconsistent between Attu and Shemya, which may be related to a much wider variety of habitats available to geese on Attu. Among the Near Islands combined, Shemya holds less than 2% of those habitats identified as moderate or high value. It appeared that habitat availability during fall probably is less limiting to geese than during other seasons. Habitats used for

nesting are most extensive on Attu, and there appeared to be high potential for continued growth of the Attu breeding population. There were indications that Shemya is used primarily by nesting and non-breeding geese that reside mainly on nearby Nizki and Alaid islands during summer; these small islands have limited nesting habitat. The most potential for population growth is on the larger Agattu and Attu islands (Frost *et al.* 2008).

Aleutian Cackling Goose Surveys and Habitat Mapping in the Near Islands, Alaska, 2008-2009 (Frost *et al.* 2010) followed-up on the work by Frost *et al.* (2008). Figures 5 and 6 in Frost *et al.* (2010) are habitat maps for Alaid, Nizki, and Shemya islands and Agattu and Attu islands, respectively. Table 5 in that report provides acreage and percent cover in the five Near Islands. The report includes data and mapping on Near Islands' elevation, snow-free dates, spring greenness, and fall greenness. Figure 15 in the report has maps showing habitat importance in spring and fall for geese and a map of selected aggregate habitats relevant to vegetation management at Shemya Island.

Frost *et al.* (2010) included the following conclusions.

- Primary determinants of habitat selection by geese in spring are lack of snow cover and presence of forage plants, especially grasses, that green-up early.
- In fall geese regularly use a wide range of habitats but rarely tall meadows. The berry crop affects low elevation tundra habitat use. Late greening habitats become increasingly important late in fall.
- The relative importance of habitats at Shemya is highest in early spring when snow cover and lack of green vegetation limits use of other islands.
- BASH hazing on Eareckson AS should be limited to primary and secondary bird-exclusion zones for 10 days after the geese's arrival in mid-April. Island-wide BASH mitigation activities could begin sporadically after May 1 and could be intensified after May 15 until geese are gone, generally by mid-June.
- Intensive BASH mitigation activities could be conducted on Shemya throughout late summer and fall without significant impact on the regional Cackling Goose population.

Both Frost *et al.* (2008) and Frost *et al.* (2010) included specific recommendations regarding BASH management on Eareckson AS. Additionally, bird, mammal, and vascular plants observed during these surveys were noted, and these were used during development of this INRMP to update species lists for Eareckson AS (Appendix 3.0-Eareckson, Appendix B).

After a listing change from endangered to threatened, approximately 200 geese were seen on Shemya Island in September 1995 by biologists Joe Meehan (USFWS) and Gene Augustine (USAF). Peak numbers using the island in spring and fall 1999 through 2001 doubled those seen in 1995 and gradually tripled, exceeding 600, as observed by Wildlife Services (Schwitters *et al.* 2002 [figures 22-24]). Aleutian Cackling Goose use of Shemya Island continued to increase to over 1,000 in 2003 and 2004 (personal communication, G. Augustine 2006) and in spring 2005 (Schwitters *et al.* 2006). Frost *et al.* (2008) recorded 117 flocks with 1,586 geese in 11 habitat types during 2006 spring surveys and 104 flocks with 1,086 geese within 14 habitat types during 2006 fall surveys. In spring 2010 Wildlife Services' personnel observed record numbers of geese during evening surveys, with >800 often counted; 2010 fall counts were low, probably due to the use of a full-time hazer during 2008-2010 fall seasons. Low fall counts may have also been due to unmowed areas along the runway during 2010 (reported in Frost *et al.* 2010).

In 1997 the USAF informally consulted with the USFWS (under Section 7 of the Endangered Species Act) to get approval to haze the then-listed as threatened Aleutian Canada Goose (now the Aleutian Cackling Goose) from the runway area at Eareckson AS. The 611 CES/CEAN Manager and other trained USAF personnel were given approval to conduct hazing. The USAF requires BOS contractors to obtain a permit for hazing from the USFWS and ADFG to implement wildlife hazing operations.

BOS contract airfield management personnel at Eareckson AS, as well as certain 611 ASG personnel, maintain similar but separate permits for lethal control. As required by the permits, 611 ASG and BOS contract personnel are trained by the U.S. Department of Agriculture, Wildlife Services (hereinafter called Wildlife Services) in bird dispersal and hazing techniques. The 611 CES Natural Resources Program Manager maintains the permit covering 611 ASG personnel, and the permit has been modified to cover trial methods used by Wildlife Services that at certain times included Pacific Golden-Plovers and Aleutian Cackling geese (personal communication, G. Augustine 2007).

A Wildlife Hazard Management Plan (U.S. Department of Agriculture, Wildlife Services 2010) was prepared to assist with BASH management on Eareckson AS. This draft plan includes an overview of the wildlife hazard issue, responsibilities, regulations and permits, habitat management, wildlife control procedures, resources, training, and evaluation chapters.

7.10.3 King Salmon Airport

King Salmon Airport site shares runways and other facilities with commercial and private aircraft. Relative to large attractions of birds in the area, bird-aircraft strikes have been minimal, and none reported to the 611 CES/CEAN natural resource manager for military flights in the past 15 years. Since 1990 two strikes were reported in the FAA Wildlife Strike Database for King Salmon Airport, and four near miss occurrences were reported in 2002 by Wildlife Services (Borchert *et al.* 2004). Based upon observations that were made from April 30 to October 16, 2002, Borchert *et al.* (2004) provided the Alaska Department of Transportation recommendations to reduce BASH threats, which included the following.

- Delegate a wildlife coordinator and define responsibilities associated with wildlife control activities.
- Develop a wildlife hazard management plan.
- Update current wildlife hazard report log and reporting procedures.
- Train personnel on species identification and wildlife hazard management techniques.
- Continue monitoring wildlife activity and use patterns on and around the airfield.
- Issue special NOTAMs during times of heightened bird activity.
- Communicate to the community the need for reduction in food waste attractants.
- Eliminate shrub and woodland cover; remove potential Bald Eagle nesting trees and loafing areas.
- Eliminate as much standing water as possible.
- Maintain perimeter fence.
- Develop a consistent mowing schedule.
- Discourage nesting of plovers and terns in gravel areas.
- Expand hazing of wildlife to include all hours of operation.
- Haze early and consistently/apply multiple methods.
- Use lethal control for unusually persistent wildlife.
- Adopt a zero tolerance policy toward all hazardous wildlife.
- Dispose of all animal carcasses immediately.
- Remove persistent mammals.
- Use guide-specific techniques to harass wildlife at King Salmon.

Most recommendations were used in the Alaska Department of Transportation wildlife hazard management plan for King Salmon Airport in 2005; that plan is reviewed annually for the 611 ASG (Augustine, G. 2006. Minutes of the 611 ASG Bird/Wildlife Hazard Working Group, Memorandum for the 611 ASG/CD, meeting date 4 Apr 2006, concurred 19 Apr 2006) and is considered the equivalent of a BASH Control Plan for King Salmon.

Concentrations of migrating waterfowl along the Naknek River create potential wildlife-human conflicts, including safety hazards for low flying Air Force aircraft and personnel and disturbance of migrating waterfowl by low flying aircraft.

Large concentrations of migrant waterfowl and shorebirds traditionally make rest stops on the Naknek River, and spawning fish in King Salmon Creek frequently attract birds. The lack of bird strikes is probably due to instructions pilots receive from the active air control tower and since aircraft approach and departure elevations are generally well above bird activity areas on the Naknek River and over King Salmon Creek. The touchdown area of Runway 11-29's southeastern end is more than 2,000 feet northwest of the river, and the elevation of the river in this area is 50-75 feet lower than the extended plain of the runway. The northwestern end of Runway 11-29 is about 7,000 feet southeast of King Salmon Creek. Tower personnel warn flight crews of the danger when birds are close to the approaches and flight paths.

Boats on Naknek River can force waterfowl into the air. Disturbance from USAF recreation on the river has been largely eliminated.

Minimal aircraft operations should be scheduled mid-April to mid-May to avoid the large concentrations of the spring migration; highest concentration typically occurs during the last week of April and the first week of May. A long term study of migrating spring waterfowl use of the Naknek River by the USFWS (Savage and Murray 2007) provides data (Upper Route Survey) to describe the potential conflict between aircraft and large concentrations of staging waterfowl. Savage and Murray (2007) state that over the 16 years of the study, considerable variation has been observed in timing, species presence, and species abundance. From their data it can be inferred dabbling and diving ducks peak in number between mid-April and mid-May, with the highest concentrations 1,000-12,000 per week, mostly during the last week of April or first week of May. Peak numbers of swans seem to occur one week earlier as dabbling and diving ducks; peak swan numbers 700-2,700. Sea ducks arrive and peak earlier from mid-March to late-April; peak numbers of 500-3,200 per week of sea ducks are seen, the highest concentrations during the last few days of March to mid-April. Based upon the study's 15-year average, the Greater White-fronted Goose on average outnumber Cackling/Canada Goose about 10 to 1. The combined peak number of geese on the river is usually 200-1,700 per week from mid-April to the end of the month. While geese use the river near the installation in large numbers during spring, they are not commonly found during the fall migration. The potential for bird strike hazards is much greater during the spring migration period when geese are present than during the fall migration.

The need to decrease aircraft operations during fall migration is as critical as during spring. The fall migration is much less concentrated and spread over a longer period, late-August to early-November. Geese are not commonly seen on the river in fall, and the number of ducks and swans are an order of magnitude lower than in the spring, based upon Scharf's (1993) data for late August through November 1993 and Reed and Wehmeyer (2000) data from late August through mid-October 2000.

Considering potential consequences of a BASH, the following recommendations were proposed to reduce BASH and minimize disturbances to migrating birds in a previous INRMP (Jones Technologies, Inc. and Gene Stout and Associates 1999b) and are still appropriate.

- Avoid low-level flight exercises during spring and fall waterfowl staging periods (10 April-20 May and 15-30 September).
- Limit disturbances of waterfowl staging on the Naknek River. These birds have migrated thousands of miles and are resting and feeding to build fat reserves for completion of migration and forthcoming nesting.
- Schedule USAF military exercises during low waterfowl activity periods, whenever possible.
- Create vegetative conditions within airport clear zones that do not provide forage or cover for waterfowl and shorebirds. Tall grass is recommended to discourage waterfowl, shorebird, tern, and gull use. This tall grass may attract waterfowl and passerine species by providing cover; however, these birds are less likely to take flight.
- If bird and other wildlife strikes become a problem, enhance the wildlife dispersal program and consult with the USFWS, Wildlife Services, Alaska Department of Transportation and Public Facilities, FAA, as well as the USAF BASH Team located at Kirkland AFB.

The U.S. Department of Agriculture (BASH training programs) normally recommends grass cutting only in late fall with no mowing during May through September and heights of 6 to 10 inches. Borchert *et al.* (2004) recommended mowing twice a month through the summer to keep foliage height to 2-4 inches around the airfield since the grasses are mixed with salmon berry, alder, and other shrubs. Keeping the grass to these lower heights is intended to reduce the hiding cover for mice and voles that attract predators. Spring waterfowl subsistence hunting occurs on the Naknek River, helping to reduce the risk of bird-aircraft strikes.

The airport previously had problems with gulls feeding at the base landfill. The installation's garbage is now transported to the Bristol Bay Borough landfill (approximately seven miles west of King Salmon Airport). Borchert *et al.* (2004) notes that aircraft on approach to Runway 11 flew directly over the landfill where 25-250 gulls and 5-150 ravens were observed. They further note this area is compatible with safe air traffic, but pilots should be advised of the landfill's location and advised of the wildlife hazard.

A previous INRMP (Jones Technologies, Inc. and Gene Stout and Associates 1999b) indicated a need to study shorebird migration along the Naknek River to determine magnitude, timing, and species composition of shorebird migration. Such a study was not specifically accomplished as a result of the INRMP nor considered to be accomplished as of 2007 (Gene Stout and Associates and Blythe & Trousil 2008). Borchert *et al.* (2004) mentioned shorebirds were sporadically observed at the beginning of May and did not observe an abundance of shorebirds. They made no recommendations beyond Guild-Specific deterrent techniques to eliminate temporary standing water, dragging gravel areas to discourage nesting, nest/egg collection or removal, and hazing.

7.10.4 Long Range Radar Sites

Cape Lisburne, *Tin City*, and *Cape Romanzof LRRSs* have had conflicts or have been identified as having potential for wildlife-aircraft conflicts. Polar bears, brown/grizzly bears, and caribou have been observed in the vicinity and on the airfield at Cape Lisburne LRRS. Caribou have been hazed off the airfield in 2006 and 2007 (personal communication, P. Cooley 2007). Though no incident with an aircraft has been reported, the potential exists for an aircraft to strike these large animals on takeoffs or landings.

Large animals (bears, moose and caribou) had been a concern that raised the risk of BASH at **Indian Mountain, Tatalina, and Sparrevohn LRRSs** in the mid to late 1990s. Alders and birch had been allowed to grow within the clear zone on each side of the airfields. Regular brush cutting has alleviated the problem (see Section 6.2.2, *Current Impacts, Long Range Radar Sites*). Vegetation type can also exacerbate the problem when it is quality food. Indian Mountain is third on the priority for brush cutting along the airstrip, behind Sparrevohn and Tatalina LRRSs. Brush is not as thick near the airfield, and the terrain slopes down and away from the runway. Necessary precautions should be taken when brush cutting is in the area of IRP contaminated sites. Periodic mowing of areas traditionally mowed should continue to provide necessary safety and clearance zones for the airfield and provide habitat for grassland birds that may not otherwise occur at the site. Mowing should be conducted only after Savannah Sparrows have completed nesting and young sparrows have fledged from the nest. Consultation with BLM, USFWS, or Alaska Bird Observatory in Fairbanks can provide guidance on site-specific nesting times. Brush cutting and its associated replacement by grasses should benefit grassland birds.

Riparian habitat at Sparrevohn LRRS is along a seasonal stream flowing from tributaries originating from slopes south and east of Upper Camp. The unnamed stream flows generally parallel to the airfield, downslope of the industrial and residential domes of Lower Camp. The stream flows through drainage ditches adjacent to the southern half of the airfield. Riparian habitat was impacted by construction of the Lower Camp in the 1950s. The airfield's initial construction diverted the stream into the ditches, precluding it from flowing east of the airfield.

Annual or biannual brush cutting along the Sparrevohn LRRS airfield is required since initial cutting of willows stimulates growth of willows, but as shown in areas with repeated moose overgrazing elsewhere, repeated top growth removal eventually reduces the density of willow and its growth rates. Brush control along the airstrip (needed for aircraft safety) is also a byproduct of snow removal operations that are routinely performed during winter. IRP sites are on both sides of the runway; care should be taken not to spread contamination and ensure necessary protection measures by personnel.

Sparrevohn LRRS BOS contractor personnel drive down the runway to haze moose prior to aircraft landings. In 2000 a wildlife dispersal program became available to BOS contract personnel. The use of noise maker loads and hazing permitted by the ADFG is available to disperse wildlife that are in the vicinity of the airfield.

Seabirds inhabiting the western boundary of **Cape Lisburne LRRS** are a BASH threat to aircraft. Black-legged Kittiwakes have been involved in BASH incidents on the runway. At Cape Lisburne in 1999 a project for additional maintenance of drainage ditches successfully reduced the attraction of Kittiwakes to impounded freshwater in ditches around the airfield.

Pilots are concerned about bird-aircraft strike hazards (BASH) from large concentrations of nesting seabirds on the shore cliffs (Denlinger *et al.* 1994). The USAF has developed guidelines that encourage pilots to approach and depart the runway in a manner that minimizes disturbance to birds and reduces BASH risk. This was accomplished as part of the BASH reduction program.

Hundreds of Sandhill Cranes visited the Lower Camp airfield area at **Tin City LRRS** on 17 May 1999 and caused a severe bird watch condition. The condition was lowered prior to an aircraft arrival by BOS contract personnel dispersing the birds by driving a vehicle through the area. The 611 ASG Bird/Wildlife Hazard Working Group reviewed the reported severe bird watch condition, and it was decided that 611 CES/Environmental Quality, through 611 Air Support Squadron/PMA, would seasonally issue wildlife

advisories to remind site personnel at Tin City LRRS, prior to mid-May and summer months, that increased wildlife use should be expected. The advisories are also provided to air crews.

At remote LRRSs, larger wildlife, small mammals, and birds could increase the BASH risk if an opportunity to feed on refuse occurs. Complete incineration of all food waste and proper disposal in the LRRS landfill is necessary. Any food waste placed outside buildings must be in wildlife-proof containers until removal to the landfill. Refuse placed in the landfill must be covered as soon as possible.

At *Cape Romanzof LRRS* Canada Geese and Tundra Swans are attracted to the hillside adjacent to the airfield, usually in the second half of August. The attraction is dependent upon the natural production of wild berries. On 19 August 1997 approximately 200 geese were in the vicinity of the airfield. A severe bird watch condition was declared by BOS contract personnel then, and hazing techniques were used to disperse the birds prior to the arrival of a scheduled aircraft.

In 1-10 June 1996 USFWS personnel reported that hundreds of gulls were in the area below the *Cape Romanzof LRRS* airfield approach. Local fishing activities attracted the birds. McCaffery (2000) reported the birds occasionally fly high enough to interfere with the approach. Specifically, although foraging gulls are limited to shores and surface waters, large numbers of gulls roosted on the slopes up to 80 meters above msl. Both roosting birds when flushed and birds flying along the north shore of Kokechik Bay and crossing the mouth of Fowler (Nilumat) Creek regularly flew at an elevation greater than 100 meters above msl. The elevation of the lower end of the runway is about 110 meters above msl. Although the bird aircraft strike hazard is undoubtedly higher with staging geese in the fall (which regularly forage on the tundra above the airfield), the risk of impacts with gulls during the spring herring fishery should not be dismissed (McCaffery 2000).

The 611 ASG Bird/Wildlife Hazard Working Group indicated in 1999 that wildlife advisories be provided to air crews and site personnel to draw attention to the increase BASH risks prior to the spring herring fishery that attracts gulls and prior to the fall migration of geese and swans through the area. The notices will be originated by the Natural Resource Program Manager and provided through the Alaska Radar System Program Management Office.

During fall of 2002 Broerman (2003) of the USFWS conducted a BASH Survey at Cape Romanzof LRRS. It concluded the density of birds in the Bird Exclusion Zone apparently varies annually, increased vigilance and dispersal of birds in the Bird Exclusion Zone was effective when aircraft are expected, the attractive crowberries should be managed by allowing birds to deplete them when the airfield is not in use, and lastly mechanically altering the vegetation was not recommended due to cost and likely un-repairable erosion damage to the drainage.

Since 2000, BOS contractor personnel have been equipped with additional means to reduce the hazards animals and birds have posed to aircraft on takeoffs or landings. Monitoring of the wildlife and BASH potential will be continued.

7.10.5 Inactive and Excess Sites

The potential for wildlife-aircraft conflicts exists at Inactive and Excess sites with runways. Large mammals and birds are a concern but only if and when USAF personnel and aircraft are performing a site visit or other management related activities at these sites.

7.11 Outdoor Recreation and Related Land Use

Outdoor recreation contributes to the quality of life and is essential for maintaining productivity, particularly at remote installations with personnel living in isolated living conditions. Consumptive uses of natural resources (commercial, subsistence, and sport use of fish and animal resources) and non-consumptive uses (bird watching, hiking, photography, etc.) are available, and these activities are pursued in areas surrounding 611 ASG sites¹⁰. Due to the remote location of some sites, little use occurs.

7.11.1 Consumptive Uses

The 611 ASG has developed policies for recreational access at USAF lands in Alaska.^{11 12} Authorized personnel (site personnel; contractor personnel working at the site; DoD military, DoD civilians, their dependents, and immediate family members; and retired military and their dependents) must apply to the Alaska Radar System Program Manager. Policies include provisions for aircraft use of USAF runways and facilities, refuse carry-out, personal weapons, and use of facilities (specifically at Sparrevohn LRRS). Use of runways by commercial guides/outfitters to access surrounding areas likely occurs at some remote sites.

However, a personal weapons policy dated 31 May 2002¹³ states that weapons will be unloaded at all times, except when being used solely for protection of work crews performing outside work. This is interpreted as stating there is no hunting allowed on 611 ASG installations (personal communication, MSgt David John 2002 and Mr. Johnathon Hackett 2007). Prior to the 31 May 2002 personal weapons policy, weapons could be used for consumptive activities on USAF lands. Because of the policy, only activities that do not require weapons (*e.g.*, fishing, egging, berry picking) can now occur. Rather than the Air Force properties being considered as land to harvest natural resources, it should be considered as a means to access neighboring properties with consumptive procurement of natural resources.

Executive Order 13443, *Facilitation of Hunting Heritage and Wildlife Conservation* (issued 16 August 2007) directs federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat. However, due to security requirements (Appendix 3.0-Eareckson, Section 5.6, *Other Natural Resources Information*), personal weapons and hunting are prohibited on Eareckson AS. Therefore this executive order is not applicable to Eareckson AS.

Active 611 ASG sites have security and personal safety issues, which preclude use or possession of personal weapons on these lands. Sites no longer in active use are in the process of being cleaned up (*i.e.*, Air Force property removed and remediating contaminants). Clean sites then will be returned to agencies from which they were originally withdrawn, or other entities that can put place them into nonmilitary use, including hunting, if that is determined a viable option through future land planning efforts.

Appendices 3.0, sections 5.6 contain site-specific outdoor recreation and subsistence information.

¹⁰ Commercial fishing occurs in waters off of Shemya Island, but does not involve Eareckson AS. Eareckson AS is not used for subsistence purposes. In 2003 Wilderness Birding Adventures, a commercial birding enterprise, proposed conducting bird watching tours on Shemya Island. However, due to security conditions necessary to safeguard the island's missile defense assets and the inability to provide the ecotourism enterprise the use of Air Force lodging and dining facilities the proposal was denied.

¹¹ Memorandum for 611 ASG Installation Visitors, 1 Mar 05 from Commander, 611 ASG/CC.

¹² Group Operating Instruction: Alaska Remote Site Recreational Activities for Long Range Radar Sites, 1 Mar 05 Certified by Commander, 611 ASG/CC.

¹³ Policy Letter, 31 May 2002, from Commander, 611 ASG, Personal Weapons Policy for 611 ASG Installations (Long Range Radar Sites, Forward Operating Bases, and Eareckson AS).

Subsistence

Subsistence use of fish and wildlife has been an important facet of life in Alaska for thousands of years. Since 1980 native and non-native subsistence uses on federal public lands in Alaska have been regulated by Title VIII of the ANILCA. It is USAF policy to adhere to requirements of the Act with regard to subsistence use of resources on lands used by the 611 ASG. Subsistence activities occurring on areas adjacent to Air Force managed land has been evaluated by Braund and Associates (2004). Gathering natural resources for subsistence uses is a year-round activity and is important to each village or city near remote 611 ASG sites.

All 611 ASG sites are federal lands, often public domain land withdrawn for military purposes. Federal regulations do not provide for subsistence priority on lands withdrawn for military use. 50 CFR 100.3(d), published 27 December 2005, in the Federal Register states: (d) *The regulations contained in this part apply on all other public lands, other than to the military, U.S. Coast Guard, and Federal Aviation Administration lands that are closed to access by the general public, including all non-navigable waters located on these lands.*

General Outdoor Recreation

Consumptive outdoor recreation, primarily sport hunting and fishing, opportunities are limited by long winters, lack of infrastructure, cost for transportation, minimal manning requiring multi-tasked personnel with very little free time, as well as transient or ephemeral fish and wildlife populations. The use of natural resources is expected to remain relatively constant at 611 ASG sites.

Recreational Fishing

Implementation of Executive Order 12962, *Recreational Fisheries*, includes five initiatives supported by the USAF¹⁴:

- increase access to recreational fisheries,
- provide fish passage,
- restore recreationally valuable native fisheries,
- promote education and outreach opportunities, and
- protect human health by reducing fish contamination.

The 611 CES/CEAN will manage fisheries resources and their associated recreation at 611 ASG sites, fully cognizant of its responsibilities to these five initiatives. Implementation of the IRP is the primary action taken in support of these initiatives. In addition, kelp protection at Eareckson AS and continued support for fishing by 611 ASG personnel are actions taken in support of these initiatives.

Woodward-Clyde (1995a) identified two issues related to fisheries resources on Shemya Island: (1) the potential for unexploded ordnance in lakes and (2) stocking fish in freshwater lakes capable of sustaining fish populations could offer expanded recreation opportunities. (Note: Such stocking would require coordination with the USFWS.)

Studies conducted by the USFWS concluded that the Lower and Middle Lakes provide habitat that could sustain fish reproduction and survival. If water quality studies confirm no significant contamination, these lakes could be stocked to provide additional fishing opportunities to the Eareckson AS community.

¹⁴ Memorandum, 6 Aug 98, from AF/ILEV (Chief Environmental Div.), Subject: *National Recreational Fisheries Executive Order*.

However, the attraction of fish eating waterfowl to these lakes would be a BASH factor since they are in or near the approach to the western end of the active airfield. Remediation of hazardous waste sites during the IRP should improve water quality.

The Upper, Middle, and Lower Lakes system at Eareckson AS is used by migrating waterfowl; any approved fishing in this area should be managed not to coincide with this migration. Also, Upper Lake is an IRP site due to munitions disposal and is off-limits.

7.11.2 Non-consumptive Uses

Wildlife Viewing

Wildlife viewing opportunities are available at each 611 ASG site to varying degrees. A great variety of flora and fauna species can be observed at or near many sites. Some sites are within or adjacent to NWRs, and wildlife viewing, photography, and environmental education are priority public uses on these lands.

The 611 ASG has developed a policy¹⁵ regarding the prohibition of wildlife feeding and poisoning on 611 ASG installations. Intentionally feeding moose, bear, wolf, coyote, fox, or wolverine, or negligently leaving human food, pet food, or garbage in a manner that attracts these animals is a violation of state law (5 AAC 92.230). Poisons or other substances that temporarily incapacitate wildlife are prohibited under ADFG general regulations. Persons engaged in unlawful activities will be liable for enforcement actions. Activities such as these are taken seriously as barment from 611 ASG sites may result. However, poisons can be used inside facilities as necessary.

The wildlife feeding and poisoning policy is important to 611 ASG sites due to past problems at some sites with threatened polar bears (Oliktok), a rabid fox (Cape Romanzof), and aggressive foxes (Eareckson AS). In response the USAF developed a polar bear awareness program beginning in 1994, which included an awareness video completed in 1997 and a *Polar Bear Interaction Management Plan* completed in 2000 and revised in 2008 (Ohms 2008) and again revised as part of this INMP preparation (*Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan*, Appendix 7.4.5); a rabies awareness poster; and the above referenced policy, which has been updated several times.

Natural resources education increases awareness, resource protection, enjoyment of recreational opportunities, and improved stewardship by installation personnel. The likelihood of funding for Natural Resource Education at Eareckson AS is not good.

7.11.3 Other Recreation

Other outdoor recreational opportunities on 611 ASG sites include walking, hiking, jogging, and ATV riding on the road systems. Contractor personnel are involved in mining near some sites (personal communication, P. Cooley 2007).

7.12 Cultural Resources Protection

Cultural resources management at 611 ASG sites is provided in accordance with Section 106 and Section 110 of the National Historic Preservation Act (16 USC Section 470, as amended), the Archeological Resources Protection Act (16 USC Section 470aa-47011), the American Indian Religious Freedom Act (42 USC), the Native American Graves Protection and Repatriation Act (25 USC Section 3001 *et seq.*),

¹⁵ Memorandum, 18 Jan 06, from Commander, 611 ASG/CC, Subject: *Prohibition of Wildlife Feeding and Poisoning Policy*.

Executive Order 11593 (*Protection and Enhancement of Cultural Environment*), DoD Directive 4710.1 (*Archeological and Historic Resources Management*, 1984), and Air Force Instruction 32-7065.

The *Integrated Cultural Resources Management Plan, Eareckson Air Station, Alaska, 2010* (Center for Environmental Management of Military Lands 2010a) includes provisions for the protection and evaluation of prehistoric and historic sites on Shemya Island. A number of the archaeological sites on Shemya have been claimed by the Aleut Corporation under the Alaska Native Claims Settlement Act's 14(h)(1). Shemya Island also contains historic properties and artifacts associated with World War II and the Cold War. Disturbance of World War II and Cold War historic properties, including buildings, structures and artifacts are subject to review under the National Historic Preservation Act.

The *Cultural Resources Management Plan, King Salmon Airport, Alaska, 2008* (Center for Environmental Management of Military Lands 2008) includes provisions for the protection and evaluation of prehistoric and historic sites on King Salmon Airport. No archaeological properties are known to exist on King Salmon Airport. The entire Aircraft Control and Warning system, which includes the King Salmon Airport, has been determined eligible for inclusion in the National Register of Historic Places (USAF 2000a).

The *Integrated Cultural Resources Management Plan: Aircraft Control and Warning (AC&W) System, Alaska, 2010* (Center for Environmental Management of Military Lands 2010b) includes provisions for the protection and evaluation of prehistoric and historic sites on Cape Lisburne, Kotzebue, Tin City, Indian Mountain, Murphy Dome, Fort Yukon, Tatalina, Sparrevohn, Cape Romanzof, and Cape Newenham LRRSs.

The *Cultural Resources Management Plan, Distant Early Warning (DEW) System* (Center for Environmental Management of Military Lands 2006) includes provisions for the protection and evaluation of prehistoric and historic sites on Bullen Point, Point Lay, and Wainwright former SRRSs; Point Lay former LRRS; and Point Barrow, Oliktok, Barter Island, and Cold Bay LRRSs. Most other Inactive and Excess sites are also covered in the *Integrated Cultural Resources Management Plan, Distant Early Warning (DEW) System, Alaska, 2006*.

Ground-disturbing projects on 611 ASG sites need to be reviewed to make sure that they do not disturb archaeological resources. All undertakings (as defined by Section 106, National Historic Preservation Act) need to be reviewed for their potential to affect historic properties, and a qualified archaeologist needs to review, and determine if there is a need for a survey, of proposed areas of potential effect. If archaeological resources are discovered, excavation must stop; the area must be protected; and the 611 CES Commander or the Cultural Resources Manager must be notified immediately. It may be necessary to consult with the State Historic Protection Officer regarding potential effects.

It is illegal to disturb archaeological sites, collect Native American artifacts, or collect artifacts from historic sites. A policy letter on Archaeological Resources Protection was signed by the 611 ASG Commander on 15 December 2006.

Some 611 ASG sites may contain historic properties and artifacts associated with World War II and the Cold War. Any undertakings that have the potential for direct or indirect effects of World War II and Cold War historic properties, including buildings, structures and artifacts, are subject to review under the National Historic Preservation Act.

7.13 Public Outreach and Natural Resources Education

7.13.1 Public Outreach

Community relations are a continuing concern to the USAF at some 611 ASG sites because of their close proximity and other relationships with these communities. Issues regarding effects of contaminants on fish and wildlife and water quality have been an IRP concern. Community concerns with regard to Air Force management of fish and wildlife and vegetation at the sites are considered in Air Force actions as they may impact subsistence activities, which may occur on the sites.

Restoration Advisory Boards (RAB), created by the USAF, provide local input into the IRP program. A RAB is a stakeholder group that meets on a regular basis to discuss environmental restoration at a specific 611 ASG property. RABs provide opportunities for local communities to become involved in the IRP process. It is an opportunity to share concerns with agencies involved in these activities (Office of the Secretary of Defense 2007). The number of RABs and their degree of involvement changes as USAF IRP activities change. As of December 2011, the 611 ASG had 13 active RABs.

The 611 CES/CEAN uses these RABs to provide information relative to natural resources in the area. Since IRP activities may impact natural resources, it is important to make sure that any potential natural resources issues are identified and minimized in a public manner.

7.13.2 Natural Resources Education

Natural resource education increases awareness, resource protection, enjoyment of recreation opportunities, and improvement of stewardship by installation personnel. Only Eareckson AS has enough personnel to justify an organized natural resources education program.

Prior to and following the drawdown, a Natural and Cultural Resource Education program was provided to installation personnel and temporary duty personnel at Eareckson AS during 1994, 1995, and 1996 (Meehan 1995, 1997b). Attendance was voluntary. In the first year, prior to the drawdown, 178 persons participated in five programs, and 22 persons took part in field trips. During 1995 and 1996, 36 persons attended five programs. Instructors were USFWS personnel temporarily on the island to conduct projects on sea otters, waterfowl, general wildlife surveys, and archeology surveys. During this period the educational opportunity offered to installation personnel frequently provided unsolicited and helpful information to the Natural Resources Program Manager. These programs have largely been discontinued.

The USAF funded the production of a birder's pamphlet, *Birds of Eareckson Air Station*, in cooperation with the DoD Partners in Flight program in 2002. A more detailed and updated list of birds found on the island, *Bird Species Found at Shemya Island, Alaska, 1999-2007*, was prepared by Schwitters (2008).

The USFWS (2010) prepared *Shemya Island, Nature Discovery Guide*, which, using many photographs, describes Shemya Island's natural environment. The guide includes plants, including edible ones; wildlife habitats; birds, including exotic migrants; the BASH role of Arctic foxes, including issues caused by human feeding; rat and mouse issues; cultural information, including native peoples and the role of the island in World War II; marine mammals on or near the island; fishing opportunities, emphasizing salt water; and reef ecology. This guide is invaluable to both contractor personnel stationed on Eareckson AS and island visitors.

7.14 Installation Restoration Program, Demolition Program, and Related Concerns

In many ways the 611 ASG IRP, Clean Sweep, and related programs affect natural resources on 611 ASG sites more than any other environmental programs, including direct natural resources management. There

are obvious positive effects of preventing and removing hazardous wastes and materials from these sites, and the removal of unused facilities significantly promotes the return of naturally functioning ecosystems to previously disturbed lands. On the other hand, there are some concerns about effects of these programs' implementation on natural resources.

The DoD has developed the IRP program to identify and evaluate past hazardous material disposal sites on DoD property to control the migration of hazardous contaminants and control hazards to health or welfare that may result from past disposal operations. The 611 ASG Environmental Compliance Program identifies and evaluates on-going hazardous material control, disposal, and compliance issues. Groundwater, surface water, and soils have been collected and analyzed from spill/leak sites and waste accumulation areas at 611 ASG sites. Results of these investigations are in the Administrative Record at the 611 CES/ Environmental Restoration Section.

Ongoing implementation of the IRP could affect natural resources at 611 ASG sites. However, effects would likely be minimal due to all sites having been identified, remediated, and in long-term management and natural attenuation status. Potential natural resource issues relating to IRP projects include:

- need for revegetation of disturbed areas,
- surface water quality associated with contaminated vegetation and soil from IRP sites,
- effects (positive and negative) on native vegetation and wildlife habitats, and
- reduced risk to the environment through the IRP.

There is a need to continue the IRP at many active and inactive 611 ASG sites, which may affect fish and wildlife resources in the vicinity of these sites. Monitoring and cleanup activities of the IRP should continue to improve surface water quality within or adjacent to the sites. Contamination of surface water and vegetation on the sites must be minimized to ensure the continued suitability of these habitats.

Structures on sites, including tropospheric antennas remaining on some Inactive and Excess sites as navigational landmarks, may be used for nesting by wildlife species, such as the Common Raven. Ravens may use inactive structures for nesting. If Ravens or other migratory birds are found to be nesting in inactive structures, and Clean Sweep is planned and includes these structures, it is important to schedule removal for times when nests are not used. Proper permits are required for nest removal and must be obtained prior to activities at the site. The USAF will, to the extent possible, minimize the overall availability of nesting sites for Ravens by avoiding the construction of facilities attractive to Ravens.

In addition to hazardous material disposal sites, there are deactivated facilities that were left "as is" when the USAF had no further need for buildings and other structures at remote sites in Alaska. Some of these are associated with hazardous materials, but many are safety hazards and unsightly blemishes on the environment.

Clean Sweep is a program that simultaneously demolishes facilities and performs environmental cleanup (IRP) at remote sites throughout Alaska. Clean Sweep's approach to cleanup is a one-time mobilization to a single remote site to remove deactivated facilities and remediate environmental contamination. This process is more efficient and reduces shipping and logistic costs compared to working solely on a "worst-first" individual facility prioritization scheme that might require many smaller projects over a number of years on a given remote site (USAF 1998b).

The Clean Sweep program uses the following factors to score and prioritize affected sites (including former SRRSs and LRRSs):

- human health and ecological risks,
- 611 CES Commander's priority,
- community safety and attractive nuisances, and
- public interest.

The Clean Sweep program is nearly complete with work remaining at Cape Newenham LRRS (minor), Indian Mountain LRRS (minor), Point Barrow LRRS (hangar), Lake Louise (finish-up), Point Lonely site, Wainwright site, and Driftwood Bay site (minor) (Steven J. Mattson, February 2012 e-mail to Matt Moran).

The term "long term management" in below descriptions of IRP and related actions means that the site has achieved its cleanup goals. Long term management includes inspection-type actions to ensure the site's remedy remains protective. Often, these involve an on-site inspection every year for a set number of years or perhaps every five years to ensure continuing compliance.

7.14 1 Eareckson Air Station

Eareckson AS has 51 IRP sites. Due to the close proximity of sites to each other on the small island, the IRP used a basewide approach to characterize source areas and their influence on each other (Jacobs Engineering Group, Inc. 1998). The USAF conducted a basewide investigation in 1993 to determine the physical and chemical characterization and condition of the island. In 1993 and 1994 all major surface water bodies and drainages, including intertidal areas, were sampled for chemistry characterization. Results indicated no off-island discharges of contaminants and inland lakes, drainages, and most major seeps were free of contamination (Jacobs Engineering Group, Inc. 1998).

In 1993 and 1994, 102 groundwater monitoring wells were installed. Results indicated no widespread groundwater contamination and that isolated occurrences of contamination were restricted to identified source areas or areas of known contamination. Ecological surveys were conducted in 1993 and 1994 to assess the extent and magnitude of potential ecological risks from exposure of biota to contaminants associated with Shemya Island. Background, or ambient, conditions were evaluated on a media-specific basis. Data are available for surface soils, subsurface soils, marine surface water, fresh surface water, marine sediments, freshwater sediments, and groundwater. In 1993 the Environmental Protection Agency made a formal decision to exclude Eareckson AS from the National Priorities List (Jacobs Engineering Group, Inc. 1998).

No significant active remediation is currently taking place on Eareckson AS. Long-term management of groundwater and seepage from surface waters is ongoing.

There is an active demolition program at Eareckson AS that resumed in 2006. Demolition actions should include removal of building foundations although some foundations from prior demolitions have been left in place for future use (electronic communication, R. Lurk 2007).

Future activities at Eareckson AS from an environmental restoration standpoint include continuation of sampling and institutional controls at various sites. PCB-contaminated soil at Sites SS005 and SS012 is scheduled for excavation and disposal off island in 2014. Military munitions investigation field work was completed in 2012, and a report is scheduled for delivery in 2013, which may lead to clearing of those areas in the distant future. Further investigation of compliance cleanup sites is scheduled in 2012 and later (personal communication, K. Barnack 2012). The Compliance Restoration Program has approximately 11 sites and 16 tank sites that are currently being environmentally characterized. No significant remediation

work is planned for these sites. Most likely, long term management of fuel contaminated groundwater and soil will be the outcome.

7.14.2 King Salmon Airport

The main contaminants of concern at King Salmon are POL and TCE. The King Salmon installation has been divided into five Zones. Final Records of Decision have been signed for three zones. One zone is operating under an interim Record of Decision, and the remaining zone should have a completed Record of Decision by 2013. Much remaining work at the installation will be Remedial Action-Operations and then Long Term Monitoring. Minor removal actions may also be required. The Installation will also have several projects that will address military munitions projects. Land use controls will be required indefinitely due to remaining landfills and contaminated soil.

A well inventory was performed in 2011. TCE contamination has been confirmed in the A and B aquifer and further investigation is ongoing. PCB contamination at OT010, the White Alice site, is completely remediated to the point that the site is available for Unrestricted Use/Unlimited Exposure. Military Munitions Response Program investigations are in the RI/FS stage, with some removal actions likely.

7.14.3 Long Range Radar Sites

The greatest issue regarding natural resources by the North Slope Borough is effects of contamination on wildlife used as a food supply. This public health issue is being addressed through the IRP for 611 ASG sites affected by this concern.. These concerns are at a high level due to the discovery by the North Slope Borough of PCB contamination in grayling at a site that was being closed by the U.S. Army Corps of Engineers at Umiat.

Barter Island LRRS

Clean Sweep activities at Barter Island LRRS were completed in 2007. Inactive structures; towers, buildings, tanks, pipelines, pads, etc. were removed. Much of the material removed (2,200 tons of material) was barged to the Oxbow Landfill in Deadhorse, and other nonhazardous wastes were transported to the Kaktovik landfill (personal communication, S. Slagle 2006). In 2008 the landfill was removed due to coastal erosion compromising it. Long term management is planned for the next five years. Active structures and site personnel still remain.

Cape Lisburne LRRS

By 2002 the Air Force had demolished all non-active buildings and structures. An investigative study of Landfill 001 to sample for contaminants was done in 2009. Polychlorinated biphenyl (PCB) cleanup has occurred. All remedial actions are complete. Long-term monitoring and land use controls will be managed indefinitely to verify protectiveness of remedial work.

Cape Newenham LRRS

There is a large concentration of a former plant species of concern, Chukchi primrose, at Cape Newenham LRRS. The 200 plants are similar to the population size found at Tin City LRRS (Lipkin 1999). There was concern (Day 1996) that site cleanup may affect these plants, which has not occurred. The USAF will be particularly cognizant of the need to protect the large concentration of Chukchi primrose at the LRRS during IRP and cleanup operations.

Clean up of debris from wind damage was completed in 2007. Hazardous waste sites are identified and addressed through the IRP. Clean Sweep at the LRRS occurred in 2012. Ongoing monitoring and maintenance of the cap at SS007 has been the focus of all recent and future work. Long-term monitoring and land use controls will be managed indefinitely to verify remedial protectiveness.

Cape Romanzof LRRS

Landfill No. 2 remediation occurred in 2006. A project to remediate PCB-contaminated soil will be awarded in FY 2013 and conducted in 2014. Long-term monitoring activities are conducted annually to verify the protectiveness of previous restoration actions and confirm land use controls compliance.

Cold Bay LRRS

Clean sweep at Cold Bay LRRS is not necessary since the site was newly established in 1985 as a MAR. There are two sites requiring remedial action at Cold Bay: site ST005 (petroleum, oil, and lubricant storage area) and site OT001 (fuel-contaminated groundwater). Groundwater at ST005 continues to exceed Alaska clean-up standards. The current remedy for the site is monitored natural attenuation, which will be ongoing for a number of years. OT001 has met cleanup standards but requires one groundwater monitoring well to be decommissioned. One additional site, LF002, does not require any remedial action but does require five-year reviews to ensure the landfill cap integrity is maintained.

Fort Yukon LRRS

All abandoned fuel tanks, antennas, and buildings (except the old gymnasium) at Fort Yukon LRRS were demolished in 1999. The gym building (114) and building 102 were recently demolished. All sites have been closed. No actions are scheduled for 2013-17.

Indian Mountain LRRS

Clean Sweep is occurring during 2013 at the LRRS.

Kotzebue LRRS

Clean Sweep at Kotzebue LRRS was completed in 1998. Long-term management of three sites is ongoing and will continue through 2013-2017.

Murphy Dome LRRS

The largest site, a co-mingled combination of SS001 and SS007, contains diesel-contaminated soil. An interim action completed the excavation and off-site disposal of 8,100 cubic yards of soil in 2001. Additional contaminated soil remains. Study (remedial investigation is required at this site, in addition to two other sites, prior to a final decision.

Two sites, LF003 and SS002, are in the Draft Record of Decision phase. LF003, aka Landfill No. 1, is recommended for closure with institutional controls. SS002, aka Waste Accumulation Area No 3, has a small quantity of lead-contaminated soil that is recommended be removed.

The last site, SS008, a former underground storage tank, is being reviewed for closure by the Alaska Department of Environmental Conservation.

Oliktok LRRS

The 611 CES obtained ADFG permits for removal of six Raven nests at Oliktok LRRS in preparation for site demolition and environmental restoration. Demolition and debris removal at Oliktok LRRS occurred in 2006-2007, including removal of about 50 items. Soil remediation was completed in 2007. Contaminated soils that fall within limits accepted by the Oxbow Landfill in Deadhorse were transported and disposed of there. Other soils were land-farmed onsite (personal communication, S. Slagle 2006).

The Air Force has a unique situation at Oliktok associated with historical environmental site LF001. The Air Force originally developed this landfill in 1956 to dispose of daily debris generated from the Oliktok LRRS. In 1995 the Bureau of Land Management transferred this dumpsite to private ownership as part of

a native allotment. The Air Force is legally responsible for any releases of hazardous substance from the dumpsite. To facilitate the environmental cleanup at site LF001, the Air Force purchased the property in 2006 and now owns this 159.97 acre parcel. The hangar has not been demolished because North Slope Borough is interested in obtaining the hangar and the surrounding property and runway. Long term management began in 2010 and will continue through 2017.

Point Barrow LRRS

PCB-contaminated soil was discovered near a maintenance garage and was removed in 2006-2007. In addition, sediment and water testing was performed at Imikpuk Lake. Clean Sweep demolition and debris removal at Point Barrow LRRS occurred in 2011. Long-term management began in 2012 and will continue through 2013-2017.

Sparrevohn LRRS

Debris from a quonset hut that blew over was partially cleaned up in 2006, and the remainder was cleaned up in 2007. Records of Decision were signed for seven sites in 2009. Two sites were closed, five sites required land use controls, and one site required long term monitoring of natural groundwater reduction. Clean Sweep removed one aboveground storage tank in 2011. BD/DR of POL Tank No. 20 was completed in 2012. A five year review of five sites and groundwater monitoring at one site will be funded in FY13. Long-term management will begin in 2013 and continue through 2017.

Tatalina LRRS

Removal of as much as 5,000 cubic yards of contaminated soils at Sterling Landing was accomplished in 2007. Long-term monitoring, remedial operations and land use control management are conducted annually to verify protectiveness of previous restoration activities. Projects to remove POL- and PCB-contaminated soil are planned for FY2013 or FY2014 depending on funding. Land-farming of the POL soil will be conducted afterwards until clean-up levels are achieved.

Tin City LRRS

There have been no IRP-related projects at Tin City during the past five years, nor are any scheduled during 2013-17.

7.14.4 Inactive and Excess Sites

Bullen Point Site

Demolition and remediation of inactive facilities under the Clean Sweep program occurred in 2006-2007 at Bullen Point site and included removal of about 25 items, leaving only a few then-active buildings. Activities included construction of a new landfill, decommissioning two existing landfills, demolition of inactive buildings and facilities, and restoring sites impacted by environmental contamination. ADFG permits were issued in 2006 and 2007 authorizing the removal of nine inactive Raven or Rough-legged Hawk nests in preparation for site demolition and environmental restoration. Removal occurred prior to active nesting at the site. Final demolition and environmental cleanup is scheduled for 2013. Long term management is scheduled for 2011-15.

Campion Site

POL remedial action was conducted in 2012, and land-farming of the excavated soil will likely continue for 5-7 years. POL-contaminated soil remains and will require monitoring for many years. MMRP investigations are in the RI/FS stage, with some removal actions of sub-surface debris likely.

Lake Louise

Clean Sweep occurred in 2010-2012. Long term management began in 2012 and is scheduled through 2017.

Point Lay Site

A public safety permit to remove an active nest with eggs and to take (*i.e.* haze or kill) adult Common Ravens was issued for 2005 at Point Lay site. Four Ravens were killed under this permit. Since the attraction of the structures for nesting at the site has been removed, BASH risk has lessened. This is particularly important since the runway at the Point Lay site is the only runway that provides access to the village of Point Lay. Clean Sweep occurred in 2005; other remediation occurred in 2012. Long term management is scheduled for 2013-17.

Point Lonely

Clean Sweep began at Point Lonely site in 2006 and was completed in 2010. Demolition and removal of debris/contaminate soil will be awarded in FY14. Long term management began in 2011 and is scheduled through 2015.

Wainwright Site

Time-critical cleanups at the Beach Tank Farm and eroding Coastal Landfill were accomplished in 2009 – 2012. A contract for final demolition of all buildings/structures and environmental clean-up was awarded in 2012 and will be accomplished in 2013 and 2014. No long term monitoring will be necessary after completion of contract.

Anvil Mountain Site

In 2010-11 PCB contamination was remediated at Anvil Mountain site. In 2011 and 2012 towers were abated of asbestos containing material. Long term management began in 2012 and is scheduled for 2016.

Bear Creek

Long term management occurred in 2005-06. Soil remediation occurred in 2010. Long term management is scheduled for 2017.

Beaver Creek Site

There have been no IRP-related projects at Beaver Creek site during the past five years, nor are any scheduled during 2013-17.

Bethel Site

The remaining White Alice tower was demolished in FY11. Long term management began in 2012 and is scheduled through 2016.

Big Mountain Site

PCB remediation occurred in 2005 and 2010. Other remediation actions occurred in 2006, 2008, 2009, and 2012. Long term management began in 2012 and is scheduled through 2017.

Driftwood Bay Site

Tank farm remediation occurred in 2010, and soil remediation occurred in 2011. Long term monitoring began in 2012 and is scheduled through 2017.

Granite Mountain Site

A public safety permit to haze brown bears, using non-lethal techniques only, at the Granite Mountain site was issued prior to Clean Sweep, which occurred in 2009. Long term management began in 2012 and is scheduled through 2014.

Kalakaket Creek Site

A remedial action occurred in 2009-2010. Long-term management, including groundwater monitoring, began in 2011 and will continue annually through 2015, at which time a 5-year review will evaluate the remedial effectiveness. Three landfills remain on the property and have indefinite land use controls. Fixed-wing aircraft are not permitted by FAA and USAF rules/policy to land at Kalakaket Creek.

Naknek Recreation Camps

Remedial removal actions have been conducted since 2009, with annual long-term management (groundwater monitoring) scheduled at least through 2017, and likely indefinitely afterward. Records of Decision will be revised in 2013 to address remaining POL contamination.

Nikolski Site

Groundwater monitoring is scheduled for 2013. In 2012 long term management began and is scheduled through 2017.

Nome Field POL Site

Long term management occurred in 2011 at Nome Field POL site and is scheduled annually for 2014-2017.

North River Site

In 2005 PCB contamination was remediated. In 2010-2012 POL and additional PCB remediation occurred, and in 2012 long term management began and is scheduled through 2014. Landfill and well remediation is scheduled for 2013.

Port Heiden Site

Site cleanup actions have occurred in 2007 through the present. In 2008 and during 2011-present soil remediation occurred; and in 2012 long term management began and is scheduled through 2042.

7.15 Coastal Zone Management

DoD Instruction 4715.03 (Feb. 14 2011) requires installations to manage its operations, activities, and natural resources to avoid or minimize adverse effects to natural resources on, adjacent to, or in close proximity to DoD lands or near-shore areas, and also to complete planning-level surveys to characterize significant installation and near-shore natural resources.

The Air Force has a Memorandum of Understanding with Coastal America (Coastal America 1992) to perform the following:

- protect, preserve, and restore the nation's coastal ecosystems through existing federal capabilities and authorities;
- collaborate and cooperate in the stewardship of coastal living resources by working together and in partnership with other federal programs; and
- provide a framework for action that effectively focuses expertise and resources on jointly identified problems to produce demonstrable environmental and programmatic results that may

serve as models for effective management of coastal living resources.

As stated in AFI 32-7064, par. 5.2.1, all Air Force activities, operations, projects, and programs that affect any lands, water use or natural resources of a state's coastal zone must be consistent, to the maximum extent practicable, with the state Coastal Zone Management Plan. Although federal lands are excluded from Alaska's coastal zone boundaries as *those lands owned, leased, held in trust or whose use is otherwise by law subject solely to the discretion of the Federal Government, its officers or agents...* (15 CFR 923.3), activities on these lands are subject to consistency provisions of Section 307 of the Coastal Zone Management Act of 1972, as amended.

This has been accomplished during the NEPA/Environmental Impact Analysis Process where if the 611 ASG determines that an activity, operation, project, or program may affect the coastal zone, a Alaska Coastal Management Program Consistency Determination for Federal Activities questionnaire was prepared and submitted for review and the state's response became part of the National Environmental Policy Act/Environmental Impact Analysis Process documentation. Equally important, the 611 ASG protects, preserves, and restores coastal ecosystems through environmentally coordinated daily operations and through the IRP program (Section 7.14) for clean-up and restoration of contaminated sites.

The Alaska coastal management program was discontinued effective 30 June, 2011 as the Alaska House defeated a measure that would have extended the state's program. There are ongoing efforts (December 2011) to reinstate this program, but results of these political efforts are uncertain. Regardless, the 611 ASG will continue to perform tasks specified in the Air Force Memorandum of Understanding with Coastal America (Coastal America 1992).

The 611 ASG has modified the former Alaska Coastal Management Program's Coastal Project Questionnaire and Certification Statement to evaluate projects that may affect any 611 ASG site's environment, regardless of whether or not such sites are coastal. A copy of this checklist is in Appendix 7.15, *611 ASG Project Environmental Questionnaire*.

7.16 Natural Resources Law Enforcement

There are virtually no natural resources law enforcement issues on 611 ASG sites. Sites are often very small; hunting is not permitted on sites; and sites, if manned, with exception of Eareckson AS, have few on-site personnel. Appendix 2.4.2. *General Items of Cooperation among the U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, and the 611th Air Support Group, U.S. Air Force* provides a means for the 611 ASG to request enforcement assistance from the USFWS. The 611 ASG will develop a means to use Joint Base Elmendorf-Richardson conservation officers, on an as-needed basis during 2013-2017.

7.17 Wildland Fire Management

Wildland fire has not been a significant issue on 611 ASG sites. Coastal sites, by their vegetative and climatic nature, are not at risk from wildland fires. There is a potential for wildland fire to be a significant issue on sites within interior Alaska, but 611 ASG missions are not, by their nature, prone to causing wildland fires.

Wildland fire management in Alaska requires multi-agency cooperation. Fire management programs are the programs of the land-managing agencies. Wildfire suppression is primarily a joint effort by BLM, Alaska Fire Service and the Alaska Division of Forestry with assistance from other agencies. Assistance to the USAF by the agencies listed in this section can be provided only if there is an agreement in place. Currently, none of the agencies have an agreement with the Air Force for 611 ASG site protection. Some

611 ASG sites are withdrawn from BLM. BLM would directly manage fire suppression on these sites, using procedures developed for other lands in Alaska. On 611 ASG sites authorized from the BLM to the Air Force by Federal Land Policy and Management Act rights-of-way BLM would have primary fire management responsibility.

The Joint Task Force-Alaska Wildland Firefighting Concept of Operations (July 2010) provides means by which the Department of Defense can support cooperative wildland fire suppression efforts in Alaska. This plan is not specifically targeted toward, but would include, 611 ASG sites. There are no military units specifically trained to provide such support within Alaska.

8.0 Management Goals, Objectives, and Projects

8.1 INRMP General Natural Resources Goals and Objectives

Section 2.4.3, *Ecosystem Management Principles* lists general 611 ASG natural resources goals and objectives used to attain them.

8.2 INRMP Program-specific Goals, Objectives, Inhouse Actions, and Projects

INRMP project-specific implementation goals, objectives, actions, and projects are listed in the order of natural resources management topics discussed in Chapter 7 (7.2, *Ecosystem Management*; 7.3, *Geographic Information System*; 7.4, *Fish and Wildlife Management*, etc.). Within each of these management topics are specific goals and objectives followed by individual actions and projects in four categories (if needed): In-house Management Actions and Projects that require additional support. Funding is further discussed in Section 9.5, *Implementation Funding Options*. Projects are discussed in Section 9.1, *Work Plans* and detailed in Appendix 9.1 in standardized work plan format.

In addition to projects to be managed by the 611 CES/CEAN Manager through inhouse or contracted means, there are other projects to be accomplished through BOS contractor operations and other 611 ASG units at the ARS sites. These are all termed “Inhouse Actions.” General, non-site-specific, environmental protection measures within this INRMP are applicable to other current or future 611 ASG sites in Alaska.

A tabular summary of goals, objectives, inhouse actions, and projects is in Appendix 8.2, including planned implementation years.

8.2.1 Ecosystem Management

Background information for these planned management actions is in Section 7.2.

Goal 1: Implement Ecosystem Management as the overall management system to ensure sustained ecosystem functionality on 611 ASG sites.

Objective 1.1: Manage land use to sustain 611 ASG sites’ natural resources in concert with military mission requirements.

In-house Management Actions:

- Use adaptive management principles to manage 611 ASG natural resources, using ecosystem monitoring to guide management actions (ongoing).
- Promote biodiversity via the use of native species, protection of sensitive areas, and restrictions on activities that negatively affect biodiversity (ongoing).

Objective 1.2: Use coordinated planning to fully integrate the 611 ASG sites natural resources program.

In-house Management Action:

Improve or develop partnerships to ensure program development is coordinated with regional management programs to the best degree possible considering needs of military missions (as needed).

Projects:

VNMHOS140313 (2014), VNMHOS150313 (2015), VNMHOS160313 (2016), VNMHOS170313 (2017), VNMHOS190313 (2019), VNMHOS200313 (2020), and VNMHOS210313 (2021). **Plan Update INRMP, Alaska Remote Sites.** Review and update of this INRMP annually (except during time of major revision) using INRMP goals, objectives, inhouse actions, and projects to guide reviews; revise projects and budgets as required; coordinate significant changes with the USFWS, ADFG, and if necessary NMFS.

VNMHOS170313 (2017) and VNMHOS220313 (2022). **Plan Update INRMP, Alaska Remote Sites.** During FY 17 implement the five year revision/update of the 611 ASG INRMP with the goal of completion for implementation in 2018; coordinate update with USFWS, ADFG, NMFS, BLM, and other partners.

8.2.2 Geographic Information System

Background for these planned management actions is in Section 7.3.

Goal 2: Provide spatial products and analyses to support 611 ASG natural resources program implementation.

Objective 2.1: Implement GIS through use of the 611 CES GeoBase program.

In-house Management Actions:

- Use GeoBase analyses and products to support natural resources management (ongoing).
- Coordinate and exchange data with the Joint Base Elmendorf-Richardson GeoBase program (ongoing).
- Establish priorities for collecting and entering GIS data into the 611 CES GeoBase geodatabase and conduct data development (ongoing).
- Ensure contracts to outside agencies or contractors require that any spatial data developed be incorporated into a compatible GIS format (ongoing).
- Solicit partnering agencies for additional relevant natural resources data layers (ongoing).
- Use GeoBase databases to respond to USAF data calls (as needed).
- Provide change analyses maps and data to monitor ecosystem changes (as needed).
- Ensure GIS coverage supports presentation of natural resources in E-Plan INRMP.

8.2.3 Fish and Wildlife Management

Background for these planned management actions is in Section 7.4.

Goal 3: Maintain fish and wildlife populations and habitats as a part of naturally functioning ecosystems to support the military mission and enhance readiness by providing natural environments for training and minimizing conflicts between mission requirements and natural resources and their uses.

Objective 3.1: Protect, conserve, and manage fish and wildlife and their habitats as vital elements of an integrated natural resources program and perform studies to enhance and maintain healthy sustainable populations.

In-house Management Actions:

- Cooperate with the Alaska Landbird Monitoring System (as needed). Conserve migratory bird populations through implementation of DoD Partner's in Flight strategies (ongoing).
- Implement requirements of Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, as established in the MOU between DoD and the USFWS (ongoing).
- Implement requirements of the *Final Rule – Migratory Bird Permits; Take of Migratory Birds by Department of Defense* (ongoing).
- Discourage raven use of Point Barrow, Oliktok, and Barter Island LRRSs and Wainwright and Bullen Point former SRRSs to protect indigenous, ground-nesting birds in the immediate area that are particularly vulnerable to raven predation (ongoing).
- Use guidelines discussed in Section 7.4.4, *Migratory Birds* to minimize Brant disturbance at Oliktok LRRS (ongoing).
- Minimize disturbance to seabird colonies from quarry blasting, minimize the spread of debris from facilities, and reduce or eliminate the disturbance of seabird colonies by approaching and departing aircraft at Cape Lisburne LRRS (ongoing).
- Educate pilots about the sensitive nature of breeding seabird colonies and haulout sites in the Cape Newenham area and discourage them from approaching too closely to haulout and nesting areas (ongoing).
- Maintain and update species lists as studies provide new information (as needed).
- Support Christmas Bird Counts on Eareckson AS, if volunteers are available (as needed).
- Provide bird monitoring information for use in generating the Bird Avoidance Model.
- Provide reminders prior to expected increases in wildlife activities at Cape Romanzof and Tin City LRRSs. The notices will be originated by the Natural Resource Program Manager and provided through the Alaska Radar System Program Management Office to BOS contract personnel per 611 ASG Bird/Wildlife Hazard Working Group instructions.
- Limit use of dock lights at Eareckson AS to only those times when necessary for barge loading/off-loading operations that must be performed after dark to protect Leach's Storm-Petrels. Evaluate if directional lighting could be used to modify or restrict the area of illumination as necessary to minimize bird attraction (Leach's Storm-Petrels).
- Integrate wildlife/habitat issues into land-use planning and decision-making processes (ongoing).
- Minimize fragmentation by promoting natural landscapes and connectivity of habitats (ongoing).
- Monitor installations for potential revegetation sites and monitor results of revegetation projects.
- Pursue all actions available to increase visibility, decrease perching suitability, and potentially reduce avian species collisions with wind turbines by addressing issues such as turbine height, tower design, and color patterns of the rotors.

Projects:

CEOSOS1167 (2013). **Management, Habitat, Native Ecosystems (ARS)**. Conduct ecosystem monitoring to detect habitat changes on active LRRSs. Compare results with previous monitoring for 2000-2002 (Schick *et al.* 2004), for 2005-2008 (Wells *et al.* 2010), and that conducted for this INRMP to monitor changes in the quality of the ecosystem to determine impacts of site operations at these sites.

VNMHOS141268 (2014). **Management, Habitat, Native Ecosystems (EAS & KS)**. Conduct ecosystem monitoring to detect habitat changes on Eareckson AS and King Salmon Airport. Compare results with previous monitoring for 2000-2002 (Frost *et al.* 2005a and 2005b), for 2005-2008 (Roth and Macander

2009, Wells *et al.* 2010), and that conducted for this INRMP to monitor changes in the quality of the ecosystem to determine the impact of site operations at these sites.

VNMHOS211268 (2021). **Management, Habitat, Native Ecosystems.** Conduct ecosystem monitoring to detect habitat changes on Eareckson AS, King Salmon Airport, and active LRRSs. Compare results with previous monitoring for 2000-2002 (Frost *et al.* 2005a and 2005b, Schick *et al.* 2004), for 2005-2008 (Roth and Macander 2009, Wells *et al.* 2010), that conducted for this INRMP, and those conducted by above two projects to monitor changes in the quality of the ecosystem to determine the impact of site operations at these sites.

Eareckson AS

Projects:

VNMF169000 (2015). **Management, Species, Arctic Fox.** Continue a study from 2008 on the condition of foxes on Shemya Island and investigate their generally poor health. The work will include additional analysis of samples already obtained, histology of teeth and jaw tissues, assessment of genetic diversity, and screening of tissues for possible environmental contaminants that were identified in 2008 project. Additional field study is also necessary to determine causes of these pathologic conditions and to identify measures that will improve fox health.

VNMHOS130412 (2013), VNMHOS140412 (2014), VNMHOS150412 (2015), VNMHOS160412 (2016), VNMHOS170412 (2017), VNMHOS180412 (2018), VNMHOS190412 (2019), VNMHOS200412 (2020), VNMHOS210412 (2021), VNMHOS220412 (2022), and VNMHOS230412 (2023). **Management, Species, Migratory Bird Protection.** Conduct surveys of wildlife at Shemya including Emperor Geese, threatened Steller's Eiders, and other winter waterfowl and seabirds, as well as threatened sea otters and endangered Steller sea lions and Arctic foxes to compare populations with historic counts funded by the Legacy Program and more recent surveys.

VNMHOS1370 (2013), VNMHOS147000 (2014), VNMHOS157000 (2015), VNMHOS167000 (2016), VNMHOS177000 (2017), VNMHOS187000 (2018), VNMHOS197000 (2019), VNMHOS207000 (2020), VNMHOS217000 (2021), VNMHOS227000 (2022), and VNMHOS237000 (2023). **Management, Invasive Species.** Eradicate rats and ensure measures to prevent rat re-introduction are implemented.

VNMHOS208845 (2020). **Update Wildlife Hazard Management Plan, Eareckson.** Update the EAS Wildlife Hazard Management Plan and present it to the Bird Hazard Working Group for review and approval.

Objective 3.2: Minimize human-wildlife conflicts at 611 ASG sites.

In-house Management Actions:

- Reduce human-wildlife conflicts with large, potentially dangerous animals, particularly polar bears, through an aggressive program of public education, garbage management, and enforcement (annually).
- Implement (ongoing) and update (as needed) the *Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan*.
- Conduct aversive conditioning of nuisance or dangerous wildlife and monitor results (as needed).

- Discourage arctic ground squirrel presence and burrowing activity damages to airfields, helipads, and other fill areas (as needed).

8.2.4 Management of Threatened and Endangered Species and Habitats

Background for these planned management action is in Section 7.5.

Goal 4: Conserve and maintain self-sustaining populations of threatened and endangered species and species of special concern, consistent with military policy, mission sustainability, and carrying capacity of the ecosystem; and avoid jeopardizing the continued existence of threatened and endangered species within 611 ASG sites.

Objective 4.1: Maintain mission flexibility through the conservation and management of federal and state-listed species and species of special concern.

In-house Management Actions:

- Protect and conserve endangered and threatened species and species of special concern and their critical habitat (ongoing).
- Coordinate with the USFWS and implement recommendations for Spectacled and Steller’s Eiders (USFWS 2004b) to the best of its capability (as needed).
- As lighting is upgraded at 611 ASG sites, there will be considerations to install green lights and/or to either shield lights or orient them downward to minimize bird hazard risks.
- Coordinate with NMFS in the event a project may affect a marine threatened and endangered species under its jurisdiction (as needed).
- Protect suitable nesting habitat for Kittlitz’s Murrelet at active sites where the species is known to nest.
- Protect populations of Arctic springbeauty, wormwood, Chukchi primrose, and Barneby’s milkvetch at active sites where the species are known to exist.
- Consider the use of *National Bald Eagle Guidelines* (USFWS 2007e) in any actions that might affect eagle nests on or near 611 ASG sites (as needed).
- In the unlikely event that take of eagles or removal of eagle nests become necessary, apply for a take/removal permit by coordinating with USFWS for technical assistance in assembling the permit application (as needed).
- Review available surveys and documents on the presence or absence of federal- and state-protected species (annually).
- Protect and monitor species of special concern to the best extent possible considering budget and military mission requirements (ongoing).

Projects:

VNMH130595 (2013), VNMH180595 (2018), and VNMH230595 (2023). **Management, Species, Threatened Eider.** Conduct threatened Eider inventory and monitoring at Bullen Point, Point Lonely and Wainwright former SRRSs; Point Lay former LRRS; Point Barrow and Oliktok LRRSs, and other sites where these birds potentially occur. This project surveys for the presence, habitats, seasonal use, and nesting locations of these birds.

VNMH140777 (2014) and VNMH199001 (2019). **Management, Species, Steller Sea Lion.** Conduct survey 611 ASG sites that have Endangered Steller sea lions as well as identify Proposed for Listing ringed and bearded seals, sea otter, and Pacific walrus. These species need to be surveyed for ongoing

operations and cleanup of coastal 611 sites. Project will also determine haulout sites for walrus and seals on 611 ASG sites and sites used by sea otters and sea lions. Besides determining potential sensitive sites that need to be managed for candidate and proposed for listing species, changes in haulout sites may be used as a baseline for monitoring effects of loss of sea ice.

8.2.5 Water Resources Protection

Background for these planned management action is in Section 7.6.

Goal 5: Comply with the Clean Water Act and other environmental laws and regulations by protecting water resources on 611 ASG sites.

Objective 5.1: Maintain clean water as a critical part of ecosystem management.

In-house Management Actions:

- Provide support for IRP and related projects to minimize erosion and related water quality degradation (ongoing).
- Provide guidance to limit activities that may affect site watersheds (ongoing).
- Control ATV use to protect surface water resources (ongoing).

8.2.6 Wetland and Flood Plain Protection

Background for these planned management action is in Section 7.7.

Goal 6: Protect and conserve wetland and riparian resources on 611 ASG sites.

Objective 6.1: Ensure 611 ASG is in compliance with all applicable federal and state laws and regulations regarding wetlands.

In-house Management Actions:

- Ensure all projects that may affect wetlands are coordinated with the Natural Resources Manager (as needed).
- Minimize impacts to wetlands through application of the Environmental Impact Analysis Process (as needed).
- Ensure on-the-ground wetland verification occurs during the planning process to ensure protection of small wetlands is not overlooked (as needed).
- Follow the permitting process of Section 404 of the Clean Water Act to allow the 611 ASG to mitigate unavoidable damage to wetlands during military or operations activities (as needed).
- Comply with Alaska water quality standards and land use permit requirements regarding wetlands (as needed).
- Update wetland mapping and change analyses as new NWI data become available (as needed).

Objective 6.2: Evaluate flood hazard potential for 611 ASG sites, and if such hazards exist, determine 100-year flood plains for such sites.

In-house Management Actions:

- Use flood plain maps and analyses (Legare 1998, U.S. Army Corps of Engineers 1998) in planning activities and construction in site flood plains (as needed).
- Prepare FONPAs before actions within flood plains (as needed).

8.2.7 Grounds Maintenance, including Revegetation and Erosion Control

Background for these planned management action is in Section 7.8.

Goal 7: Conserve soil and vegetative resources on 611 ASG sites to comply with the Clean Water Act and the Sikes Act.

Objective 7.1: Manage soil and vegetative resources on 611 ASG sites with a focus on soils conservation as the foundation of other natural resources.

In-house Management Actions:

- Control or eliminate runoff and erosion through sound vegetative and land management practices (ongoing).
- Correct drainage problems that may lead to erosion along roads, particularly during routine maintenance activities (as needed).
- Minimize impacts to vegetation resources on sites.
- Avoid vegetation clearing during times within the *Recommended Time Periods for Avoiding Vegetation Clearing in Alaska in order to Protect Migratory Birds* (USFWS 2005) to protect migratory birds (ongoing).
- Ensure vegetation management is consistent with and supports BASH Reduction goals (ongoing).
- Use updated guidance, professional advice from other agencies, and native species for revegetation of sites.
- Whenever possible, do not disturb tundra vegetation (ongoing).
- Utilize site-specific reseeded recommendations, when available (ongoing).
- Implement the biosecurity plan (when completed) to minimize threats from exotic plant species (ongoing).
- Obtain USAF, USFWS, and ADFG approval prior to the introduction of exotic plants on installations (as needed).

Objective 7.2: Perform grounds maintenance and landscaping operations consistent with natural resource goals and objectives.

In-house Management Actions:

- Ensure grounds maintenance activities protect soils from wind and water erosion (ongoing).
- Ensure grounds maintenance activities preserve and protect wetlands, flood plains, wildlife habitat, and minimize pollution (ongoing).
- Restrict mowing to areas where tall vegetation causes safety concerns or impacts the primary mission, such as along roadways, airport facilities, and buildings (ongoing).
- Maintain habitat as grassland at Indian Mountain, Tatalina, and Sparrevohn LRRSs to limit shrubs and trees that could obscure sighting moose, caribou or bear (as needed).

8.2.8 Integrated Pest Management

Background for these planned management action is in Section 7.9.

Goal 8: Provide a well-planned and executed pest management program to ensure that pests do not hinder completion of the 611 ASG mission.

Objective 8.1: Comply with the federal Insecticide, Fungicide, and Rodenticide Act and DoD and Air Force policies minimizing the use of pesticides.

In-house Management Actions:

- Provide natural resource-based technical support for general pest management on 611 ASG sites (ongoing).
- Minimize damage to facilities from swallows, especially at Indian Mountain and Sparrevohn LRRSs (as needed).
- Whenever possible, conduct nest-removing activities during non-nesting periods. If required during nesting periods, obtain necessary permits (as needed).
-

8.2.9 BASH

Background for these planned management action is in Section 7.10.

Goal 9: Manage natural resources in cooperation with the USFWS, ADFG, and the 611 ASG Bird Hazard Working Group to reduce the potential for bird and animal strikes during airfield operations on 611 ASG sites.

Objective 9.1: Obtain and provide natural resources scientific information to reduce the potential for bird and animal strikes.

In-house Management Actions:

- Provide natural resources representation to the BASH Hazard Working Group to monitor and advise the group of environmental modification and conditions that affect BASH potential (ongoing).
- Provide support in obtaining federal and state permits required for the minimization of wildlife threats to aircraft safety (ongoing).
- Provide guidance and support for biological monitoring of wildlife populations, bird migration activity, and habitat management to improve technical advice for wildlife and vegetation management programs (ongoing).
- Identify aircraft strike hazards and evaluate deterrent/control techniques that may help reduce hazards (ongoing).
- Provide guidance and support for operations conducted regarding habitat modifications to make airfield habitats less attractive to birds and wildlife (ongoing).
- Use studies to provide provided data for the Bird Avoidance Model (ongoing).
- Manage arctic fox populations on Eareckson AS to provide population control of ground-burrowing nesting birds by preying on their eggs, young, and in some cases, adults (ongoing).
- Implement operations and grounds maintenance results of studies at King Salmon Airport involving bird migration peaks and grass cutting to minimize BASH risks (ongoing).
- Annually review the Alaska Department of Transportation wildlife hazard management plan for King Salmon Airport; implement plan recommendations; and recommend modifications to the plan, if needed (ongoing).
- Use airfield habitat modifications, garbage management, and large animal hazing, as needed, to minimize BASH risks at remote radar sites (ongoing).

8.2.10 Outdoor Recreation and Related Land Use

Background for these planned management action is in Section 7.11.

Goal 10: Manage natural resources to provide subsistence and outdoor recreational opportunities, as appropriate.

Objective 10.1: Provide a diversity of quality outdoor recreation opportunities for military personnel and the public consistent with supporting the military mission while also maintaining ecosystem health and sustainability.

In-house Management Actions:

- Implement Executive Order 13443, *Facilitation of Hunting Heritage and Wildlife Conservation* and Executive Order 12962, *Recreational Fisheries* to facilitate the expansion and enhancement of hunting and fishing opportunities, consistent with military mission requirements (ongoing).
- Provide human-valued products of renewable natural resources when such products can be produced in a sustainable fashion without significant negative impacts on the military mission (ongoing).
- Implement 611 ASG polices for recreational access and weapons control to sites (ongoing).
- Conduct on-the-ground monitoring to assess impacts from recreational use on the environment and recreational facilities adequacy (ongoing).
- Implement off-road vehicle use restrictions on 611 ASG sites (ongoing).
- Provide appropriate wildlife safety information to recreational users, including provisions within the *Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan* (Appendix 7.4.5) (ongoing).

Objective 10.2: Support subsistence activities on or in the vicinity of 611 ASG sites, consistent with supporting the military mission.

In-house Management Actions:

- Provide opportunities for subsistence activities to the best degree possible, considering military mission requirements (ongoing).
- Ensure that biodegradable wastes are buried and non-biodegradable wastes and equipment are removed along with personal gear upon breaking camp following herring fishing season activities at Cape Romanzof LRRS (as needed).

8.2.11 Cultural Resources Protection

Background for these planned management action is in Section 7.12.

Goal 11: Protect cultural resources on 611 ASG lands.

Objective 11.1: Implement this INRMP in a manner consistent with the protection of cultural resources on 611 ASG sites.

In-house Management Actions:

- Ensure appropriate review of natural resource management projects by the Cultural Resources Manager to ensure that adverse effects to archeological sites are avoided (ongoing).
- Implement natural resources management aspects of 611 ASG Integrated Cultural Resources Management Plans (ongoing).

8.2.12 Public Outreach and Natural Resources Education

Background for these planned management action is in Section 7.13.

Goal 12: Implement a public outreach and environmental education program appropriate for remote 611 ASG sites.

Objective 12.1: Provide natural resources outreach, awareness, and education to 611 ASG inhouse and contract personnel and the general public.

In-house Management Actions:

- Use Restoration Advisory Boards to provide information relative to natural resources in the area (ongoing).
- Provide educational materials to site personnel and site visitors, as appropriate for each site (ongoing).
- Ensure site personnel and visitors in polar bear regions are aware of polar bear dangers and means to minimize these risks (ongoing).
- If opportunities present, provide natural resources informal briefings to site personnel (ongoing).

Projects:

VNMHOS131368 (2013), VNMHOS141368 (2014), VNMHOS151368 (2015), VNMHOS161368 (2016), VNMHOS171368 (2017), VNMHOS181368 (2018), VNMHOS191368 (2019), VNMHOS201368 (2020), VNMHOS211368 (2021), VNMHOS221368 (2022), and VNMHOS231368 (2023). **Outreach.** Provide educational materials to the general public and other interested parties external to the 611 ASG. This project also includes support for cultural resources public outreach.

VNMHOS555313 (2013), VNMHOS555314 (2014), VNMHOS555315 (2015), VNMHOS165553 (2016), VNMHOS175553 (2017), VNMHOS185553 (2018), VNMHOS195553 (2019), VNMHOS205553 (2020), VNMHOS215553 (2021), VNMHOS225553 (2022), VNMHOS235553 (2023). **Training, Others.** Base personnel (non-environmental) requiring training to support environmental compliance program objectives. Support the Alaska Forum for the Environment, which includes invasive species, listed species, Coastal America issues, and similar programs. Note: Project was born out of federal Statement of Cooperation with Alaska Department of Environmental Compliance and other federal agencies.

Objective 18.2: Provide for necessary supplemental training for natural resources personnel to ensure the proper and efficient management of 611 ASG natural resources per DoDI 4715.03, Enclosure 3, 1.1.

Projects:

VNMHOS555213 (2013), VNMHOS555214 (2014), VNMHOS555215 (2015), VNMHOS555216 (2016), VNMHOS555217 (2017), VNMHOS555218 (2018), VNMHOS555219 (2019), VNMHOS555220 (2020), VNMHOS555221 (2021), VNMHOS555222 (2022), VNMHOS555223 (2023). **Training, Environmental Function.** Provide for the maintenance of staff knowledge of management strategies at the current state of the art through training and participation in workshops, research presentations, and other activities of regional and national professional natural resources research and conservation programs; and by sharing information with natural resources experts to ensure maximum benefits of adaptive management and research efforts.

8.2.13 Installation Restoration Program, Demolition Program, and Related Concerns

Background for these planned management action is in Section 7.14.

Goal 13: Minimize effects of Installation Restoration Program and related projects on natural resources on 611 ASG sites.

Objective 13.1: Provide natural resources management support for Installation Restoration Program and related projects.

In-house Management Actions:

- Review construction, demolition, and remediation plans and Air Force Certificates of Compliance for new facilities or relocation of facilities to understand potential impacts to natural resources and compatibility with this INRMP (as needed).
- Provide natural resources support for IRP and related projects, to include wildlife-related permits, mitigation requirements, minimization of natural resources impacts, personnel safety minimization, and monitoring of effects of projects on natural resources (ongoing).

8.2.14 Coastal Zone Management

Background for these planned management action is in Section 7.15.

Goal 14: Protect and restore coastal zone natural resources on or near 611 ASG sites.

Objective 14.1: Ensure all 611 ASG activities, operations, projects, and programs that affect any lands, water use or natural resources of a state's coastal zone must be consistent, to the maximum extent practicable, with the state Coastal Zone Management Plan.

In-house Management Actions:

- Implement the Air Force Memorandum of Understanding with Coastal America on 611 ASG sites (ongoing).
- Use the Alaska Coastal Management Program Consistency Determination for Federal Activities questionnaire to evaluate effects of 611 ASG activities on coastal zone resources (as needed).
- Protect coastal zone resources to the same degree as when the State of Alaska Coastal Zone Management Program was active (ongoing).

8.2.15 Natural Resources Law Enforcement

Background for these planned management action is in Section 7.16.

Goal 15: Protect 611 ASG site natural resources.

Objective 15.1: Ensure federal and state laws and 611 ASG natural resources protection policies are enforced on 611 ASG sites.

In-house Management Actions:

- Request enforcement assistance from the USFWS, if required (as needed).

- Develop an agreement with Joint Base Elmendorf-Richardson to provide natural resources law enforcement on 611 ASG sites, as needed (2014).

8.2.16 Wildland Fire Management

Background for these planned management action is in Section 7.17.

Goal 16: Protect 611 ASG site natural resources from wildfires.

Objective 16.1: Use external agencies' wildland fire management resources to protect 611 ASG sites from wildfire damage.

In-house Management Actions:

- Mitigate and minimize risk from a wildland fire to 611 ASG property and structures using Firewise landscaping principles (<http://firewise.org/>) (as needed).
- Recommend the development of written agreements with the BLM, Alaska Fire Service and the Alaska Division of Forestry to provide fire suppression services for 611 ASG sites with significant fire risks (2013).
- Develop a project to prepare a Wildland Fire Management Plan for 611 ASG sites (2013).
- If wildfires threatened 611 ASG sites, use BLM, Alaska Fire Service and the Alaska Division of Forestry resources to manage these fires (as needed).
- Provide support, as available, to manage wildfires, as stated in the Joint Task Force-Alaska Wildland Firefighting Concept of Operations (as-needed).

8.3 General INRMP Implementation Projects

The 611 ASG requires additional contract support to implement this INRMP, particularly contract personnel support, often personnel stationed at larger 611 ASG sites. These contract support projects often support implementation of this INRMP in locations other than where the personnel are stationed. Due to the large number of sites, often in very remote locations, travel to sites is difficult and often expensive. Thus, effective implementation of this INRMP also requires funding for travel to sites (TDY). In addition, implementation of this INRMP requires supplies and equipment. These requirements are generally described in Chapter 9, Section 9.2, *Natural Resources Management Staffing*.

Goal 17: Implement this INRMP using professionally trained natural resources personnel, who are properly equipped and funded to work on remote 611 ASG sites.

Objective 17.1: Ensure that sufficient numbers of professionally trained natural resources management personnel are available to implement this INRMP.

Projects:

YGFZOS138012 (2013). **Contractor Support, CN, Natural Resources.** VNMHOS141914 (2014), VNMHOS151914 (2015), VNMHOS161914 (2016), VNMHOS171914 (2017), VNMHOS181914 (2018), VNMHOS191914 (2019), VNMHOS201914 (2020), VNMHOS211914 (2021), VNMHOS221914 (2022), VNMHOS231914 (2023). **Contractor Support, Contracted/A76 CN, EAS/KSA/WIA.** VNMHOS501213 (2013). **Contractor Support, Contracted/A76 CN, Eareckson.** VNMHOS513012 (2013). **Contractor Support, Contracted/A76 CN, King Salmon.** Provide Natural Resource Managers for geographically separated units of 611 Air Support Group to support installations' environmental programs. Contractor assistance provides normal day-to-day management functions and

operations of the King Salmon Airport and Eareckson Air Station installation conservation programs while 611 CES provides oversight of these programs. Contract support will provide professional technical services for natural resources to support military readiness, training, and operations.

Objective 17.2: Ensure that 611 ASG natural resources personnel have funding to travel to remote sites to implement this INRMP.

Projects:

VNMHOS541114 (2014), VNMHOS541115 (2015), VNMHOS541116 (2016), VNMHOS541117 (2017), VNMHOS541118 (2018), VNMHOS541119 (2019), VNMHOS541120 (2020), VNMHOS541121 (2021), VNMHOS541122 (2022), VNMHOS541123 (2023). **TDY, Environmental Function.** VNMHOS541113 (2013). **TDY, Environmental Function, FOL & Radar Sites.** Costs associated with all site visits (including Wake Island Airfield) for a variety of reasons, including sampling, training, quality control evaluations, audits, meetings, etc. Mission-essential TDY for conservation personnel to participate in meetings, brief program initiatives, cross feed information with other environmental offices, meet with regulators, and participate in environmental seminars/symposiums in order to remain current on technology advances and changes in environmental regulatory requirements.

Objective 17.3: Provide necessary equipment and supplies to implement this INRMP.

Projects:

VNMHOS510913 (2013), VNMHOS510914 (2014), VNMHOS510915 (2015), VNMHOS510916 (2016), VNMHOS510917 (2017), VNMHOS510918 (2018), VNMHOS510919 (2019), VNMHOS510920 (2020), VNMHOS510921 (2021), VNMHOS510922 (2022), VNMHOS510923 (2023). **Supplies, CN. Supplies, CN Office.** VNMHOS562213 (2013), VNMHOS562214 (2014), VNMHOS562215 (2015), VNMHOS562216 (2016), VNMHOS562217 (2017), VNMHOS562218 (2018), VNMHOS562219 (2019), VNMHOS562220 (2020). **Supplies, Office, Environmental Function.** Provide all non-AFSF and AFSF supplies and equipment associated with conservation resources to support readiness of all installations. These funds will be used to support 611 ASG requirements for natural resources management on all sites.

8.4 Other Planned Projects

There are planned projects for 611 ASG sites. Some projects potentially could affect natural resources (e.g., road repair, building demolition, BASH actions, underground storage tank activities) in either a positive or negative fashion. Section 7.14, *Installation Restoration Program, Demolition Program, and Related Concerns* briefly describes IRP projects that could have natural resources complications.

9.0 INRMP Implementation

The Sikes Act Improvement Act (Sec. 2905(c) of the National Defense Authorization Act for Fiscal Year 1998) required the preparation and implementation of an INRMP on appropriate military installations by November 2001. INRMPs have been in place for 611 ASG sites since 1995. This latest plan is the first single INRMP for all 611 ASG sites; it will be implemented by actions and projects to achieve goals and objectives stated in Chapter 8. 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, 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. Air Force programming procedures will be followed by the 611 ASG to request funding for these projects.

9.1 Work Plans

Most 611th ASG natural resources projects are performed under contract, and a specific scope of work is developed for each project. Priorities are set as needed based on available funding, funding avenue, and current requirements (*e.g.*, changes in the status of federal-listed species may dictate an adjustment to project priority, timing, funding, etc.).

Work plans and projects are integral to successful implementation of this INRMP. Annual requirements for funding through the Environmental Compliance Program have been identified through FY 2023. Work plans (Appendix 9.1) may change with time, as work requirements change and projects are completed, either on time, ahead of schedule, or behind schedule, or significantly change due to mission changes. All work plans and subsequent projects will revolve around best management practices to support the mission and ensure ecosystem management. Work plans will be updated annually. Annual work plans will be reviewed and approved, per AFI 32-7064.

9.2 Natural Resources Management Staffing

The management and conservation of natural resources within DoD control, including planning, implementation, oversight, and enforcement functions, are inherently governmental functions that shall not be contracted. (DoDI 4715.03, Enclosure 3, 1.j)

DoD Components shall ensure that sufficient numbers of professionally trained natural resources management personnel and natural resources law enforcement personnel are available and assigned responsibility to manage their installations' natural resources. Necessary supplemental training to ensure the proper and efficient management of those resources shall be provided in a timely manner. (DoDI 4715.03, Enclosure 3, 1.i)

Natural resources management staffing within 611 ASG is limited to the 611 CES/CEAN Manager, and this level of staffing is inadequate to cover all 611 ASG sites. Additional contract support is provided for larger 611 ASG sites via on-site contract environmental personnel. The Natural Resource Program Manager provides oversight of the natural resources management program and implementation of the INRMP. Most projects included in this INRMP will be performed under individual contracts. Personnel within other organizations may have roles in implementation of this INRMP.

To comply with conservation requirements and ensure the installation mission is not compromised, training for the Natural Resource Program Manager is essential to maintain knowledge of management strategies at the current state of the art and to ensure maximum benefits of adaptive management and research efforts. This training includes annual workshops or professional conferences listed below, if schedules and budgets allow. The last three training courses also apply to other personnel conducting 611 ASG field work or planned activities authorized by state and federal wildlife agencies on 611 ASG sites.

- National Military Fish and Wildlife Association annual workshop (concurrent with the North American Wildlife and Natural Resources Conference).
- Partners in Flight workshops.
- Wild Animal Behavior and Firearm Safety.
- Bird/Wildlife Dispersal for Airfield Management.
- Oil Spill Contingency Planning.

These workshops and professional conferences have some of the best scientific publications in their professions, and literature review is a commitment needed to maintain standards. Meetings of these societies provide excellent ways to communicate with fellow professionals as well as maintain professional standards. Other conferences/workshops will be evaluated for their usefulness, and decisions will be made based on appropriateness to ongoing projects and funding availability.

The Natural Resource Program Manager will be encouraged to join professional societies and their state chapters, as well as be active in them. The Natural Resource Program Manager will be sent to as many meetings as feasible to meet with other professionals, exchange ideas, and work on matters of common interest.

9.3 Annual Coordination Requirements

Section 2.5, *Conditions for Implementation and Revision* describes requirements for annual reviews and the 5-year formal review of this INRMP.

This INRMP will be reviewed annually by the 611 ASG Natural Resource Program Manager in coordination with the USFWS, Alaska Region Sikes Act Representative, and the ADFG, Conservation Division Sikes Act Representative. Through annual review of this INRMP, changes to management programs and projects will be addressed and updated as necessary to accommodate and enable adaptive management.

Annual reviews facilitate adaptive management by providing an opportunity for parties to review goals and objectives in the INRMP and establish realistic schedules for completing proposed actions. The 611 ASG and its statutory partners conduct an annual INRMP review to verify that:

- current information on all conservation metrics is available;
- all “must fund” projects and activities have been budgeted for and implementation is on schedule;
- all required trained natural resources positions are filled or are in the process of being filled;
- projects and activities for the upcoming year have been identified and included in the INRMP;
- all required coordination with the USFWS and ADFG has occurred;
- all significant changes to the 611 ASG mission requirements or its natural resources have been identified; and
- the 611 ASG is effectively ensuring that there is no “net loss” in the capability of its lands to support the military mission.

In addition to annual reviews, a formal review and revision, if necessary, occurs on a regular basis but no less often than five years in cooperation with the USFWS and ADFG. This INRMP will be reviewed “as to operation and effect” to determine whether it is being implemented to meet Sikes Act requirements and contributes to the conservation and rehabilitation of natural resources on 611 ASG lands.

9.4 Monitoring INRMP Implementation

Air Force policy¹⁶ states, *The annual natural Resources self-assessments shall address the Natural Resources Conservation Metrics in DoDI 4715-03, Enclosure 5. The United States Fish and Wildlife Service (USFWS) and the state fish and wildlife management agency shall be invited to participate in the internal natural resources self-assessment. Also invite the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service to participate if the installation includes or borders marine environments.*

Chapter 8, *Management Goals, Objectives, and Projects* is particularly important to monitoring INRMP implementation. Objectives and specific projects serve as a checklist to monitor effectiveness of natural resources management on 611 ASG sites and success of the plan. The annual review and coordination between the 611 ASG Natural Resource Program Manager; USFWS, Alaska Region Sikes Act Representative; and ADFG, Conservation Division Sikes Act Representative is the primary procedure used for monitoring INRMP implementation. Annual review and coordination should include analysis of results and foster formulation of any adaptive management strategies that may be necessary.

Because of the dynamic nature of natural resources and the mission, there are expected variations in needs during the course of a normal year. Some projects may be moved to a higher priority status than originally planned; some have to be dropped totally as systems change or work priorities change. The INRMP implementation and monitoring effort will include these and other changes, ensure they are reviewed and documented, and alter INRMP planning, if necessary, to fit current ecosystem and military mission needs.

9.5 Implementation Funding Options

The 611 ASG receives funding based upon the projects and requirements it has entered and validated in the Automated Civil Engineering System, Project Management system. The Automated Civil Engineering System, Project Management is used for programming compliance, pollution prevention, and conservation requirements. If a requirement is not entered into and validated in the Automated Civil Engineering System, Project Management by the Major Command, the installation will not receive any funding to carry out that requirement.

Natural resources management relies on a variety of funding mechanisms, some of which are self-generating and all of which have different application rules. AFI 32-7064 outlines funding sources, funding priorities, and level of effort for Air Force conservation programs. Funding sources include the operations and maintenance appropriation, reimbursable conservation program accounts, the DoD Legacy Resource Management Program, the Strategic Environmental Research and Development Program, and other sources, such as those that may be obtained through cooperative agreement under authority of the Sikes Act. Annual requirements for funding through the Environmental Compliance Program and project work plans are in Appendix 9.1.

9.5.1 Funding Categories of Priority

DoD Instruction 4715.03, Enclosure 4, *Program and Budgeting Priorities for Natural Resources Programs* (February 14, 2011) describes priorities for natural resources management funding on military

¹⁶ Memorandum for ALMAJCOM/A7, Department of Defense Instruction (DODI) 4715.03, *Natural Resources Conservation Program*, September 2011, HQ USAF/A7C.

installations. In the Automated Civil Engineer System, Level 0 projects generally relate to DoDI 4715.03 funding priority *Recurring Natural Resources Conservation Requirements*. Level 1 projects generally relate to DoDI 4715.03 *Non-recurring Natural Resources Conservation Requirements*, subsection a, *Current Compliance*. Level 2 projects generally relate to DoDI 4715.03 *Non-recurring Natural Resources Conservation Requirements*, subsection b, *Maintenance Requirements*. Level 3 projects generally relate to DoDI 4715.03 *Non-recurring Natural Resources Conservation Requirements*, subsection c, *Enhancement Actions Beyond Compliance*.

Recurring Natural Resources Conservation Requirements

a. Activities needed to cover recurring administrative, personnel, and other costs associated with managing the Department of Defense's natural resources conservation program that are necessary to meet applicable compliance requirements (Federal and State laws, regulations, Presidential Executive Orders, and DoD policies) or that are in direct support of the military mission.

b. Environmental management activities associated with the operation of facilities, installations, and deployed weapons systems, including day-to-day costs of sustaining an effective natural resources management program, as well as annual requirements, including manpower, training, supplies, permits, fees, testing and monitoring, sampling and analysis, reporting and recordkeeping, maintenance of natural resources conservation equipment, and compliance self-assessments.

Non-recurring Natural Resources Conservation Requirements

a. Current Compliance includes projects and activities to support:

- (1) installations currently out of compliance (*e.g.*, has received an enforcement action from an authorized Federal or State agency, or local authority);
- (2) signed compliance agreement or consent order;
- (3) meeting requirements with applicable Federal or State laws, regulations, standards, Presidential Executive Orders, or DoD policies, including those listed in Enclosure 1;
- (4) immediate and essential maintenance of operational integrity or military mission sustainment; and
- (5) projects and activities needed that will be out of compliance if not implemented in the current program year. Those activities include:
 - (a) environmental analyses for natural resource conservation projects, and monitoring and studies required to assess and mitigate potential impacts of the military mission on conservation resources;
 - (b) planning documentation, master plans, compatible development planning, and INRMPS;
 - (c) natural resources planning level surveys;
 - (d) reasonable and prudent measures included in incidental take statements or biological opinions, biological assessments, surveys, monitoring, reporting of assessment results, or habitat protection for listed, at-risk, and candidate species so that proposed or continuing actions can be modified in consultation with the USFWS or the NOAA Fisheries Service;
 - (e) mitigation to meet existing regulatory permit conditions or written agreements, such as those required in Chapter 26 of Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, and included in documents required by the DoD Chesapeake By Strategic Action Plan;
 - (f) nonpoint source pollution or watershed management studies or actions needed to meet compliance dates cited in approved State coastal nonpoint source pollution

control plans, as required to meet consistency determinations consistent with Coastal Zone Management.

(g) wetlands delineation critical for the prevention of adverse impacts to wetlands, so that continuing actions can be modified to ensure mission continuity; and

(h) compliance with missed deadlines established in DoD executed agreements.

b. Maintenance Requirements includes those projects and activities needed to meet an established deadline beyond the current program year and maintain compliance. Examples include:

(1) compliance with future deadlines;

(2) conservation, GIS mapping, and data management to comply with Federal, State and local regulations, Executive Orders, and DoD policy;

(3) efforts undertaken in accordance with non-deadline specific compliance requirements of leadership initiatives;

(4) wetlands enhancement to minimize wetlands loss and enhance existing degraded wetlands as required in Chapter 26, Title 33 USC; and

(5) conservation recommendations in biological opinions issued pursuant to the Endangered Species Act.

c. Enhancement Actions Beyond Compliance includes those projects and activities that enhance conservation resources or the integrity of the installation mission, or are needed to address overall environmental goals and objectives, but are not specifically required under law, regulation, or Executive Order, and are not of an immediate nature. Examples include:

(1) community outreach activities, such as International Migratory Bird Day, Earth Day, National Public Lands Day, Pollinator Week, and Arbor Day activities;

(2) educational and public awareness projects, such as interpretive displays, oral histories, Watchable Wildlife areas, nature trails, wildlife checklists, and conservation teaching materials;

(3) restoration or enhancement of natural resources when no specific compliance requirement dictates a course or timing of action; and

(4) management and execution of volunteer and partnership programs.

Conservation projects are usually funded through the Environmental Planning, Programming, and Budgeting System process using the Automated Civil Engineer System. Projects are identified, prioritized, and cost-estimated. They are then submitted through the Automated Civil Engineer System environmental budget process to the parent command and, ultimately, Headquarters Air Force.

Nonrecurring projects have three priority categories. Level 1 projects are required to comply with federal laws or regulations in the fiscal year they are programmed. An example might be funding for an endangered species-related project. Level 2 funding includes requirements that are not currently out of compliance, but will be at a future date. Level 3 projects support enhancement projects that are not driven by compliance with laws.

Most recently funded projects have been Level 1 (must fund). Levels 2 and 3 have not been funded in recent years. Air Force natural resource funding is programmed through 2023 and reviewed annually. An Air Force budgetary integrated priority list is created at the Major Command level from installation project submittals for two subsequent fiscal years beyond the operating year. The integrated priority list not only prioritizes the Major Command project, it restricts project and financial modifications.

9.5.2 Operations and Services

The 611 CES/CEAN normally has an annual operations and services budget allocated through the Civil Engineering Squadron that covers day-to-day operational costs, such as employee salaries, vehicles, gas, office and field supplies, and basic operating requirements. 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 programs that generated them. These requirements are submitted through the Automated Civil Engineer System as Compliance Class O&S (Level 0), which means they *must be funded* and paid for each and every year for the installation to continue normal operations. Per AFI 32-7011, O&S funds are *necessary to maintain environmental compliance, meet EO goals/objectives, and prevent natural resource degradation that may affect military readiness*.

9.5.3 Alternative Sources of Funding

Other sources of funds may be available to support implementation of INRMP actions and initiatives. Below are general descriptions alternative sources of funding available to the 611 ASG to implement this INRMP. Not all of these are used by the 611 CES/CEAN.

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 may 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.

Strategic Environmental Research and Development Program

The Strategic Environmental Research and Development Program is a joint DoD, Department of Energy, and U.S. Environmental Protection Agency program. The program can be used to fund conservation research on DoD installations. The program can pay for certain research and development projects that involve the development of new technologies for natural and cultural resources management.

Cooperative Agreements

The Sikes Act authorizes the use of cooperative agreements with states, local governments, non-governmental organizations, and individuals to maintain and improve natural resources (Sec. 103(a)). A cooperative agreement functions as an acquisitions tool that is less formal than a contract but has more control than a grant. The principal purpose of a cooperative agreement relationship is to transfer money, property, services, or anything of value to the recipient to support or stimulate an activity undertaken for the public good. Cooperative agreements assume substantial involvement between the federal agency and the recipient during activity performance, establishing the agency as a “partner” during performance.

References Cited

- 3rd Wing History Office. 2007. *A Short Military History of Alaska: 1867-2007*. Elmendorf AFB, Alaska.
- 11th Civil Engineering Operations Squadron, Operating Engineers. 1992. *Preliminary Assessment, Bureau of Indian Affairs, Bethel, Alaska*. Prepared for Bureau of Indian Affairs, Facilities Management and Construction Center, Albuquerque, NM.
- 611 CES/CEVO. 1998. *Interim Remedial Action: Drum Removal And Soil Investigation At AOC06, Drum Storage Area At Beach, Nikolski Radio Relay Station, Alaska, September-October 1997*. Elmendorf AFB, AK.
- Alaska Department of Community and Regional Affairs. 1990. Alaska Community Database.
- _____. 1982. *King Salmon Community Profile*.
- Alaska Department of Fish and Game. 1999. December 27 letter from Alvin G. Ott (ADFG) to Gene Augustine (611 CES/CEVP). Alaska Department of Community and Regional Affairs. 1990. *Fort Yukon Community Profile*.
- _____. 1992. *Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes*. Arctic Region Resource Management Region V.
- _____. 1990a. *Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes*. Southwestern Region III.
- _____. 1990b. *Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes*. Interior Region, Resource Management Region VI - Galena Area, Anchorage, AK.
- _____. 1986a. *Alaska Habitat Management Guide Reference Maps, Western and Interior Regions*. Vol III, Distribution of Freshwater Fish, Marine Fish and Shellfish.
- _____. 1986b. *Alaska Habitat Management Guide Reference Maps, Western and Interior Regions*. Vol IV, Distribution of Anadromous Fish and Human Use of Fish.
- _____. 1978. *Alaska's Fisheries Atlas. Volumes 1 & 2*. Anchorage, AK.
- Alaska Natural Heritage Program. 1993. Letters from E.W. West (May 11) and Rob Lipkin (May 16).
- Alaska Plant Materials Center. 1992. *Annual Report*. Alaska Department of Natural Resources, Agriculture Division.
- Alaska Shorebird Working Group. 2000. *Shorebird Conservation Plan for Alaska Bird Conservation Regions*, USFWS, Anchorage, AK. 31 pp + appendices.
- Aman Environmental Construction, Incorporated. 1995. *Chemical Data Acquisition Plan For Defense Environmental Restoration Program At Unalakleet and North River Sites, Alaska*. Contract number DACA85-94-C-0027. Covina, CA.

- Anderson, J. 2000. Minutes of the 611 ASG Bird/Wildlife Hazard Working Group, Memorandum for the 611 ASG/CD, meeting date 26 Jul 2000, concurred Aug 24, 2000.
- Andres, B.A. and D. L. Brann. 1997. *Inventory of Breeding Birds on Alaska Army National Guard Training Areas, Nome Region, 1996 Progress Report*. Prepared for the Alaska Army National Guard by the U.S. Fish and Wildlife Service, Anchorage, AK. 13 pp.
- Andres, B.A., D.L. Brann, and B.T. Browne. 1999. *Inventory of Breeding Birds on Alaska Army National Guard Training Areas*. Final Report prepared by the U.S. Fish and wildlife Service, Anchorage, AK. 104 pp.
- Anonymous. Undated(a). Species composition and numbers of birds recorded in the King Salmon-Naknek Christmas Bird Count, 1986-1997. Provided by Susan Savage, USFWS. 2 pp.
- _____. Undated(b). Banding Totals, 1994-97, from Mother Goose Lake, Becharof NWR, and King Salmon. Provided by Susan Savage, USFWS. 4 pp.
- Archibeque, A. 1993. Letter to D. McCormick (Woodward-Clyde). USFWS, Sept. 24.
- Arctic Environmental Information and Data Center (AEIDC). 1989. *Alaska Climate Summaries*. 2nd ed. University of Alaska Anchorage. Alaska Climate Center Technical Note No.5.
- Arctic Slope Technical Services. 1982. *Bullen Point Industrial Center Environmental Survey Results and Impact Assessment*. Anchorage, AK.
- Argus, G.W. 2001. *A Guide to the Identification of Willows in Alaska, the Yukon Territory and Adjacent Regions*. Available from George W. Argus, 310 Haskins Rd., Merrickville R3, Ontario, Canada K0G1N0 (E-mail: argus@post.harvard.edu). 104 pp. + appendices.
- Armstrong, R.H. 1998. *Guide to the Birds of Alaska*. Alaska Northwest Books, Portland OR.
- _____. 1991. *Guide to the Birds of Alaska*. Alaska Northwest Books, Anchorage, AK.
- Avian Power Line Interaction Committee. 1996. *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996*. Edison Electric Institute/Raptor Research Foundation, Washington, DC. 125pp + appendices.
- B and B Environmental Inc. 1997. *Wetland Delineation and Site Characterization of FAA Stations Alaska – King Salmon*. An unpublished final report dated May 8, 1997, accomplished through a U.S. Army corps of Engineers, Alaska District, Anchorage, AK contract, project number 9609. 60 pages.
- Bailey, E. 1993. *Introduction of Foxes to Alaska Islands - History, Effects on Avifauna, and Eradication*. USFWS Publication No. 193. Washington, D.C.
- Barkalow, F.S., Jr. 1952. *Life History and Ecologic Observations on the Tundra Mouse (Microtus oeconomus) and Lemmings (Lemmus trimucronatus and Dicrostonyx groenlandicus) at Barter Island, Alaska*. Journal of the Elisha Mitchell Scientific Society 68:199-205.

- Bee, J.W. and E.R. Hall. 1956. *Mammals of Northern Alaska*. University of Kansas Museum of Natural History. Misc. Publ. No. 8.
- Benton, N., J.D. Ripley, and F. Powledge, eds. 2008. *Conserving Biodiversity on Military Lands: a Guide for Natural Resources Managers*. Available at <http://www.dodbiodiversity.org>. Arlington, VA: NatureServe.
- Boarman, W.I. 1992. *Problems with Management of a Native predator on a Threatened Species: Raven Predation on Desert Tortoises*. Proceedings of 15th Vertebrate Pest Conference (J.E. Borrecco and R.E. Marsh, editors). Published by University of California, CA. Wildlife/Research Biologist, Desert Tortoise Research Group, Bureau of Land Management, Riverside, CA. pp 48-52.
- Boisvert, J.H. and R.H. Day. 2006. *Collision Potential of Spring Migrant Sandhill Cranes and Other Birds, USAF Tin City Long Range Radar Site, May 2005*. Prepared for USAF, 611th CES/CEVP, Elmendorf, AFB, AK., by ABR Inc., Environmental Research & Services, Anchorage and Fairbanks, AK. 42 pp.
- Boisvert, J.H., C.T. Schick, and R.H. Day. 2004. *Collision Potential of Fall Migrant Sandhill Cranes and Other Birds, USAF Tin City Long Range Radar Site, September 2003*. Prepared for USAF, 611th CES/CEVP, Elmendorf, AFB, AK., by ABR Inc., Environmental Research & Services, Anchorage and Fairbanks, AK. 34 pp.
- BONAP (The Biota of North America Program). 1998. *A Synonymized Checklist of the Vascular Flora of the United States, Puerto Rico, and the Virgin Islands*. On-line database located (in December 2002) at <http://www.csdl.tamu.edu/FLORA/b98/check98.htm>.
- Borchert, N.J.H., C.L. Rossi, and W.F. Wilmoth 2004. *Wildlife Hazard Assessment of King Salmon Airport, King Salmon, Alaska (April 30, 2002 through October 16, 2002)* – January 2004 draft report. Unpublished report for the Alaska Department of Transportation and Public Facilities by U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, 720 O’Leary St., N.W. Olympia, WA 98502. 49 pp.
- Boreal Partners in Flight Working Group. 1999. *Landbird Conservation Plan for Alaska Biogeographic Regions, Version 1.0*. Unpublished report, U.S. Fish and Wildlife Service, Anchorage, AK. 45 pp.
- Boyer, L.P. 1987. *Environmental Assessment, Cold Bay AFS, AK*. Defense Environmental Restoration Program, Installation Restoration Program.
- _____. Undated(a). *Environmental Assessment for Defense Environmental Restoration Program, Installation Restoration Program. Kotzebue Air Force Station, Alaska*. U.S. Army District Engineer, Anchorage, AK.
- _____. Undated(b). *Environmental Assessment. Defense Environmental Restoration Program, Installation Restoration Program. Murphy Dome AFS, Alaska*. U.S. Army District Engineer, Anchorage, AK.
- Braund and Associates. 2004. *Traditional Land Use Survey Characterizations for Remote Air Force Facilities in Alaska*. Prepared for 611 ASG, Elmendorf AFB, AK and Environmental and Natural Resources Institute, University of Alaska Anchorage, Anchorage, AK. 200 pp.

- Bridges, J.W. 2001. *Polar Bear Interaction Management Plan*. Prepared for U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK., by U.S. Fish and Wildlife Service, Anchorage, AK.
- Broerman, F.J. 2003. *Bird Aircraft Strike Hazard Survey at Cape Romanzof Long Range Radar Site, Alaska – Fall 2002*. Prepared for USAF 611 ASG/CES, Elmendorf AFB, AK, by USFWS, Yukon Delta National Wildlife Refuge, Bethel, AK. 15 pp.
- Brown, J. 1999. Minutes of the 611 ASG Bird/Wildlife Hazard Working Group, Memorandum for the 611 ASG/CD, meeting date 27 Jul 1999, concurred Jul 30, 1999.
- Buckle, B. 1993. Letter to G. Augustine (11 CEOS). Bureau of Land Management, December 22.
- Buckman, A.F. 1995. Review Comments. Headquarters, Pacific Air Forces, USAF.
- Bureau of Land Management. 2007. *Bay Proposed Resource Management Plan/Final Environmental Impact Statement (RMP/EIS)* Dec 7, 2007. U.S. Department of Interior, Bureau of Land Management (http://www.blm.gov/ak/st/en/prog/planning/bay_rmp_eis_home_page.html).
- _____. 2000. E-mail, Subject: *INFO Comments Regarding Air Force INRMP'S* forwarded by Curtis Wilson 13 Jan 2000 from Gary Foreman 21 Dec 1999 to Gene Augustine 611 CES/CEVP.
- Byrd, G.V., J.C. Williams, and G. Thomson. 1995. *The Status of Oil Pollution on Beaches of the Alaska Maritime National Wildlife Refuge*. USFWS Report Alaska Maritime NWR 95/02. Homer, AK. 106 pp.
- Byrd, G.V., and L. Scharf. 2003. *Winter Wildlife Surveys At Eareckson Air Station, Shemya Island, Alaska, 1988-2002*. Prepared by USFWS, Alaska Maritime NWR, Homer, AK for the 611 CES, Elmendorf AFB, AK. 36 pp + appendices.
- Cannon, P.J. 1977. *The Environmental Geology and Geomorphology of the Barrier Island-Lagoon System along the Beaufort Sea Coastal Plain from Prudhoe Bay to the Colville River*. BLM/NOAA-OCSEAP, Boulder, CO.
- Cansler, T.V. 1993. *Installation Restoration Program, Preliminary Assessment/Site Investigation, Lake Louise Recreation Camp*. Prepared for 11th Civil Engineer and Operations Squadron (11 CEOS), Elmendorf Air Force Base, AK.
- Center for Environmental Management of Military Lands. 2010a. *Integrated Cultural Resources Management Plan, Eareckson Air Station, Alaska, 2010*. Prepared by Colorado State University, Fort Collins, CO for the 611 CES, Elmendorf AFB, AK. 182 pp + appendices.
- _____. 2010b. *Integrated Cultural Resources Management Plan: Aircraft Control and Warning (AC&W) System, Alaska, 2010*. Prepared by Colorado State University, Fort Collins, CO for the 611 CES, Elmendorf AFB, AK. 307 pp + appendices.
- _____. 2008. *Integrated Cultural Resources Management Plan, King Salmon Airport, Alaska, 2008*. Prepared by Colorado State University, Fort Collins, CO for the 611 CES, Elmendorf AFB, AK. 180 pp + appendices.

- _____. 2006. *Integrated Cultural Resources Management Plan, Distant Early Warning (DEW) System, Alaska, 2006*. Prepared by Colorado State University, Fort Collins, CO for the 611 CES, Elmendorf AFB, AK. 138 pp + appendices.
- CH2M Hill. 1994a. *Preliminary Assessment, Anvil Mountain*. Prepared for 11th Air Control Wing (11 ACW) and 11th Civil Engineer and Operations Squadron (11 CEOS), Elmendorf Air Force Base, AK.
- _____. 1994b. *Preliminary Assessment, Driftwood Bay*. Prepared for U.S. Army Engineer District, Alaska. Anchorage, AK.
- _____. 1994c. *Preliminary Assessment, Nikolski*. Prepared for U.S. Army Engineer District, Alaska. Anchorage, AK.
- _____. 1994d. *Preliminary Assessment, North River*. Prepared for 11 ACW and 11 CEOS, Elmendorf Air Force Base, AK.
- _____. 1994e. *Preliminary Assessment, Port Heiden*. Prepared for U.S. Army Engineer District, Alaska. Anchorage, AK.
- _____. 1993a. *Draft Preliminary Assessment, Champion*. Prepared for 11th Air Control Wing (11 ACW) and 11th Civil Engineer and Operations Squadron (11 CEOS), Elmendorf Air Force Base, AK.
- _____. 1993b. *Draft Preliminary Assessment, Kalakaket Creek*. Prepared for 11th Air Control Wing (11 ACW) and 11th Civil Engineer and Operations Squadron (11 CEOS), Elmendorf Air Force Base, AK.
- _____. 1990. *TRP Stage I Final Tech Report*.
- _____. 1981. *Installation Restoration Program, Phase 1 - Records Search, Alaska DEW Line Installations*.
- Childs, H.E. 1969. *Birds and Mammals of the Pitmegea River Region, Cape Sabine, Northwestern Alaska*. Biological Paper, University of Alaska.
- Chugach Development Corporation. Undated. *King Salmon Air Force Base Visitor's Guide*. King Salmon Airport. 11 pp.
- Clark, M.H. and D.R. Kautz. 1999. *Soil Survey of Copper River Area, Alaska*. U.S. Department of Agriculture, Natural Resources Conservation Service.
- Cloe, J.H. 2008. *Military Development in Alaska*.
- Comeau, M.J., and W.G. Vandre. 1997. *Noxious Weed: Identification and Prevention*. Alaska Cooperative Extension, University of Alaska Fairbanks. Fairbanks, AK.
- Cook, N.A. 1992. *Spring Staging Waterfowl on the Naknek River, Alaska Peninsula, Alaska, February-May 1992*. USFWS, Alaska Peninsula/Becharof National Wildlife Refuge Complex, King Salmon, AK. 41 pp.

- Cooper, and T. Pogson. 1983. *Annotated Checklist of the Birds of Nushagak Peninsula, Togiak NWR*. Dillingham, AK.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D.C. 103 pp.
- Craig, P.C. 1984. *Fish Use of Coastal Waters of the Alaskan Beaufort Sea*. Trans. American Fisheries Society 113: 265-282.
- Cuccarese, S.V., M.F. Arend, R.J. Hensel, and P.O. McMillan. 1984. *Biological and Socioeconomic Systems of the BAR-M, POW-1, LIZ-3A, and SI-1 North Warning System Sites, Alaska*. ADEIC. University of Alaska, Anchorage, AK.
- Day, R.H. 1996. Letter to Gene Augustine, 611 CES/CEVP. 11 April. ABR, Inc., Fairbanks, AK.
- Day, R.H., R.J. Ritchie, and D.A. Flint. 1995. *Spectacled and Steller's Eider Surveys at Remote Air Force Sites in Alaska, 1994*. Prepared for EA Engineering, Science, and Technology and the USAF, 611 ASG, 611 CES/CEV by ABR, Inc., Fairbanks, AK. 66 pp.
- Day, R.H., and J.R. Rose. 2000. *Eider Surveys at USAF Radar Sites In Northern Alaska, June 2000*. Unpublished report prepared for USFWS, Northern Alaska Ecological Services, Fairbanks, AK. 16 pp.
- Day, R.H., J.R. Rose, B.S. Cooper, and R.J. Blaha. 2001. *Migration Rates and Flight Behavior of Migrating Eiders Near Towers at Barrow, Alaska*. Prepared for the Northern Alaska Ecological Services, USFWS and the Department of Wildlife Management, North Slope Borough by ABR, Inc., Fairbanks, AK and Forest Grove, OR. 40 pp.
- Day, R.H. and A.A. Stickney. 1996. *Kittlitz's Murrelet Surveys at Remote Air Force Sites in Alaska, 1995*. Prepared for the USAF, 611 ASG, 611 CES/CEV, Elmendorf AFB by ABR, Inc., Fairbanks, AK. 46 pp.
- DeLapp, J. 1987. *Vascular Flora of the Innoko National Wildlife Refuge*. U.S. Fish and Wildlife Service, Innoko National Wildlife Refuge, AK.
- Denfeld, D.C. 1993. *The Cold War in Alaska: A Management Plan for Cultural Resources, 1993-1998*. U.S. Army Corps of Engineers, Alaska District, Anchorage, AK.
- Denlinger, L.M., D.G. Roseneau, A.L. Sowls, and A. Springer 1994. Chapter 3 *Murre and Kittiwake Monitoring and Effects of Blasting and Aircraft Disturbance at Cape Lisburne, Alaska - 1992*. In Irons, D.B. (ed.) 1994. *Monitoring of Populations and Productivity of Seabirds at Cape Lisburne and Little Diomedes, Alaska, 1992*. MMS93-0060 Minerals Management Service, Anchorage, AK.
- Department of Defense. 1992. *Department of Defense Management of Cultural and Natural Resources: Air Force Module, Reference Guide and Workshop Manual*. Prepared by Shipley Associates, Bountiful, UT.
- Department of the Air Force. 2004. Air Force Instruction 32-7064, *Integrated Natural Resource Management*.

- Derksen, D.V., T.C. Rothe, and W.D. Eldridge. 1981. *Use of Wetland Habitats by Birds in the National Petroleum Reserve-Alaska*. U.S. Fish and Wildlife Service, Resource Publication 141.
- Dolezal, W. 1993. 22 December letter to G. Augustine (11 CEOS), USFWS.
- DOWL/Ogden Joint Venture. 1998a. *Final Community Relations Plan for Big Mountain Radio Relay Station, Big Mountain, Alaska*. Prepared for the U.S. Air Force, 11th Air Control Wing, 611th Civil Engineer Squadron, Elmendorf AFB, AK.
- _____. 1998b. *Final Work Plans, Big Mountain Radio Relay Station, Big Mountain, Alaska*. Prepared for the U.S. Air Force, 11th Air Control Wing, 611th Civil Engineer Squadron, Elmendorf AFB, AK.
- Dygas, J.A., and D.C. Burrell. 1976. *Dynamic Sedimentological Processes along the Beaufort Sea Coast of Alaska*. Institute of Marine Science, University of Alaska (Fairbanks). *In Assessment of the Arctic Marine Environment: Selected Topics*, pp. 189-203.
- Dynamac Corporation, Inc. 1989a. *Installation Restoration Program, Preliminary Assessment, Bethel Radio Relay Station, Alaska*. Prepared for HQ AAC/DEPV, Elmendorf AFB, AK. Rockville, MD.
- _____. 1989b. *Installation Restoration Program, Preliminary Assessment, Granite Mountain Radio Relay Station, Alaska*. Prepared for Elmendorf Air Force Base, Alaska. Rockville, MD.
- _____. 1989c. *Installation Restoration Program, Preliminary Assessment, Naknek Recreational Camps, Alaska*. Prepared for HQ AAC/DEPV, Elmendorf AFB, AK. Rockville, MD.
- EA Engineering, Science, and Technology. 1993. *Final Environmental Assessment for the Drawdown at Galena Airport, Galena, AK*. Prepared for the 611th Air Support Group, Colonel Harry Kieling, Jr., Responsible Official, 11th Air Control Wing, Elmendorf AFB, AK.
- Earth Technologies Corporation. 1998. Draft *Historic Building Inventory and Evaluation for King Salmon Airport, Alaska*. Prepared for the USAF, 611 CES, Elmendorf AFB, AK.
- Elias, S.A., S.K. Short, D.A. Walker, and N.A. Auerbach. 1996. *Historical Biodiversity at Remote Air Force Sites in Alaska*. Final Report, Legacy Resource Management Program Project #0742. Institute of Arctic and Alpine Research, Univ. of Colorado, Boulder, CO. 60 pp. + appendices.
- EMCON Alaska, Inc. 1996a. *Baseline Human Health and Ecological Risk Assessment, Bethel BIA Administrative Site, Bethel, Alaska*. Anchorage, AK.
- _____. 1996b. *Final Preliminary Assessment/Site Inspection Port Heiden Radio Relay Station*. Prepared for 611th Civil Engineer Squadron, Elmendorf AFB, Anchorage, AK.
- _____. 1995a. *Final Human Health Risk Assessment for King Salmon Airport*. Prepared for the USAF, 611th Air Support Group, 611th Civil Engineer Squadron, Elmendorf AFB, AK. Anchorage, AK.
- _____. 1995b. *Draft Site Investigation Report, White Alice Communication Site, Nikolski, Alaska*. Prepared for 611th Civil Engineer Squadron, Elmendorf AFB and U.S. Army Engineer District, Alaska. Anchorage, AK.

- Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Tech. Rpt. 4-87-1. Vicksburg, MS. 100 pp.
- Estes, J., and B. Konar. 1996. *Shemya Island Sea Otter Project, 1996 Annual Report*. Prepared for the USAF, 611 CES/CEV, Elmendorf AFB, AK. 18 pp.
- Fischer, J.B. 1998. *Harlequin Duck Diet Contamination, Winter Feeding Ecology and Body Condition at Eareckson Air Station, Shemya Island, Alaska*. Prepared for USAF, Pacific Air Forces, 611 ASG, 611th CES/Environmental Flight, Elmendorf AFB, AK by USFWS, Alaska Maritime NWR, Adak, AK. 63 pp.
- Fison and Associates. 1987. *Galena Community Profile*. Alaska Department of Community and Regional Affairs, Anchorage, AK.
- Flock, W.L., and J.D. Hubbard. 1979. *Environmental Studies at the Bering Strait*. In *Annual Reports of Principal Investigators, Environmental Assessment of the Alaskan Continental Shelf*. NOAA-BLM. Vol. 1:(713-769), Boulder, CO.
- Frost, G.V., J.H. Boisvert, and C.T. Schick. 2005a. *Wildlife Observations and Wildlife Habitat Mapping for Eareckson Air Station*. Technical appendix to the Eareckson Air Station Integrated Natural Resources Management Plan, U.S. Air Force, 611th CES/CEVP, Elmendorf AFB, AK.
- _____. 2005b. *Wildlife Observations and Wildlife Habitat Mapping for King Salmon Forward Operating Location*. Technical appendix to the King Salmon Forward Operating Location Integrated Natural Resources Management Plan, U.S. Air Force, 611th CES/CEVP, Elmendorf AFB, AK.
- Frost, G.V., M.J. Macander, A.K. Prichard, and J.H. Boisvert. 2008. *Aleutian Cackling Goose Surveys and Habitat Mapping in the Near Islands, Alaska, 2006*. Prepared for U.S. Air Force, 611th CES/CEVP, Elmendorf AFB, AK by ABR, Inc. Environmental Research and Services, Fairbanks, AK. 78 pp.
- Frost, G.V., M.J. Macander, A.K. Prichard, R.H. Day, P.F. Miller and K.L. Beattie. 2010. *Aleutian Cackling Goose Surveys and Habitat Mapping in the Near Islands, Alaska, 2008-2009*. Prepared for U.S. Air Force, 611th CES/CEVP, Elmendorf AFB, AK by ABR, Inc. Environmental Research and Services, Fairbanks, AK. 77 pp.
- Frost, G.V., R.J. Ritchie, and T. Obritschkewitsch. 2007. *Spectacled and Steller's Eiders Surveys at U.S. Air Force Radar Sites in Northern Alaska, 2006*. Final report prepared for U.S. Air Force, 611th Civil Engineer Squadron, Environmental Planning, Elmendorf AFB, AK by ABR, Inc. Environmental Research and Services, Fairbanks, AK. 68 pp.
- Fuller, T. 1994. Dew Line Information Facsimile from the NORAD/U.S. Space Command to G. Waldmann (Woodward-Clyde).
- Furbush, C.E., and C.C. Wiedenfeld. 1968. *Soils of King Salmon - Naknek Area, Alaska*. Prepared by the Soil Conservation Service. 25 pp. + maps.
- Garner, G.W., and P.E. Reynolds. 1987. *Arctic National Wildlife Refuge Coastal Plain Resource Assessment*. 1985 Update Report Baseline Study of the Fish, Wildlife, and Their Habitats. Vol. I of III.

- Gene Stout and Associates, and Bythe & Trousil, Inc. 2009. *Integrated Natural Resources Management Plan, Inactive Sites, Alaska, 611th Air Support Group*. Prepared for U.S. Air Force, 611th Air Support Group, 611th Civil Engineer Squadron, Environmental Flight, Elmendorf Air Force Base, AK. Loveland, CO and Loveland, CO. 96 pp. + appendices.
- _____. 2008. *Integrated Natural Resources Management Plan, King Salmon Airport, Forward Operating Location, King Salmon, Alaska*. Prepared for U.S. Air Force, 611th Air Support Group, 611th Civil Engineer Squadron, Environmental Flight, Elmendorf Air Force Base, AK. Loveland, CO and Cheyenne, WY, (respectively). 122 pp.
- _____. 2007a. *Integrated Natural Resources Management Plan, Alaska Radar System, Alaska, Short and Long Range Radar Sites*. Prepared for U.S. Air Force, 611th Air Support Group, 611th Civil Engineer Squadron, Environmental Flight, Elmendorf Air Force Base, AK. Loveland, CO and Cheyenne, WY, (respectively). 158 pp. + appendices.
- _____. 2007b. *Integrated Natural Resources Management Plan, Eareckson Air Station, Shemya Island, Alaska*. Prepared for U.S. Air Force, 611th Air Support Group, 611th Civil Engineer Squadron, Environmental Flight, Elmendorf Air Force Base, AK. Loveland, CO and Cheyenne, WY, (respectively). 24 pp.
- Gibson, D.D. 1993. *Checklist of Alaska Birds*. University of Alaska Museum, Fairbanks, AK.
- _____. 1981. *Migrant Birds at Shemya Island, Aleutian Islands, Alaska*. Condor, Vol. 83:65-77.
- D.D. Gibson, and G.V. Byrd. 2007. *Birds of the Aleutian Islands, Alaska*. Nuttall Ornithological Club, Cambridge, MA and the American Ornithologists' Union, Washington, DC.
- D.D. Gibson, G.V. Byrd, and C.L. Pruett. 1999. *Birds Observed at Shemya Island, Aleutian Islands, 27 April – 11 June, 1999*. Unpublished report.
- Gilbert, M.N. (CPT). 1986. *Evaluation of Natural Resources Planning Requirements for Selected AAC Installations*. Prepared by 439th Civil Engineering Squadron, Westover AFB, MA, for AFESC/DEV, Tyndal AFB, FL and AAC/DEPV, Elmendorf AFB, AK.
- Grantz, A., P.W. Barnes, D.A. Dinter, M.B. Lynch, E. Remnitz, and E.W. Scott. 1982. *Geologic Framework; Hydrocarbon Potential and Environmental Conditions for Exploration and Development of Proposed Oil and Gas Lease Sale in the Beaufort and Northeast Chukchi Seas*. U.S. Geological Survey Open-File Report 82-48.
- _____. 1980. *Geologic Framework; Hydrocarbon Potential, Environmental Conditions, and Anticipated Technology for Exploration and Development of the Beaufort Shelf North of Alaska*. U.S. Geological Survey Open-File Report 80-94.
- Gusey, W.F. 1988. *The Fish and Wildlife Resources of the Chukchi Sea Region*. Shell Western E & P Inc., Houston, TX.
- Gutleber, R.J. 1986. *Environmental Assessment, Cape Newenham LRRS, Alaska*. Defense Environmental Restoration Program, Installation Restoration Program. U.S. Army Corps of Engineers, Anchorage, AK.

- _____. Undated(a). *Environmental Assessment, Cape Lisburne AFS, Alaska*. U.S. Army Corps of Engineers, Anchorage, AK.
- _____. Undated(b). *Environmental Assessment. Defense Environmental Restoration Program, Installation Restoration Program. Indian Mountain AFS, Alaska*. U.S. Army Corps of Engineers, Anchorage, AK.
- _____. Undated(c). *Environmental Assessment. Defense Environmental Restoration Program, Installation Restoration Program. Sparrevohn AFS, Alaska*. U.S. Army Corps of Engineers, Anchorage, AK.
- _____. Undated(d). *Environmental Assessment. Defense Environmental Restoration Program, Installation Restoration Program. Tatalina AFS, Alaska*. U.S. Army Corps of Engineers, Anchorage, AK.
- Hall, G.E. 1972. *A Summary of Observations of Birds at Oliktok - Summer 1971*. In: Kinney, P.J., ed. *Baseline Data Study of the Alaskan Arctic Aquatic Environment*. Inst. of Marine Science Rep. R723. Fairbanks: University of Alaska: 245-275.
- Harcharek, R.C. 1993. *North Slope Borough 1992 Economic Profile*. Vol. VI. North Slope Borough Planning Department, Barrow, AK. 106 pp.
- Harris, R. 1996. *Bering Land Bridge National Preserve Bird Checklist*. U.S. Department of Interior, National Park Service, Bering Land Bridge National Preserve, AK.
- Hart Crowser, Inc. 1997a. *Management Action Plan, Anvil Mountain Radio Relay Station, Alaska*. Prepared for 611 ASG and 611 CES, Elmendorf Air Force Base, AK.
- _____. 1997b . *Final Management Action Plan, Driftwood Bay Radio Relay Station, Alaska*. Prepared for the U.S. Air Force, 11th Air Support Group, 611th Civil Engineer Squadron, Elmendorf AFB, AK. Anchorage, AK.
- _____. 1997c. *Draft Management Action Plan, Granite Mountain Radio Relay Station, Alaska*. Prepared for 611 ASG and 611 CES, Elmendorf Air Force Base, AK.
- _____. 1997d. *Management Action Plan, Nikolski Radio Relay Station, Alaska*. Prepared for the U.S. Air Force, 11th Air Support Group, 611th Civil Engineer Squadron, Elmendorf AFB, AK.
- _____. 1997e. *Management Action Plan, West Nome Tank Farm, Alaska*. Prepared for 611 ASG and 611 CES, Elmendorf Air Force Base, Alaska. U.S. Engineer District, Alaska. Anchorage, AK.
- _____. 1997f. *Management Action Plan, North River Radio Relay Station, Alaska*. Prepared for 611 ASG and 611 CES, Elmendorf Air Force Base, Alaska. U.S. Engineer District, Alaska. Anchorage, AK.
- _____. 1987. *Environmental Assessment for North Warning System, Alaska*. Prepared for USAF 611th Air Support Group/Civil Engineer Squadron, Elmendorf, AK.
- Hazardous Materials Technical Center. 1989. *Installation Restoration Program, Preliminary Assessment, Bear Creek Radio Relay Station, Alaska*. Rockville, MD.

- Headquarters, Alaska Air Command. 1988. *Natural Resources Plan for 14 AAC Remote Installations in the Alaska Air Command*.
- HDR Alaska, Inc. 2005. *Oliktok Long Range Radar Station Road Project Environmental Assessment*. Prepared for 611 CES, Elmendorf AFB, AK. 130 pp.
- Hoffecker, J.F., and M. Whorton. 1999. *Final Cultural Resources Management Plan for Eareckson Air Station*. Prepared by Argonne National Laboratory, Argonne, IL for 611 ASG, USAF/Pacific Air Force Command, Elmendorf AFB, AK.
- Holmes, R.T. and C.P. Black. 1973. *Ecological Distribution of Birds in the Kolomak River - Askinuk Mountain Region, Yukon-Kuskokwim Delta, Alaska*. Condor 75:150-173.
- Hopkins, D.M., and R.W. Hartz. 1978. *Coastal Morphology, Coastal Erosion, and Barrier Islands of the Beaufort Sea, Alaska*. U.S. Geological Survey, Open File Report 78-1063. 54 pp.
- Hostman, J. 1988. *Natural Resources Plan for 14 Remote Installations in the Alaska Air Command*. HQ AAC/DEPV, Elmendorf AFB, AK.
- Howard, B. 2000. *Report of Observations of Wildlife at Eareckson Air Station, January 9-23, 2001*. Unpublished USFWS report.
- _____. 2001. *Report of Observations of Wildlife at Eareckson Air Station, December 8-19, 2000*. Unpublished USFWS report.
- Hulten, E. 1968. *Flora of Alaska and Neighboring Territories - A Manual of the Vascular Plants*. Stanford University Press, Stanford, CA. 1008 pp.
- ICF Technology Inc. 1996a. *Remedial Investigation and Feasibility Study, Barter Island Radar Installation, Alaska*. Final study, Vol. 1 of 2. Prepared for USAF 611th ASG/CES, Elmendorf AFB, AK.
- _____. 1996b. *Remedial Investigation and Feasibility Study, Bullen Point Radar Installation, Alaska*. Final. Prepared for USAF 611th Air Support Group/Civil Engineer Squadron, Elmendorf, AK.
- _____. 1996c. *Final Risk Assessment, Bullen Point Radar Installation, Alaska*. Prepared for USAF 611th Air Support Group/Civil Engineer Squadron, Elmendorf, AK.
- _____. 1996d. *Remedial Investigation and Feasibility Study, Point Lonely Radar Installation, Alaska*. Final. Prepared for USAF 611th Air Support Group/Civil Engineer Squadron, Elmendorf, AK.
- _____. 1996e. *Final Risk Assessment, Point Lonely Radar Installation, Alaska*. Prepared for USAF 611th Air Support Group/Civil Engineer Squadron, Elmendorf, AK.
- _____. 1996f. *Remedial Investigation and Feasibility Study, Wainwright Radar Installation, Alaska*. Prepared for USAF 611th Air Support Group/Civil Engineer Squadron, Elmendorf, AK.
- _____. 1996g. *Final Risk Assessment, Wainwright Radar Installation, Alaska*. Prepared for USAF 611th Air Support Group/Civil Engineer Squadron, Elmendorf, AK.

- Igl, L.D. 1996. *Bird Checklists of the United States*. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <<http://www.npwrc.usgs.gov/resource/othrdata/chekbird/chekbird.htm>> (Version 23 Feb. 2001).
- Jacobs Engineering Group, Inc. 1998. *Management Action Plan, Eareckson Air Station, Eareckson, Alaska*. Prepared for USAF, 611 ASG, 611 CES, Elmendorf AFB, AK.
- _____. 1995. *Remedial Investigation/Feasibility Study Report, Indian Mountain LRRS, Alaska*. Prepared for the USAF 611 ASG, 611 CES, Elmendorf AFB, AK. Denver, CO.
- _____. 1994. *Granite Mountain RRS, Alaska, Preliminary Assessment/Site Inspection Work Plan*. Denver, CO. 72 pp.
- _____. 1993. *IRP Final Report*. Prepared for 11th Air Force, Elmendorf AFB, AK.
- Jemison, L.A. 1992. *Abundance and Distribution of Marine Mammals in Northern Bristol Bay - A Status Report of the 1990 Marine Mammal Monitoring Effort at Togiak National Wildlife Refuge*. Unpublished report for USFWS, Togiak NWR, Dillingham, AK.
- Johnson, W.N. 1998. *A Summary of Landbird Inventory and Monitoring Activities on the Koyukuk/Nowitna Refuge Complex*. USFWS, Koyukuk/Nowitna Wildlife Refuge Complex, Galena, AK. 38 pp.
- Joint Task Force, Alaska, Alaska Command. 2010. *JTF-AK Wildland Firefighting (WFF)*. Concept of Operations. 21 pp.
- Jones Technologies, Inc. and Gene Stout and Associates. 2000a. *Integrated Natural Resources Management Plan 2000-2003, North Coastal Long Range Radar Sites, Alaska*. Prepared for the U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 78 pp. + appendices.
- _____. 2000b. *Integrated Natural Resources Management Plan 2000-2003, South Coastal Long Range Radar Sites, Alaska, Cape Romanzof, Cape Newenham, Cold Bay*. Prepared for the U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 79 pp. + appendices.
- _____. 2000c. *Integrated Natural Resources Management Plan 2000-2003, Interior Long Range Radar Sites, Alaska*. Prepared for the U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 112 pp. + appendices.
- _____. 1999a. *Integrated Natural Resources Management Plan 1999-2003, Eareckson Air Station, Shemya, Alaska*. Prepared for 611 ASG/CES, Elmendorf AFB, AK. 87 pp.
- _____. 1999b. *Integrated Natural Resources Management Plan 1999-2003, King Salmon Airport, King Salmon, Alaska*. Prepared for the U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 53 pp. + appendices.
- _____. 1999c. *Integrated Natural Resources Management Plan 1999-2003, North Warning Long Range Radar Sites, Alaska (Point Lay, Point Barrow, Oliktok, Barter Island)*. Prepared for the U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 88 pp. + appendices.

- _____. 1999d. *Integrated Natural Resources Management Plan 1999-2003, Galena Airport, Galena, Alaska*. Prepared for the U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 46 pp. + appendices.
- Jorgensen, J.L., I. Stehlik, C. Brochmann, and E. Conti. 2003. *Implications of ITS Sequences and RAPD Markers for the Taxonomy and Biogeography of the Oxytropis Campestris and O. Arctica (Fabaceae) Complexes in Alaska*. In American Journal of Botany 90(10): 1470-1480.
- Jorgenson, M.T., S.M. Murphy, and B.A. Anderson. 1989. *A Hierarchical Classification of Avian Habitats on the North Slope, Alaska*. Abstract in Proceedings of the 3rd Alaska Bird Conference, March 1989, University of Alaska, Fairbanks, AK.
- Jorgenson, M.T., J.E. Roth, E.R. Pullman, R.M. Burgess, M. Reynolds, A.A. Stickney, M.D. Smith, and T. Zimmer. 1997. *An Ecological Land Survey for the Colville River Delta, Alaska, 1996*. Final report prepared for ARCO Alaska, Inc., Anchorage, AK, by ABR, Inc., Fairbanks, AK. 160 pp.
- Kartesz, J. 1994. *A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland*. Volumes 1 and 2. Second edition. Timber Press, Portland, OR. 622 and 816 pp.
- Kendall, S., C. Dau, and P. Martin. 2001. *Eider Surveys at USAF Radar Sites in Northern Alaska, 2001*. Unpublished report prepared for USFWS, Northern Alaska Ecological Services, Fairbanks, AK. 17 pp.
- Kessel, B. 1989. *Birds of the Seward Peninsula, Alaska*. University of Alaska Press, Fairbanks, AK.
- Kessel, B.A. and D.D. Gibson. 1978. *Status and Distribution of Alaska Birds*. Studies in Avian Biology, No. 1. Cooper Ornithological Society (Allen Press), Lawrence, KS. 100 pp.
- Kinchloe, K., M. North, L. Tibbitts, and D. Ward. 1988. *Birds of Izembek Lagoon/Cold Bay, Alaska*. USFWS, Anchorage, AK.
- King, R.J. 1977. *Migratory Bird Populations of the National Petroleum Reserve - Alaska (NPR-A)*. U.S. Fish and Wildlife Service.
- Kirk, L. 1999. *Spring Staging Waterfowl on the Naknek River, Alaska Peninsula, Alaska, March-May 1999*. USFWS, Alaska Peninsula/Becharof National Wildlife Refuge Complex, King Salmon, AK. 36 pp.
- Konar, B. 2001. *Seasonal Changes in Subarctic Sea Urchin Populations from Different Habitats*. In Polar Biology, 24: 754-763. Biology Department, University of California, Santa Cruz, CA.
- _____. 2000a. *Limited Effects of a Keystone Species: Trends of Sea Otters and Kelp Forests at the Semichi Islands, Alaska*. In Marine Ecology Progress Series, Vol. 199: 271-280. U.S. Geological Survey, University of California, Santa Cruz, CA.
- _____. 2000b. *Seasonal Inhibitory Effects of Marine Plants on Sea Urchins: Structuring Communities the Algal Way*. In Oecologia, 125:208-217. Earth and Marine Sciences, University of California, Santa Cruz, CA.

- Konar, B. and J. A. Estes. 2003. *The Stability of Boundary Regions between Kelp Beds and Deforested Areas*. In *Ecology*, 84(1): 174-185. U.S. Geological Survey and Department of Biology, Earth and Marine Sciences, University of California, Santa Cruz, CA.
- Kuletz, K. 2004. *Kittlitz's Murrelet – A Glacier Bird In Retreat*. Unpublished report, Nongame Bird Management Program, U.S. Fish and Wildlife Service Regional Office, Anchorage, AK. May, 2004. 4 pp.
- Lachenbruch, A.H. 1962. *Mechanics of Thermal Contraction Cracks and Ice-wedge Polygons in Permafrost*. Geological Society of America, Special Paper No. 70.
- Lapinski, L., and G. Thomson. 1994. *Trip Report: Winter Wildlife Survey, Shemya Island, Alaska, 11-18 Feb 1994*. USFWS report.
- _____. 1993. *Trip Report: Winter Wildlife Survey, Shemya Island, Alaska, 9-15 December 1993*. USFWS report AMNWR 93/38 Adak.
- Lapinski, S., and B. Williamson. 2005. *Spring Staging Waterfowl On The Naknek River, Alaska Peninsula, Alaska, March-May 2005*. USFWS, Alaska Peninsula/Becharof National Wildlife Refuge, King Salmon, AK. 43 pp.
- Larned, B., T. Tiplady, R. Platte, and R. Stehn. 1999. *Eider Breeding Population Survey, Arctic Coastal Plain, Alaska, 1997-1998*. Unpublished report, prepared by USFWS, Migratory Bird Management, Anchorage, AK. 22 pp.
- Lefevre, C., D. West, and D.G. Corbett. 2001. *Archaeological Surveys in the Near Islands: Attu Island and Shemya Island*. In *Archaeology in the Aleut Zone of Alaska: Some Recent Research*, D. Dumond, ed. University of Oregon Anthropological Papers No. 58. Department of Anthropology and Museum of Natural History, University of Oregon, OR. pp. 235-250.
- Legare, H. 1998. *Flood Plain Identification of Eighteen Remote Air Force Radar Sites in Alaska*. Prepared for the 611 CES/CEVP, USAF by the U.S. Army Corps of Engineers, Alaska District, Anchorage, AK. 46 pp.
- Leslie, L.D. 1986. *Alaska Climate Summaries, Alaska Climate Center Technical Note No. 3*. Arctic Environmental Information and Data Center.
- Leslie, M., G.K. Meffe, J.L. Hardesty, and D.L. Adams. 1996. *Conserving Biodiversity on Military Lands: A Handbook for Natural Resources Managers*. The Nature Conservancy, Arlington, VA.
- Lewellen, R. 1977. *A Study of Beaufort Sea Coastal Erosion, Northern Alaska*. NOAA/OCSEAP, Boulder, CO. Annual Reports of Principal Investigators. Vol. XV. pp. 491-527.
- Lipkin, R. 1999. *Floristic Surveys of Selected Alaskan Long Range Radar Sites 1996*. Report prepared for the 611 CES/CEVP, USAF by the University of Alaska, Alaska Natural Heritage Program, Anchorage, AK. 51 pp.
- MacDonald, R. 1999. *The Status of Kittiwakes, Murres and Cormorants at Cape Peirce, Bristol Bay, Summer 1998*. USFWS report, Togiak NWR, Dillingham, Alaska. 44 pp.

- MacGowan, B. 1994. *Spring Staging of Waterfowl Along Major Drainages of Bristol Bay, with an Emphasis on the Naknek River, Alaska, March - May 1994*. USFWS, Alaska Peninsula/Becharof National Wildlife Refuge Complex, King Salmon, AK. 49 pp.
- Martin Marietta. 1993. Newsletter. Welcome to Oliktok. Oli Pub. A-901 [05/93].
- McCaffery, B. J. 2000. Letter to Ann Rappoport, USFWS, Anchorage. 20 January. USFWS/Yukon Delta NWR, Bethel, AK.
- _____. 1994. *An Avifaunal Reconnaissance of the Cape Romanzof Long Range Radar Station, Askinuk Mountains, Alaska*. Unpublished. USFWS report, Bethel, Alaska. 21 pp.
- McCaffery, B.J., and C.M. Harwood. 1997. *Results of the 1996 Avifaunal Inventory, Cape Romanzof Long Range Radar Site, Alaska*. Final report for Department of Defense Legacy project number 9510096. Prepared for USAF, 611th Air Support Group, CES/CEVP, Elmendorf AFB, AK. USFWS, Bethel, AK. 46 pp.
- McCaffery, B. J., C. M. Harwood, and H. Moore. 1998. *Results of the 1997 Avifaunal Inventory, Cape Romanzof Long Range Radar Site, Alaska*. Final report for the Department of Defense Legacy project number 97611CES001. Prepared for USAF, 611th Air Support Group, Civil Engineer Squadron/Environmental Flight, Elmendorf Air Force Base, Alaska. USFWS report, Bethel, Alaska. 27 pp.
- McCaffery, B. J., C. M. Harwood, and J. R. Morgart. 1997a. *First Breeding Records of Slaty-backed Gull (Larus schistisagus) for North America*. Pacific Seabirds 24:70.
- _____. 1997b. *First Nests of Caspian Terns (Sterna caspia) for Alaska and the Bering Sea*. Pacific Seabirds 24:71-73.
- McCaffery, B. J., M. L. Wege, and C. A. Nicolai. 1999. *Spring Migration of Spectacled Eiders at Cape Romanzof, Alaska*. Western Birds 30:167-173.
- Meehan, J.P. 1997a. *Wildlife Surveys at Eareckson Air Station, Shemya Island, Alaska - Winter 1996/1997*. Final report for Department of Defense Legacy Project #1279. Prepared for the USAF, 611 ASG, CES/CEV, Elmendorf AFB, AK. USFWS Report Alaska Maritime NWR 97/15. Adak, AK. 60 pp.
- _____. 1997b. *Natural and Cultural Resource Education Program at Eareckson, AS, Shemya Island, AK*. Final report for the Department of Defense Legacy Project No. 9501083. Prepared for USAF, 611 ASG, Civil Engineer/CEVP, Elmendorf AFB, AK.
- _____. 1995. *Natural and Cultural Resource Education Program at Eareckson, AS, Shemya Island, AK*. Final report for the Department of Defense Legacy Project No. 1083. Prepared for USAF, 611 ASG, Civil Engineer/CEVP, Elmendorf AFB, AK.
- Meehan, J.P., and G.V. Byrd. 1996. *Neotropical and Seabird Habitat Enhancement by Rat Eradication at Eareckson Air Station, Alaska*. Final report for DoD Legacy Project #1244. Prepared for the USAF, 611 ASG, CES/CEV, Elmendorf AFB, AK. USFWS Report Alaska Maritime NWR 96/07. Adak, AK. 34 pp.

- Meehan, J.P., and M.A. Krom. 1997. *Wildlife Surveys at Eareckson Air Station, Shemya Island, Alaska - Winter 1995/1996*. Final report for USAF Work Order #85252. Prepared for the USAF, 611 ASG, CES/CEV, Elmendorf AFB, AK. USFWS Report Alaska Maritime NWR 97/02. Adak, AK. 60 pp.
- Meehan, J.P., M.A. Krom, J.C. Williams, and L.M. Scharf. 1996. *Wildlife Surveys at Eareckson Air Station, Shemya Island, Alaska - Winter 1994/1995*. Final report for DoD Legacy Project #1279. Prepared for the USAF, 611 ASG, CES/CEV, Elmendorf AFB, AK. USFWS Report Alaska Maritime NWR 95/11. Adak, AK. 60 pp.
- Miller, J.F. 1963. *Probable Maximum Precipitation and Rainfall – Frequency Data for Alaska*. Technical Paper No. 47. U.S. Weather Bureau, Washington, D.C.
- Minerals Management Service. 1989. *Point Lay Case Study - Final Technical Report No. 139*. OCS Study, Minerals Management Service 89-0093. November 17. Alaska OCS Region, Anchorage, AK.
- Moore, H. 1998. *Population Ecology and Nesting Biology of Yellow Wagtails (*Motacilla flava*) Breeding at Cape Romanzof, Alaska*. Unpublished progress report on file, USAF, Elmendorf AFB, Alaska. 23 pp.
- _____. 1996. *Spring Staging of Waterfowl Along Major Drainages of Bristol Bay 1991-1995, with an Emphasis on the Naknek River, Alaska, March - May 1995*. USFWS, Alaska Peninsula/Becharof National Wildlife Refuge Complex, King Salmon, AK. 33 pp.
- Moore, N.J. 2004. *Propagation and Mitigation Efforts for *Oxytropis arctica barnebyana* OAB (Barneby's milkvetch) at the Kotzebue Long Range Radar Site*. Report prepared for the 611 CES/CEVP, USAF by the Alaska Plant Materials Center, Division of Agriculture, Palmer AK.
- Moran, V.S. 1997. *Implementation of the Multi-partnership Agreement for *Oxytropis arctica barnebyana* (Barneby's milkvetch) Kotzebue LRRS 1996/1997*. Final report prepared for the 611 CES/CEV, USAF by U.S. Fish and Wildlife Service, Ecological Services, Anchorage, AK. 55 pp.
- Morgan, J.R. 1999. USDI, Yukon Delta National Wildlife Refuge, personal communication with J. Trousil, Stout and Associates.
- Morrow, J.E. 1980. *The Freshwater Fishes of Alaska*. Alaska Northwest Publishing Company, Anchorage, AK. 248 pp.
- Murray, D.F. 1978. *Vegetation, Floristics, and Phytogeography of Northern Alaska*. In *Vegetation and Production Ecology of an Alaskan Arctic Tundra*. L.L. Tieszen, Ed. pp. 19-36. Springer-Verlag.
- Murray, D.F. and R. Lipkin. 1987. *Candidate Threatened and Endangered Plants of Alaska with Comments on Other Rare Plants*. University of Alaska Museum, Fairbanks, AK.
- Nakata Planning Group. 1989. *Base Comprehensive Plan. King Salmon Airport, Alaska*. Prepared for the 11th Air Force, USAF, Elmendorf.

- National Marine Fisheries Service. 1992. *Recovery Plan for the Steller Sea Lion (Eumetopias jubatus)*. Prepared by the Steller Sea Lion Recovery Team for the National Marine Fisheries Service, Silver Spring, MD. 92 pp.
- National Petroleum Reserve in Alaska Task Force, 1978. *105(c) Land Use Study, Volume 2: Values and Resources Analysis*. U.S. Department of Interior. Anchorage, AK.
- Nickerson, P.R. 1975. *Raptor Electrocution*. USFWS, Division of Technical Assistance. Wildlife Society Bulletin Vol. 3:(79-81), Washington, D.C.
- Norton, D.W., Brower, J., and B. Macy. 1993. *Checklist of Birds, Barrow, Alaska*. Arctic Sivunmun Ilisagvik College, Barrow, AK.
- Oasis Environmental, Inc. 2008. *Spectacled and Steller's Eider Ground-based Nest Surveys and Avian Inventory at Six U.S. Air Force Radar Sites in Northern Alaska*. Prepared for 611th Air Support Group, 611th Civil Engineer Squadron/Environmental Flight, Elmendorf AFB, AK by OASIS Environmental Inc., Anchorage, AK. 44 pp + appendices.
- Obritschkewitsch, T., P.D. Martin, and R.S. Suydam. 2001. *Breeding Biology of Steller's Eiders Nesting Near Barrow, Alaska, 1999, 2000*. Ecological Services, USFWS, Fairbanks, AK, Technical Report NAES-TR-01-04. 113 pp.
- Office of the Secretary of Defense. 2007. *Restoration Advisory Board Rule Handbook*. The Pentagon, Washington, DC. 28 pp.
- Ohms, H. 2008. *Polar Bear Interaction Management Plan*, January 2008. A final revised plan for the Department of Defense, U.S. Air Force contract number FA5000-06-FA019. Prepared for 611th Air Support Group, 611th Civil Engineer Squadron/Environmental Flight, Elmendorf AFB, AK by OASIS Environmental Inc., Anchorage, AK. 37 pp.
- Oligsclaeger, L.M. and S.M. Schuster. 2004. *Spring Staging of Waterfowl Along the Naknek River, Alaska, March-May 2000-2001*. USFWS, Alaska Peninsula/Becharof National Wildlife Refuge Complex, King Salmon, AK. 21 pp.
- Parker, C.L. 2000. *Vascular Plants Collected and Observed at the Sparrevohn Long Range Radar Site (LRRS), Southwestern Interior Alaska*. Draft report. University of Alaska Museum Herbarium Fairbanks and Bureau of Land Management, Anchorage Field Office.
- Peterson, M.R., D.N. Weir, and M.H. Dick. 1991. *Birds of the Kilbuck and Ahklun Mountain Region Alaska*. North American Fauna, Vol. 76.
- Pitelka, F.A. 1974. *An Avifaunal Review for the Barrow Region and North Slope of Arctic Alaska*. Arctic and Alpine Research 6 (2):161-184.
- Potts, R. 1993. Letter to G. Augustine (11 CEOS) dated December 6, 1993. Katmai National Park, NPS.
- Pratt, V.E. 1991. *Wildflowers Along the Alaska Highway*. Alaskakrafts, Inc., Anchorage, AK.
- _____. 1989. *Field Guide to Alaskan Wildflowers*. Alaskakrafts, Inc., Anchorage, AK.

- Quakenbush, L.T., R.H. Day, B.A. Anderson, F.A. Pitelka, and B.J. McCaffery. 2002. *Historical and Present Breeding-season Distribution of Steller's Eider in Alaska*. *Western Birds* 33: 99-120.
- Quakenbush, L., R. Suydam, and T. Obritschkewitsch. 2000. *Habitat Use by Steller's Eiders During the Breeding Season Near Barrow, Alaska, 1991-1996*. Unpublished report, prepared by USFWS, Ecological Services, Fairbanks, AK, and Department of Wildlife Management, North Slope Borough, Barrow, AK.
- Rappoport, A. 1993. Letter to G. Augustine (11 CEOS), September 29. USFWS, Anchorage, AK.
- Reed J. and E. Wehmeyer 2000. Bird Observation Report as Requested for King Salmon Air Base, unpublished data 29 August through 23 October 2000, provided to G. Augustine 611 CES/CEVP. 22 faxed pp.
- Reiger, S., D.B. Schoephorster, and C.E. Furbush. 1979. *Exploratory Soil Survey of Alaska*. U.S. Department of Agriculture, Soil Conservation Service. Anchorage, AK.
- Reynolds, G.L. 1988. *Historical Overview and Inventory: White Alice Communications System*. U.S. Army Corps of Engineers, Alaska District, Anchorage, AK. Prepared for USAF Alaskan Air Command, Elmendorf AFB, AK.
- Ritchie, R. and J.G. King. 2002. *Results of Steller's Eider Surveys Near Barrow and the Meade River, Alaska, 2001*. Unpublished report, prepared for the North Slope Borough, Department of Wildlife Management, Barrow, AK, by ABR, Inc. – Environmental Research & Services, Fairbanks, AK. 19pp.
- Ritchie, R.J., C.T. Schick, and J.E. Shook. 2003. *Spectacled and Steller's Eiders Surveys and Habitat Mapping at Remote U.S. Force Sites in Northern Alaska, 2002*. Prepared for U.S. Fish and Wildlife Service and U.S. Air Force by ABR, Inc. Environmental Research and Services, Fairbanks, AK. 46 pp.
- Robbins, C.R., R.M. Bailey, C.E. Bond, J.R. Brooker, E.A. Lachner, R.N. Lea, and W.B. Scott. 1991. *Common and Scientific Names of Fishes from the United States and Canada*. American Fisheries Society Special Publication 20, Fifth Ed. Bethesda, MD. 183 pp.
- Robbins, C.S., B. Bruun, and H.S. Zim. 1983. *A Guide to Field Identification, Birds of North America*. Western Publishing Company, Inc. New York, NY.
- Roth, J.E., and M.J. Macander. 2009. *Habitat Mapping Updates for Eareckson Air Station and Shemya Island, Alaska 2008*. Final Report, prepared for U.S. Air Force, 611 Civil Engineering Squadron, Environmental Flight, Elmendorf AFB, Anchorage, AK., by ABR, Inc. Environmental Research & Services, Fairbanks, AK. 20 pp.
- Ruhl, G. 1997. *Spring Staging of Waterfowl Along Major Drainages of Bristol Bay, with an Emphasis on Naknek River, Alaska, March - May 1997*. USFWS, Alaska Peninsula/Becharof National Wildlife Refuge Complex, King Salmon, AK. 30 pp.
- Ruhl, G., and H. Moore. 1996. *Spring Staging of Waterfowl Along Major Drainages of Bristol Bay, with an Emphasis on Naknek River, Alaska, March - May 1996*. USFWS, Alaska Peninsula/Becharof National Wildlife Refuge Complex, King Salmon, AK. 35 pp.

- Russell, R. 1993. December 27 letter from Gary Wheeler to Gene Augustine, (11 CEOS), ADF&G.
- SAIC. 1993a. *Draft Solid Waste Management Plan for King Salmon Airport, King Salmon, Alaska*. Prepared for USAF 11th Air Control Wing, 11 CEOS, Elmendorf AFB, AK.
- _____. 1993b. *Preliminary Assessment at Big Mountain Radio Relay Station, Alaska, Draft Expanded Preliminary Assessment Report*. Prepared for USAF 11th Air Control Wing, 11 CEOS, Elmendorf AFB, AK.
- Sauer, J.R., J.E. Hines, G. Gough, I. Thomas, and B.G. Peterjohn. 1997. *The North American Breeding Bird Survey Results and Analysis, Version 96.4*. Patuxent Wildlife Research Center, Laurel, MD.
- Savage, S.E. 2008. *Spring Staging Waterfowl on the Naknek River, Alaska Peninsula, Alaska, March-May 2007*. USFWS, Alaska Peninsula/Becharof National Wildlife Refuge, King Salmon, AK. 25 pp.
- Savage, S.E. and W. Murray, 2007. *Spring Staging Waterfowl on the Naknek River, Alaska Peninsula, Alaska, March-May 2006*. USFWS, Alaska Peninsula/Becharof National Wildlife Refuge, King Salmon, AK. 46 pp.
- Scharf, L. 1993. *Fall Staging of Waterfowl Along the Naknek River, Alaska Peninsula, Alaska, August - November 1993*. USFWS, Alaska Peninsula/Becharof National Wildlife Refuge Complex, King Salmon, AK. 44 pp.
- Schick, C.T., G.V. Frost and R.J. Ritchie. 2004. *Spectacled and Steller's Eiders Surveys and Habitat Mapping at U.S. Air Force Radar Sites in Northern Alaska, 2003*. Final Report, prepared for U.S. Air Force, 611 CES/EP, Elmendorf AFB, Anchorage, AK., by ABR, Inc. Environmental Research & Services, Fairbanks, AK.
- Schuster, S.M. 2004. *Spring Staging Waterfowl on the Naknek River, Alaska Peninsula, Alaska, March-May 2004*. USFWS, Alaska Peninsula/Becharof National Wildlife Refuge Complex, King Salmon, AK. 39 pp.
- Schwitters, M.T. 2010a. *Observations of Arctic Foxes (*Alopex lagopus*) on Shemya Island, Alaska, Fall 2010 (27 August – 15 October 2010)*. U.S. Department of Agriculture, Wildlife Services unpublished report. 4 pp.\
- _____. 2010b. *Species Observed Shemya Island, Alaska, Fall 2010, 27 August - 15 October 2010*. U.S. Department of Agriculture, Wildlife Services unpublished report. 18 pp.
- _____. 2008. *Bird Species Found at Shemya Island, Alaska, 1999-2007*. USFWS Report AMNWR 08/15. Homer, AK. 167 pp. + appendices.
- _____. 2007. *Illustrated List of Wildlife Species Observed, 10 Aug – 14 Oct 2007*. U.S. Department of Agriculture, Wildlife Services unpublished report.
- _____. 2004. *Birds Observed, Shemya Island, Alaska, 28 May-7 June 2004*. U.S. Department of Agriculture, Wildlife Services unpublished report.

- _____. 2002. *Bird Species Seen, Shemya Island, Alaska, 20 August-16 October 2002*. U.S. Department of Agriculture, Wildlife Services unpublished report.
- _____. 2000. *Bird Species Observed on Shemya Island, Alaska, 25 April-26 May 2000*. Unpublished report.
- _____. 1999. *Birds and Mammals Observed on Shemya Island, Alaska, Early Summer 1999, 26 June-27 July*. Unpublished report.
- Schwitters, M.T. and D. Gibson. 2001. *Bird Species Seen on Shemya Island, Alaska, 24 April-12 June 2001*. U.S. Department of Agriculture, Wildlife Services unpublished report.
- Schwitters, M.T. and R. Martinka. 2006. *Illustrated List of Wildlife Species Observed, 16 August – 20 October 2006, Shemya Island, Alaska*. Prepared by U.S. Department of Agriculture, Animal and Plant Inspection Service, Wildlife Services, Olympia, WA. 30 pp.
- Schwitters, M.T. and C.L. Rossi. 2002. *Experimental Wildlife Control, Fall 2002 Eareckson Air Station, Shemya Island, Alaska* (abridged version). Prepared by U.S. Department of Agriculture, Animal and Plant Inspection Service, Wildlife Services, Olympia, WA., abridged July 2004 by G. Augustine, 611 CES, Elmendorf AFB, AK. 26 p.
- Schwitters, M.T., C.L. Rossi, D.R. Sinnett, and M.A. Linnell. 2002. *Wildlife Hazard Assessment of Eareckson Air Station, Shemya Island, Alaska, April 27, 1999 – October 18, 2001*. Final Report prepared for the USAF, 611 ASG, Alaska, 611 CES/CEVP, Elmendorf AFB, AK by U.S. Department of Agriculture, Animal Plant Health Inspection Service, Wildlife Services, Olympia, WA. 112 pp.
- _____. 2001. *Wildlife Hazard Assessment of Eareckson Air Station, Shemya Island, Alaska, December 8, 1999 – October 17, 2000*. Interim Report prepared for the USAF, 611 ASG, Alaska, 611 CES/CEVP, Elmendorf AFB, AK by U.S. Department of Agriculture, Animal Plant Health Inspection Service, Wildlife Services, Olympia, WA. 61 pp.
- Schwitters, M.T., C.L. Rossi, and D.R. Sinnett. 2006. *Operational Field Evaluation of Alternative Wildlife Deterrent Methods, 2006 Report, Eareckson Air Station, Shemya Island, Alaska*. U.S. Department of Agriculture, Animal Plant Health Inspection Service, Wildlife Services, Olympia, WA. 24 pp.
- Schwitters, M.T., C.L. Rossi, and T.L. Smith. 2005. *Operational Field Evaluation of Alternative Wildlife Deterrent Methods*. Report, Eareckson AS, Shemya Island, AK by U.S. Department of Agriculture, Animal Plant Health Inspection Service, Wildlife Services, Olympia, WA. 112 pp.
- Schwitters, M.T. and C. Schwitters. 2007. *Illustrated List of Species Observed, Eareckson Air Station, Shemya Island, Alaska, 11 April – 11 June 2007*. Prepared by U.S. Department of Agriculture, Animal and Plant Inspection Service, Wildlife Services, Olympia, WA. 27 pp.
- _____. 2005a. *Wildlife Observed at Shemya Island, Alaska, 15 April-14 June 2005*. Prepared by U.S. Department of Agriculture, Animal and Plant Inspection Service, Wildlife Services, Olympia, WA. 35 pp.

- _____. 2005b. *Wildlife Observed at Shemya Island, Alaska, Fall 2005, 15 August – 21 October 2005*. Prepared by U.S. Department of Agriculture, Animal and Plant Inspection Service, Wildlife Services, Olympia, WA. 35 pp.
- _____. 2002a. *Experimental Wildlife Control, Spring 2002 Eareckson Air Station, Shemya Island, Alaska* (abridged version). Prepared by U.S. Department of Agriculture, Animal and Plant Inspection Service, Wildlife Services, Olympia, WA., abridged July 2004 by G. Augustine, 611 CES, Elmendorf AFB, AK. 16 p.
- _____. 2002b. *Bird Species Seen on Shemya Island, Alaska, 9 April-11 June 2002*. U.S. Department of Agriculture, Wildlife Services unpublished report.
- _____. 2001. *Bird Species Observed Fall 2001, Shemya Island, Alaska, 16 August-18 October 2001*. U.S. Department of Agriculture, Wildlife Services unpublished report.
- _____. 2000. *Bird Species Seen on Shemya Island, Alaska, 25 August-17 October 2000*. U.S. Department of Agriculture, Wildlife Services unpublished report.
- Schwitters, M.T. and L.E. Schwitters. 2006. *Illustrated List of Wildlife Species Observed, 19 April - 9 June 2006, Shemya Island, Alaska*. Prepared by U.S. Department of Agriculture, Animal and Plant Inspection Service, Wildlife Services, Olympia, WA. 24 pp.
- Sekora, P.S. 1973. *Aleutian Islands National Wildlife Refuge Wilderness Study Report*. Unpublished Administrative Report. U.S. Department of Interior, Bureau of Sport Fisheries and Wildlife, Anchorage, AK.
- Selkregg, L.L. 1984. *Alaska Regional Profiles*. Vol. VI. Yukon Region. State of Alaska.
- _____. 1975. *Alaska Regional Profiles*. Volume II Arctic Region. University of Alaska, Arctic Environmental Information and Data Center.
- Sellman, P.V., J. Brown, R.I. Lewellen, H. McKin and C. Merry. 1975. *The Classification and Geomorphic Implications of Thaw Lakes on the Arctic Coastal Plain, Alaska*. Research Report 344, U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory, Hanover, NH.
- Shideler, R.T. 1986. *Impacts of Human Developments and Land Use on Caribou: a Literature Review, Vol. II. Impacts of Oil and Gas Development on the Central Arctic Herd*. Tech. Rep. No. 86-3. ADFG, Habitat Div., Juneau, AK. 128 pp.
- Shirley, D.L., and M.T. Schwitters. 2010. *Wildlife of Shemya Island, Alaska, Spring 2010*. U.S. Department of Agriculture, Wildlife Services unpublished report. 22 pp.
- Skinner, B. 1999. U.S. Department of Interior, Innoko National Wildlife Refuge, personal communication with J. Trousil, Stout and Associates.
- Skinner, B.R. 2000. *Results of the 1995 - 1998 Tatalina North American Breeding Bird Survey, Tatalina Long Range Radar Site, Alaska*. Final Report for Department of Defense Legacy Project Number 9510023. Prepared for U.S. Air Force, 611th Air Support Group, Civil Engineer Squadron/Environmental Flight, Elmendorf AFB, AK. USFWS, McGrath, AK 19pp.

- Sloan, C.E., *et al.* 1986. *Hydrologic Reconnaissance Of The Unalakleet River Basin, Alaska*. U.S. Geological Survey Water Resources Investigation Report 86-4089.
- Smith, M.E. 2011. *Place-based Summary of the Arctic Marine Synthesis: Atlas of the Chukchi and Beaufort Seas*. [http://ak.audubon.org/files/Audubon%20Alaska/documents/Place-Based_Summary_of_the_Arctic_Marine_Synthesis_FINAL.pdf], Alaska Audubon, Anchorage, AK.
- Soil Conservation Service. 1979. *Exploratory Soil Survey of Alaska*. U.S. Department of Agriculture.
- Sousa, P.J. 1999. Letter from U.S. Fish and Wildlife Service - Northern Alaska Ecological Services. December 21, to Major Kent H. Nonaka, Commander, Environmental Flight (611 CES).
- _____. 1993. Letter from U.S. Fish and Wildlife Service - Northern Alaska Ecological Services. December 8, to G. Augustine (11 CEOS).
- Sowls, A.L., S.A. Hatch, and C.J. Lensink. 1978. *Catalog of Alaska Seabird Colonies*. Biological Services Program FWS/OBS-78/78. October.
- Spies, M. 1998. *Spring Staging Waterfowl on the Naknek River, Alaska Peninsula, Alaska, March-May 1998*. USFWS, Alaska Peninsula/Becharof National Wildlife Refuge Complex, King Salmon, AK. 32 pp.
- Spindler, M.A. 1979. *Bird Populations in Coastal Habitats, Arctic National Wildlife Range, AK: Results of 1978 and 1979 Aerial Surveys*. Arctic National Wildlife Range. Fairbanks, AK.
- _____. 1978. *Bird Populations and Habitat Use in the Okpilak River Delta Area, Arctic National Wildlife Range, Alaska*. Prepared by the USFWS, Arctic National Wildlife Range. Fairbanks, AK.
- Springer, A.M., D.G. Rosenau, and M. Johnson. 1979. *Ecological Studies of Colonial Seabirds at Cape Thompson and Cape Lisburne, Alaska*. In *Annual Reports of Principal Investigators, Environmental Assessment of the Alaskan Continental Shelf*. PLN/NOAA, OCSEAP. Vol. 2. Pp. 517-574. Boulder, CO.
- Stickney, A.A. 1997. *Brant Use of the Oliktok LRRS and Movements in the Kuparuk Oilfield*. Prepared for the 611 ASG, 611 CES/CEVP, Elmendorf AFB, AK by ABR, Inc., Fairbanks, AK. 30 pp.
- Stinchcomb, C. 2004. Title unknown. Prepared by NMFS, Southwest Fisheries Science Center, Protected Resources Division, San Diego, CA, for the USAF, 611th ASG, Elmendorf AFB, AK.
- Stout, G. 2012. *Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan*. An update of Ohms, H. 2008. *Polar Bear Interaction Management Plan*. A final revised plan for the Department of Defense, U.S. Air Force contract number FA5000-06-FA019. Prepared for 611th Air Support Group, 611th Civil Engineer Squadron/Environmental Flight, Elmendorf AFB, AK by Oasis Environmental, Inc., Anchorage, AK. Updated by Gene Stout and Associates, Loveland, CO. 47 pp.
- Tack, S.L. 1970. *The Summer Distribution and Standing Stock of the Fishes of Izembek Lagoon, Alaska*. M.S. Thesis, University of Alaska.

- Tande, G.F., and R. Lipkin. 2003. *Wetland Sedges of Alaska*. Prepared for the U.S. Environmental Protection Agency, Kenai River Center, AOO/Kenai, AK. Alaska Natural Heritage Program, University of Alaska Anchorage, Anchorage, AK. 138 pp.
- Tetra Tech, Inc. 1995. *Final Remedial Investigation/Feasibility Study Report, Installation Restoration Program Remedial Investigation/Feasibility Study, Kotzebue Long Range Radar Station, Alaska*. Prepared for the USAF Center for Environmental Excellence, Brooks AFB, TX. Redmond, WA.
- The Keystone Center. 1996. *A Department of Defense (DoD) Biodiversity Management Strategy*. Keystone Center Policy Dialogue on Department of Defense (DoD) Biodiversity, Final Report. Keystone, CO. 37 pp.
- TRA/Farr & Dowl Engineering. 1988. *Shemya Air Force Base Comprehensive Plan*. Prepared for 11th Air Force, Elmendorf AFB, AK.
- U.S. Air Force. USAF. 2012. *2012 Land Use Control Management Plan, 2012, 611 Air Support Group Installations*. Draft. Prepared by Environmental Restoration Program, JBER, AK. 419 pp.
- _____. 2000a. *Cultural Resources Management Plan, King Salmon Airport, Alaska*. 611th Civil Engineer Squadron, Elmendorf Air Force Base, AK.
- _____. 2000b. *Cultural Resources Management Plan, Distant Early Warning (DEW) System*. Final. Prepared by 611th CES, Elmendorf, AFB, AK.
- _____. 1999a. *Draft General Plan - 611th Air Support Group, Alaska Remote Sites*. Prepared by Parsons, Harland Bartholomew and Associates, Inc., Richmond, VA for 611th Air Support Group, 611th CES, Elmendorf AFB, AK.
- _____. 1999b. *Remedial Investigation Report Sparrevohn LRRS, Alaska*. Final. Prepared by 611 CES/CEVR, 611 ASG, Elmendorf AFB, AK.
- _____. 1998a. *Bear Creek Radio Relay Station, Alaska, Conceptual Site Model and Risk Assessment Workplan*. Revised Draft. Prepared by the 611th Air Support Group, 611th Civil Engineer Squadron, Elmendorf AFB, AK.
- _____. 1998b. *Draft Program Management Plan - Project Clean Sweep*. Prepared by the 611 ASG, 611 CES, Elmendorf AFB, AK. 25 pp + appendices.
- _____. 1997. *Management Action Plan Beaver Creek Radio Relay Station, Alaska*. Prepared by the 611th Air Support Group, 611th Civil Engineer Squadron, Elmendorf AFB, AK.
- _____. 1995. *Management Action Plan (MAP). Fort Yukon LRRS, Alaska*. Final. Prepared by 611 CES/CEVR, 611 ASG, Elmendorf AFB, AK.
- _____. Undated. *Eareckson Air Station, Cultural Heritage Stewardship*. Handout pamphlet developed by Pacific Air Force, Eleventh Air Force, 611th Air Support Group in cooperation with Center for Environmental Management of Military Lands, Colorado State University, Fort Collins, CO. 1 p.
- _____. Undated. *Environmental Assessment - Shemya Borrow Pit and Rock Quarry Plan*. Draft. Shemya, AK.

- U.S. Army Corp of Engineers. 1998. *Flood Plain Identification, Forward Operating Bases, Eareckson Air Station, Galena Airport, King Salmon Airport, Alaska*. Anchorage, AK.
- _____. 1997. *Engineering Evaluation and Cost Analysis (EE/CA) Anvil Mountain WACS, Nome, Alaska*. Alaska District, Environmental Technical Engineering Section, Anchorage, AK. 41 pp.
- _____. 1991. *Environmental Assessment And Finding Of No Significant Impact, Department Of Defense Environmental Restoration Program, North River White Alice Communication Site, Unalakleet, Alaska*. Alaska District, Anchorage, AK. 22 pp.
- U.S. Department of Agriculture, Wildlife Services. 2010. *Eareckson Air Station, Wildlife Hazard Management Plan*. Animal and Plant Health Inspection Services, Palmer, AK.
- U.S. Department of Commerce. 2012a. *Threatened and Endangered Species; the Status for the Arctic, Okhotsk, and Baltic Subspecies of the Ringed Seal and Endangered Status of the Ladoga Subspecies of the Ringed Seal; Final Rule*. In Federal Register Vol. 76:76706-76738, December 28, 2012. National Oceanic and Atmospheric Administration.
- _____. 2012b. *Threatened and Endangered Species; Threatened Status for the Beringia and Okhotsk Distinct Population Segments of the *Erignathus barbatus nauticus* Subspecies of the Bearded Seal; Final Rule*. In Federal Register Vol. 77:249, 76740-76768, December 28, 2012. National Oceanic and Atmospheric Administration.
- U.S. Department of Interior. 1987a. *Draft Environmental Impact Statement, Proposed Chukchi Sea Lease Sale 109*. March 1987. Minerals Management Service, Alaska OCS Region.
- _____. 1987b. *Alaska Outer Continental Shelf Beaufort Sea Sale 97*. Final Environmental Impact Statement. June. Minerals Management Service, 887-0069.
- U.S. Fish and Wildlife Service. 2012. *Shemya Island Diesel Generators and Fuel Storage (Consultation number 2012-0069)*. Letter from S. Haught, Endangered Species Biologist, USFWS, Anchorage Field Office to K. Moss, Senior NEPA Specialist, AECOM, Anchorage, AK. 2 pp.
- _____. 2011. Endangered, Threatened, Proposed, Candidate, and Delisted Species in Alaska. Available at Alaska.fws.gov/fisheries/endangered/consultation_guide/species_list.pdf, April 21, 2011. An update of species protected by the UFWS and NMFS. Anchorage Fish and Wildlife Field Office, Anchorage, AK. April, 2004. 2 pp.
- _____. 2010. *Shemya Island, Nature Discovery Guide*. Prepared for U.S. Air Force, 611th Air Support Group, 611th Civil Engineer Squadron, Natural Resources Management, Elmendorf Air Force Base, AK. Alaska Maritime National Wildlife Refuge, Homer, AK. 55 pp.
- _____. 2009. *Land Clearing Timing Guidance for Alaska, Plan Ahead to Protect Nesting Birds*. Anchorage Fish and Wildlife Field Office, Anchorage, AK.
- _____. 2007a. National Wildlife Refuge Profiles: www.fws.gov/refuges/profiles.
- _____. 2007b. *National Bald Eagle Guidelines*. www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf. 23 pp.

- _____. 2004a. *U.S. Shorebird Conservation Plan. 2004. High Priority Shorebirds - 2004*. Unpublished report, Arlington, VA. 5 pp.
- _____. 2004b. *Alaska's Threatened and Endangered Species*. Unpublished Report, Anchorage Fish and Wildlife Field Office, Anchorage, AK. April, 2004. 63 pp.
- _____. 2001. *Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for the Alaska-Breeding Population of the Steller's Eider*. In Federal Register Vol. 66 No. 23. February 2, 2001. Rules and Regulations.
- _____. 2000. *Endangered and Threatened Wildlife and Plants; Notice of Designation of the Northern Sea Otter in the Aleutian Islands as a Candidate Species*. In Federal Register Vol. 65 No. 218, November 9, 2000. Proposed Rules.
- _____. 1997. *Endangered, Threatened and Candidate Species in Alaska*. Unpublished list. 3 pp.
- _____. 1996. *Spectacled Eider Recovery Plan*. Anchorage, AK. 157 pp.
- _____. 1995. *Management Action Plan (MAP). Fort Yukon LRRS, Alaska*. Final. Prepared by 611 CES/CEVR, 611 ASG, Elmendorf AFB, AK.
- _____. 1993a. *Birds of the Alaska Peninsula; Cape Douglas to Cape Moller*. Alaska Peninsula/Becharof National Wildlife Refuge, King Salmon, AK.
- _____. 1993b. *Listed Endangered Species, Candidate Species, and Proposed Candidate Species*. List provided for several interior and coastal LRRS sites.
- _____. 1992. *Birds of the Selawik National Wildlife Refuge*.
- _____. 1991a. *Togiak National Wildlife Refuge, Public Use Management Plan and Environmental Assessment*. Togiak National Wildlife Refuge, Dillingham, AK.
- _____. 1991b. *Birds of the Innoko National Wildlife Refuge*. USFWS, Alaska Region, Anchorage, AK.
- _____. 1989a. *Yukon Delta National Wildlife Refuge Comprehensive Conservation Plan, Bethel, Alaska*. January 18.
- _____. 1989b. *Togiak Refuge Bird List*. Compiled and written by Donnal O'Daniel, Togiak NWR, Dillingham, AK.
- _____. 1988. *Alaska Maritime National Wildlife Refuge Final Comprehensive Conservation Plan, Wilderness Review and Environmental Impact Statement*. Anchorage, AK.
- _____. 1986a. *Togiak National Wildlife Refuge Final Comprehensive Conservation Plan, Environmental Impact Statement, and Wilderness Review*. Anchorage, AK.
- _____. 1986b. *Arctic National Wildlife Refuge Coastal Plain Resource Assessment*. In *Baseline Study of the Fish, Wildlife, and Their Habitats*. Update Report.

- _____. 1985. *Izembek National Wildlife Refuge Final Comprehensive Plan, Environmental Impact Statement, and Wilderness Review*. Region 7, Anchorage, AK.
- _____. 1984. *Yukon Delta National Wildlife Refuge*. Informational pamphlet distributed by USFWS, Bethel, AK.
- _____. 1982a. *Arctic National Wildlife Refuge Coastal Plain Resource Assessment - Initial Report, Baseline Study of Fish, Wildlife, and Their Habitats*. U.S. Department of Interior, Anchorage, AK.
- _____. 1982b. *Yukon Flats National Wildlife Refuge Information Pamphlet*.
- _____. 1978. *Breeding Bird Survey, Wet Coastal Plain Tundra, North Slope Borough*. *American Birds* 32(1):116-118.
- _____. Undated (a). *Mammals of the Izembek National Wildlife Refuge*. Cold Bay, AK.
- _____. Undated (b). *Mammals of the Selawik National Wildlife Refuge and Adjacent Waters*.
- _____. Undated (c). *Birds of the Izembek National Wildlife Refuge*. Cold Bay, AK.
- U.S. Geological Survey. 1998. *Ecoregions of Alaska*. U.S. Geological Survey Professional Paper 1567.
- Universe Technologies, Inc. and Gene Stout and Associates. 2001a. *Integrated Natural Resources Management Plan 2001-2005, North Warning Short Range Radar Sites, Alaska (Wainwright, Point Lonely, Bullen Point)*. Prepared for U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 63 pp. + appendices.
- _____. 2001b. *Integrated Natural Resources Management Plan 2001-2005, Interior Inactive Sites, Alaska (Campion, Kalakaket Creek, Bear Creek, Lake Louise, Beaver Creek)*. Prepared for U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 62 pp. + appendices.
- _____. 2001c. *Integrated Natural Resources Management Plan 2001-2005, Western Inactive Sites, Alaska (Anvil Mountain, West Nome Tank Farm, Granite Mountain, North River)*. Prepared for U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 53 pp. + appendices.
- _____. 2001d. *Integrated Natural Resources Management Plan 2001-2005, Southwestern Inactive Sites, Alaska (Bethel, Naknek Recreation Camps, Big Mountain)*. Prepared for U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 48 pp. + appendices.
- _____. 2001e. *Integrated Natural Resources Management Plan 2001-2005, Aleutian Islands/Alaska Peninsula Inactive Sites, Alaska (Nikolski, Driftwood Bay, Port Moller, Port Heiden)*. Prepared for U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 52 pp. + appendices.
- University of Alaska. 1998. *Mammal Collection Database*.
- _____. 1978. *Point Lay Community Profile*. Arctic Environmental Information and Data Center. Prepared for the U.S. Department of the Interior. July.

- University of Alaska Fairbanks. 1991. *A Revegetative Guide for Conservation Use in Alaska*. Cooperative Extensive Service, Fairbanks, AK.
- Viereck, L.A., C.T. Dyrness, A.R. Batten, and K J. Wenzlick. 1992. *The Alaska Vegetation Classification*. Pacific Northwest Research Station, U.S. Forest Service, Portland, OR. 278 pp.
- Viereck, L.A., and E.L. Little, Jr. 1972. *Alaska Trees and Shrubs*. Agriculture Handbook No. 410. U.S. Department of Agriculture, Forest Service. University of Alaska Press. Fairbanks, Alaska.
- Wahrhaftig, C. 1965. *Physiographic Divisions of Alaska*. U.S. Geological Survey Professional Paper 482. (p 71).
- Washburn, A.L. 1973. *Periglacial Processes and Environments*. Edward Arnold, London. 320 pp.
- Webber, P.J. 1978. *Spatial and Temporal Variation of the Vegetation and its Productivity*. In *Vegetation and Production Ecology of an Alaskan Arctic Tundra*. L.L. Tieszen, Ed. pp. 37-112.
- Wells, A.F., M.J Macander, and C.T. Schick. 2010. *Habitat Mapping Updates for Bullen Point, Oliktok, and Wainwright Radar System Sites and King Salmon Forward Operating Location, Alaska 2010*. Draft Report, prepared for U.S. Air Force, 611 Civil Engineering Squadron, Environmental Flight, Elmendorf AFB, Anchorage, AK., by ABR, Inc. Environmental Research & Services, Fairbanks, AK. 54 pp.
- West, E. 1991. *An Annotated List of Vertebrate Species of Ecological Concern in Alaska*. Unpublished report. Alaska Natural Heritage Program, Anchorage. 104 pp.
- West, G.C., and B.B. DeWolfe. 1974. *Populations and Energetics of Birds Near Fairbanks, Alaska*. Auk, Vol. 91:(757-775).
- Wheeler, G. 1993. Letter to G. Augustine (11th CEOS/DEVC). USFWS, Dec. 27.
- White, H.A. (ed.). 1974. *The Alaska-Yukon Wild Flowers Guide*. Alaska Northwest Publishing Co., Anchorage, AK.
- White, P.A., and T. R. Spraker. 2012. *Update - Shemya Island's Arctic Foxes: Population Status and Health*. Prepared for the USAF, 611th ASG, Elmendorf AFB, AK. 2 pp.
- Wood, J. M., C. Rossi, D. Sinnett, and M. Linnell. 1999. *Wildlife Hazard Assessment for Eareckson AS, Shemya Island, AK, 1999*. Interim Report prepared for the USAF, 611 ASG, Alaska, 611 CES/CEVP, Elmendorf AFB, AK by U.S. Department of Agriculture, Animal Plant Health Inspection Service, Wildlife Services, Olympia, WA.
- Woodward-Clyde, Inc. 1996a. *Remedial Investigation, Cold Bay WACS, Alaska*. Final report. Prepared for USAF, 11th Air Control Wing, 11th Civil Engineering Operations Squadron, Elmendorf AFB, AK.
- _____. 1996b. *Remedial Investigation Report, Fort Yukon LRRS, Alaska, Volume I, Report & Appendix I*. Prepared for USAF, 611 ASG, 611 CES, Elmendorf AFB, AK.

- _____. 1995a. *Natural Resources Plan, Eareckson Air Station, Shemya Island, Alaska*. Draft. Prepared for the USAF, 611th ASG, Elmendorf AFB, AK. 68 pp.
- _____. 1995b. *Natural Resources Plan, King Salmon Airport, King Salmon, Alaska*. Draft. Prepared for the USAF, 611 ASG, Elmendorf AFB, AK. 78 pp.
- _____. 1995c. *Natural Resources Plan, North Warning Long Range Radar Sites (Point Lay, Point Barrow, Oliktok, Barter Island)*. Draft. Prepared for the U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 113 pp.
- _____. 1995d. *Natural Resources Plan, North Coastal Long Range Radar Sites (Tin City, Kotzebue,, Cape Lisburne)*. Draft. Prepared for the U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 94 pp.
- _____. 1995e. *Natural Resources Plan, South Coastal Long Range Radar Sites (Cape Romanzof, Cape Newenham,, Cold Bay)*. Draft. Prepared for the U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 108 pp.
- _____. 1995f. *Natural Resources Plan, Interior Long Range Radar Sites (Fort Yukon, Murphy Dome, Indian Mountain, Tatalina, Sparrevohn)*. Draft. Prepared for the U.S. Air Force, 611th Air Support Group, Elmendorf AFB, AK. 155 pp.
- _____. 1995g. *Management Action Plan Lake Louise Recreation Camp, Alaska*. Prepared for the 11th Civil Engineer and Operations Squadron (11 CEOS), Environmental Restoration Section, Elmendorf AFB, AK.
- _____. 1993a. *Site Assessment, Murphy Dome LRRS*.
- _____. 1993b. *Site Investigation Report. Tin City LRRS, AK*.
- _____. 1991a. *Installation Restoration Program, Remedial Investigation/Preliminary Feasibility Study, Stage 2: Indian Mountain AFS, Alaska*.
- _____. 1991b. *Installation Restoration Program (IRP) Remedial Investigation/Feasibility Study, Stage 2: Sparrevohn AFS, Alaska*.
- _____. 1991c. *Installation Restoration Program (IRP) Remedial Investigation/Feasibility Study, Stage 2, Galena AFS and Champion AFS, Alaska*. Draft Report, 1989-1990. Prepared for HQ 11th AF and HQ 11th AF/DEPV, HQ PACAF/DEV, Hickam AFB, HI.
- _____. 1989. *Installation Restoration Program, Phase II - Confirmation/Quantification, Stage 1. Champion, Fort Yukon, Galena, Indian Mountain, Murphy Dome, Cold Bay, and Sparrevohn LRRSs*. (Reviewed but not cited in Woodward-Clyde, 1995)
- Wright, S.J. 2008. *A Revegetation Manual for Alaska*. Alaska Department of Natural Resources, Palmer, AK. 74 pp.
- _____. 1997. *Final Report Natural Revegetation of Peat Soils on Eareckson Air Station, Shemya Island, Alaska: A Qualitative Study of a Natural Process*. Prepared for the USAF, 611 ASG, CES/CEV,

- Elmendorf AFB, AK. Alaska Department of Natural Resources, Division of Agriculture, Palmer, AK. 74 pp.
- Wright, S.J., and N.J. Moore. 1994a. *Revegetation Manual for Eareckson AFS, Shemya, Alaska*. Contract F65501-93-P6136 for 11th Civil Engineer and Operations Squadron by the Alaska Plant Material Center, Palmer, AK. 34 pp.
- _____. 1994b. *Revegetation Manual for King Salmon Airport, Alaska*. Prepared for USAF, 11th Air Control Wing, 11 CEOS, Elmendorf AFB, AK by the Alaska Plant Material Center, Palmer, AK. 51 pp.
- Wynne, K. 1993. *Guide to Marine Mammals of Alaska*. Alaska Sea Grant College Program, University of Alaska, Fairbanks, Fairbanks, AK.
- Young, S.B. 1971. *The Vascular Flora of St. Lawrence Island with Special Reference to Floristic Zonation in the Arctic Regions*. No. 201. Gray Herbarium, Harvard University, MA.
- Young and Walters. 1982. *Proposed Geological and Ecological Natural Landmarks in Interior and Western Alaska*. Vol. 2. Research Sponsored by the U.S. Department of Interior, National Park Service. Center for Northern Studies, Wolcott, VT.
- Zeillemaker, F. 1994. (Refuge Manager, Izembek NWR). Letter to M. North (USFWS). January 5.
- _____. 1987. *Birds of Agattu, Alaid, Nizki, Shemya, and Buildir Islands*. Unpublished List. USFWS, Aleutian Islands Unit, Alaska Maritime NWR, Adak, AK.

Agencies and Persons Contacted

The following persons were either contacted during the draft plan preparation phase or asked to review this document.

U.S. Air Force

Scott Anderson	Former Chief, Operations, 611 CES/CEOS
Tommie Baker	Community Relations Coordinator, 673 ABW/PA
Keith Barnack	Remedial Project Manager (Eareckson Air Station, Cape Lisburne, Cape Newenham, Cape Romanzof, and Tin City), Environmental Restoration, 611 CES/CEAR
Robert Beachler	GeoBase Administrator, 611 CES/CEPT
James Fife	Chief, Asset Optimization, 611 CES/CEAO
Vikki Gilmore	Realty Officer, 611 CES/CEAO
Wade Gilpin	Environmental Compliance Manager, 611 CES/CEAN
Nick C. Hilton	Deputy Program Manager, 611 ASUS/ARS
Richard Homan	Former King Salmon Airport Installation Manager, 611 ASUS/FOL
Kim Hopkins	Former Eareckson Air Station Deputy Project Manager, 611 ASUS/EAS
Steve Hunt	Remedial Project Manager (Sparrevohn, Nikolski, Nome Tank Farm, Beaver Creek, Anvil Mountain, Bear Creek, and Driftwood Bay), Environmental Restoration, 611 CES/CEAR
Robert Johnston	Remedial Project Manager (Oliktok, Indian Mountain, Tatalina, and Bethel)
Laura Keiser	Realty Officer, 611 CES/CEAO
William C. Kiechle	CTR USAF PACAF, 611 CES/CEPT
Karlene B. Leeper	Cultural Resources Program Manager, Natural Resource Management Element, 611 CES/CEAN
Steve Mattson	Chief, Environmental Restoration Section, 611 CES/CEAR
Pam Mealer	Environmental Health and Safety Manager, Eareckson AS
Matthew Moran	Natural Resources Program Manager, Natural Resource Program Element, 611 CES/CEAN
Catherine Moody	Realty Officer, 611 CES/CEAO
LtCol Robert Neiper	611 ASUS/CC
Charlie Peyton	Remedial Project Manager (Campion, Kalakaket, King Salmon, Naknek), Environmental Restoration, 611 CES/CEAR
Yvonne Pierre	611 CES/CEAO – Realty Officer, 611 CES/CEAO
Pat Roth	Remedial Project Manager (Cold Bay, Fort Yukon, Murphy Dome, Granite Mountain, North River, Port Heiden), Environmental Restoration, 611 CES/CEAR
Lori Roy	Remedial Project Manager (Barter Island, Big Mountain, Bullen Point, Duncan Canal, Kotzebue, Lake Louise, Point Barrow, Pillar Mountain, Point Lay, Point Lonely, and Wainwright), Environmental Restoration Element, 611 CES/CEAR
Stan Slagle	Former Remedial Project Manager (Barter Island, Bullen Point, Point Lonely, and Wainwright), Environmental Restoration, 611 CES/CEAR
Ron Terry	Program Analyst, 611 CES/CEAR
Maj David Troxell	Chief, Operations, 611 CES/CEOS
Bryson Twidwell	Environmental Engineer, 611 CES/CEAN

Agencies

Alaska Department of Fish and Game

Cora Campbell Commissioner, Juneau

U.S. Bureau of Land Management

Bud C. Cribley State Director, Anchorage
Stephen Fusilier Anchorage
Robert King BLM-AK State Archaeologist & Paleontology Program Lead, Anchorage
June Lowery Anchorage
Mary Lynch Planning and Environmental Coordinator, BLM-Alaska Fire Service,
Fairbanks

U.S. Fish and Wildlife Service

Sarah Conn Field Supervisor, Fairbanks
Bill Hanson Acting Deputy Field Supervisor, Juneau
Judy Jacobs AFWFO Endangered Species Program
Kimberly Klein Endangered Species Biologist, Anchorage
Susi Miller Polar Bear Biologist, Polar Bear Program, Anchorage
Craig Perham Polar Bear Biologist, Polar Bear Program, Anchorage
Christopher Putnam Wildlife Biologist, Polar Bear Program, Anchorage
Ann G. Rappoport Field Supervisor, Anchorage
Louise N. Smith Fish and Wildlife Biologist, Fairbanks

National Marine Fisheries Service

James W. Balsiger Ph.D Regional Administrator, Alaska Region, Juneau

Other

Gene Augustine former Natural Resources Program Manager, 611 CES/CEAN
Taquik Hepa Director, North Slope Borough, Department of Wildlife Management,
Barrow

Plan Preparers

This INRMP was prepared by Gene Stout and Associates with support from **Matt Moran, 611 CES Natural Resources Program Manager** and persons identified in *Agencies and Persons Contacted*. The U.S. Army Corps of Engineers, Alaska District, via Colorado State University, **Center for Ecological Management of Military Lands**, provided basic contracting support for this project. The Center for Ecological Management of Military Lands provided INRMP GIS support, including habitat mapping.

Gene Stout - Owner, Gene Stout and Associates and Principle Author of the INRMP - Mr. Stout has Bachelor of Science and Master of Science degrees in Zoology with an emphasis on wildlife biology. Mr. Stout has 37 years of experience with Department of Defense environmental programs and was responsible for natural resources management and National Environmental Policy Act compliance at Fort Sill, Oklahoma for 18 years.

INRMP Distribution List

Alaska Department of Fish and Game, Anchorage, AK
Alaska Department of Natural Resources, Anchorage, AK
Bureau of Land Management, Anchorage District Office, Anchorage, AK
HQ PACAF/A7NQ, Joint Base Pearl Harbor-Hickam, HI
National Marine Fisheries Service, Alaska Region, Juneau, AK
North Slope Borough, Wildlife Management Department, Barrow, AK
U.S. Fish and Wildlife Service, Anchorage Field Office, Anchorage, AK
U.S. Fish and Wildlife Service, Region 7, Anchorage, AK

Appendix 2.2.4. Laws and Regulatory Instruments that May Affect 611 ASG Natural Resources Management

Below is a list of the most significant federal laws and regulations and other regulatory instruments that may govern implementation of this Integrated Natural Resources Management Plan.

Federal Laws

32 CFR. Part 190, *Appendix--Integrated Natural Resources Management*
32 CFR. Part 989, *Environmental Impact Analysis Process (EIAP)*
Alaska National Interest Lands Conservation Act (ANILCA) (Public Law (P.L.) 96-487)
American Indian Religious Freedom Act (42 United States Code (USC))
Americans with Disabilities Act of 1990 (PL 101-336; 42 USC 12101)
Animal Damage Control Act (7 USC 426-426b)
Archaeological and Historic Preservation Act of 1974 (PL 93-291; 16 USC 469 *et seq.*)
Archaeological Resources Protection Act of 1979 (PL 96-95; 16 USC 470aa-11)
Bald Eagle Protection Act (PL 95-616; 16 USC 688 *et seq.*)
Clean Air Act (as amended through 1990)
Clean Water Act (PL 95-217; 33 USC 1251 *et seq.*)
Coastal Barrier Resources Act of 1982 (16 USC 3509)
Coastal Zone Management Act (16 USC 145 *et seq.*)
Conservation Programs on Military Reservations (see Sikes Act below)
Defense Appropriations Act of 1991 – Legacy Program
Emergency Wetlands Resources Act of 1986 (16 USC 3901-3932)
Endangered Species Act of 1973 (PL 95-632, 16 USC 1531 *et seq.*)
Estuarine Areas Act (16 USC 1221-1226)
Farmland Protection Policy Act (7 USC 4201 *et seq.*)
Federal Facilities Compliance Act of 1992 (PL 102-386; amending 42 USC 6961)
Federal Insecticide, Fungicide and Rodenticide Act (7 USC 136 *et seq.*)
Federal Land Policy and Management Act of 1976 (43 USC 1701)
Federal Noxious Weed Act of 1976 (7 USC 2801)
Federal Water Pollution Control Act of 1977 (Clean Water Act), as amended (33 USC 1251 *et seq.*)
Fish and Wildlife Conservation Act (FWCA) of 1980 (16 USC 2901 *et seq.*)
Fish and Wildlife Conservation and Natural Resource Management Programs on Military Reservation
(Amends Public Law 86-797 (Sikes Act) (PL 96-561))
Fish and Wildlife Coordination Act, as amended (16 USC 661 *et seq.*)
Forest and Rangeland Renewable Resources Planning Act of 1974 (16 USC. 1601 *et seq.*)
Hunting, Fishing and Trapping on Military Lands (an update to the Military Construction Authorization
Act 10 USC 2665)
Lacey Act of 1900 (16 USC 701, 702)
Leases: Non-Excess Property of Military Departments (10 USC 2667)
Marine Mammal Protection Act (MMPA) of 1972, as amended (16 USC 1361 *et seq.*)
Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972, as amended (33 USC 1401 *et seq.*
and 16 USC 1431 *et seq.*)
Migratory Bird Conservation Act (Chapter 257; 45 Stat 1222; 16 USC 715 *et seq.*)
Migratory Bird Treaty Act (PL 65-186; 16 USC 703 *et seq.*)
Military Reservation and Facilities: Hunting, Fishing and Trapping Act of 1958 (Public Law 85-337, 10
USC 2671)
National Defense Authorization Act for Fiscal Year 2003 (PL 107-314)

National Defense Authorization Act for Fiscal Year 2004 (PL 108-136)
National Environmental Policy Act of 1969 (as amended, PL 91-190; 42 USC 4321 *et seq.*)
National Historic Preservation Act of 1966 (as amended, PL 89-665; 16 USC 470 *et seq.*)
National Trails Systems Act of 1986 (16 USC 1241-1249)
Native American Graves Protection and Repatriation Act (25 USC, Section 3001 *et seq.*)
NonIndigenous Aquatic Nuisance Prevention and Control Act of 1990
North American Wetlands Conservation Act (16 USC 4401 *et seq.*)
Noxious Plant Control Act (PL 90-583)
Outdoor Recreation on Federal Lands (16 USC 4601{1} *et seq.*)
Outleasing for Grazing and Agriculture on Military Lands (10 USC 2667(d)(4))
Plant Protection Act of 2000 (7 USC 7701 *et seq.*) (replaces Federal Noxious Weed Act of 1973 (PL 93-629))
Plant Quarantine Act (7 USC 151-167)
Protection of Fossils on Federal Lands (43 USC 1701 *et seq.*, 18 USC 641, and 18 USC 1361).
Readiness and Environmental Protection Initiative (within Section 2811, FY 2003 National Defense Authorization Act) (10 USC 2684a)
Rivers and Harbors Act (33 USC 401 *et seq.*)
Sale of Certain Interests in Lands; Logs (10 USC 2665)
Sikes Act (PL 105-85, as amended through 2004 including PL 108-136; 16 USC 670 *et seq.*)
Soil and Water Conservation Act (16 USC 2001)
Soil Conservation Act of 1938 (16 USC 5901 *et seq.*)
Soil Conservation and Domestic Allotment Act (7 USC 128)
Timber Sales on Military Lands [An update of the Military Construction Authorization Act] (10 USC 2665)
Watershed Protection and Flood Prevention Act (PL 84-566; 16 USC 1001-1009)
Wild and Scenic Rivers Act of 1968 (16 USC 1271-1287)

Executive Orders and Presidential Memoranda

Executive Order 11593, *Protection and Enhancement of the Cultural Environment*
Executive Order 11644, *Use of Off-Road Vehicles on the Public Lands*
Executive Order 11987, *Exotic Organisms*
Executive Order 11988, *Floodplain Management*, May 24, 1977
Executive Order 11989, *Off-Road Vehicles on Public Lands*, May 24, 1977
Executive Order 11990, *Protection of Wetlands*, May 24, 1977
Executive Order 11991, *Protection and Enhancement of Environmental Quality*: Amends Executive Order 11514
Executive Order 12608, *Protection of Wetlands*: Amends Executive Order 11990
Executive Order 12898, *Environmental Justice*
Executive Order 12962, *Recreational Fisheries*, June 6, 1995
Executive Order 13007, *Indian Sacred Sites*
Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*
Executive Order 13112, *Invasive Species*, February 3, 1999
Executive Order 13148, *Greening the Government through Leadership in Environmental Management*, April 22, 2000
Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*
Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, January 10, 2001
Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*
Executive Order 13443, *Facilitation of Hunting Heritage and Wildlife Conservation*
Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, October 8, 2009

Presidential Memorandum, *Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds* (April 26, 1994)

Presidential Memorandum, *Government-to-Government Relations with Native American Tribal Governments*

Department of Defense (DoD) Directives/Instructions

DoD Directive 4150.7, *DoD Pest Management Program*

DoD Directive 4700.4, *Natural Resources Management Program*

DoD Directive 4710.1, *Archaeological and Historic Resources Management*

DoD Instruction 4715.03, *Natural Resources Conservation Program* (February 14, 2011)

DoD Instruction 4715.1, *Environmental Security*

DoD Directive 4715.1E, *Environment, Safety, and Occupational Health*

DoD Instruction 4715.9, *Environmental Planning and Analysis*

DoD Instruction 5000.13, *Natural Resources*

DoD Regulation 5400.7-R, *DoD Freedom of Information Act Program*, May 22, 1997

DoD Directive 6050.1, *Environmental Effects in the United States of DoD Actions*

DoD Directive 6050.2, *Use of Off-Road Vehicles on DoD Lands*

Department of Defense, *American Indian and Alaska Native Policy*

DoD Commander's Guide to Biodiversity, 1996, Keystone Center, Keystone, CO

U.S. Air Force

AFI 13-212, Volume 1, *Range Planning and Operations*

AFI 32-1021, *Planning and Programming of Military Construction (MILCON) Projects*

AFI 32-1053, *Pest Management Program*

AFI 32-2001, *The Fire Protection Operations and Fire Prevention Program*

AFI 32-7001, *Environmental Budgeting*

AFI 32-7006, *Environmental Program in Foreign Countries*

AFI 32-7020, *The Environmental Restoration Program*

AFI 32-7045, *Environmental Compliance Assessment and Management Program (ECAMP)*

AFI 32-7062, *Air Force Comprehensive Planning*

AFI 32-7064, *Integrated Natural Resources Management*

AFI 32-9003, *Granting Temporary Use of Air Force Real Property*

AFI 36-2817, *Civil Engineer Awards Program*

AFI 65-601, *Budget Guidance and Procedures*, Volume 1

AFI 91-202, *The US Air Force Mishap Prevention Program*

AFI 91-204, *Safety Investigations and Reports*

AFMAN 37-123, *Management of Records*

AFPAM 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Techniques*

AFPD 32-70, *Environmental Quality*

State of Alaska

State Fish and Game Regulations. State fish and game laws apply to federal lands within the State of Alaska, and are enforced on 611 ASG lands. Alaska Statutes Title 16 and Alaska Department of Fish and Game (ADFG) Regulations Title 5 detail state laws relating to use of fish and wildlife resources and habitat protection.

Appendix 2.4.2. General Items of Cooperation among the U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, and the 611th Air Support Group, U.S. Air Force

Note: The below is not a formal agreement, but it has been used in previous INRMPs.

PURPOSE: The purpose of this document is to specifically list items to be provided by the Alaska Department of Fish and Game (ADFG), U.S. Fish and Wildlife Service (USFWS), and the 611th Air Support Group, Eleventh Air Force (611 ASG) for cooperative implementation of the 611 ASG Integrated Natural Resources Management Plan (INRMP). Items not specifically discussed below will generally be the responsibility of the USAF unless the other agencies agree to assist with their implementation.

AUTHORITY: In accordance with the authority contained in Title 10, U.S. Code, sections 2668-2671, and Title 16, U.S. Code, Section 670, the Department of Defense, Department of Interior, and the State of Alaska, through their duly designated representatives whose signatures appear on the 611 ASG INRMP, specifically approve the INRMP and below specific items of cooperation among the three agencies.

MUTUAL AGREEMENT:

- The USAF will maintain favorable habitats for featured species of fish and wildlife by coordinating other land uses and accomplishing direct habitat improvement measures according to this INRMP.
- User fees for persons trapping or fishing the waters at 611 ASG sites will not be charged.
- Persons fishing the waters of 611 ASG sites must purchase State licenses, tags, and stamps, as required by ADFG, unless exempt by ADFG regulations.
- No hunting will be permitted at 611 ASG sites.
- All fishing and trapping on 611 ASG sites will be in accordance with federal and state fish and game laws. Federal law takes precedence only in the event of conflict.
- Representatives of the USFWS and ADFG will be admitted to 611 ASG sites at reasonable times, subject to requirements of military necessity and security.
- The ADFG and USFWS shall furnish technical assistance for development and implementation of professionally sound natural resources programs and resolving special problems on 611 ASG sites provided funding for such support is available.
- The USAF may furnish assistance and facilities to the ADFG and/or USFWS for mutually agreed upon natural resources research projects. All parties will cooperate in conducting fish and wildlife studies required under the National Environmental Policy Act on 611 ASG lands.
- No exotic species of fish or wildlife will be introduced on 611 ASG lands without prior written approval of the U.S. Air Force, ADFG, and the USFWS.
- Fishing access and policies on 611 ASG sites will be authorized and controlled by the 611 ASG sites Commander in accordance with a published policy promulgated in compliance with applicable Federal and State laws, Air Force instructions, military requirements, and the INRMP. Air Force policy is to permit public access for outdoor recreational purposes to the greatest extent possible consistent with installation security and safety requirements and the ability of natural resources to support such activities without degrading or impairing environmental qualities or morale, welfare, and recreation programs. Specific requirements may be implemented for individual sites to meet unusual conditions.
- The USAF agrees to cooperate with the USFWS and ADFG for management of threatened or endangered species residing on 611 ASG sites. Such efforts will be in compliance with federal and state laws and applicable Air Force instructions.

- The USAF will survey its lands for endangered and threatened plant and animal species.
- The USAF has the option to directly transfer funds to the ADFG and USFWS for implementation of this INRMP.
- The use of chemical toxicants for controlling nuisance wildlife species on 611 ASG sites will be in accordance with Air Force instructions and state and federal laws.
- The USFWS will make available, upon USAF request, the services of a Federal Game Warden to aid in enforcing federal regulations, if such support is consistent with priorities of the USFWS.
- The USFWS and ADFG, upon USAF request, will provide technical assistance in controlling nuisance wildlife species, depending upon available funding.
- The USFWS and ADFG will assist in fish and wildlife surveys needed to implement this INRMP, providing funding is available.
- All agencies involved will make available to the other parties information collected, studies, and reports that involve natural resources at 611 ASG sites.

LIMITATIONS: Military missions of 611 ASG sites supersede natural resources management and associated recreational activities, and such activities must be compatible with the military mission. However, where there is conflict between the military mission and provisions of the Endangered Species Act, the Sikes Act, or any other law associated with natural resources conservation, such conflicts will be resolved according to statutory requirements.

Activities and actions in this plan related to Eareckson Air Station must be compatible with the purposes of the Alaska Maritime National Wildlife Refuge. Compatible means that an activity "... will not materially interfere with or detract from the fulfillment of the mission of the National Wildlife Refuge System or the purposes of the refuge" (National Wildlife Refuge Improvement Act of 1997). Compatibility determinations will be made by the manager of the Alaska Maritime National Wildlife Refuge.

REQUIRED REFERENCES:

- Nothing contained in this agreement shall modify the present cooperative program with other public agencies, conservation groups, or educational institutions, or modify any rights granted by treaty to any Native American tribe or to members thereof.
- This INRMP is a Federal Facilities Compliance Agreement.
- As required by the Sikes Act, the following agreements are made:

(1) This INRMP is the planning document required by the Sikes Act, as amended. This INRMP contains those items specifically required by law. In the event the Sikes Act is amended after this INRMP is signed/approved, this plan will be amended to conform to the new requirements within the Sikes Act, if needed.

(2) This plan will be reviewed by the ADFG, USFWS, and the USAF on a regular basis, but not less often than every five years.

(3) *With regard to implementation and enforcement of cooperative plans (i.e. the 611 ASG INRMP)... neither Office of Management and Budget (OMB) Circular A-76 nor any successor circular thereto applies to the procurement of services that are necessary for that implementation and enforcement; and priority shall be given to the entering into of contracts for the procurement of such implementation and enforcement services with Federal and State agencies having responsibility for the conservation or management of fish or wildlife¹.* This provision prohibits the inclusion of implementation

¹ The Sikes Act referenced is as amended, including Public Law 105-85, the Sikes Act Improvement Act of 1997 and as amended by Public Law 108-136, the National Defense Authorization Act of 2004.

and enforcement of the INRMP into Commercial Activities review associated with OMB Circular A-76, and mandates that other contracts for such services be first offered to the USFWS and ADFG, in the case of 611 ASG sites.

(4) The 611 ASG INRMP is not, nor will be treated as, a cooperative agreement to which chapter 63 of title 31, United States Code applies.

(5) This INRMP will become effective upon the date subscribed by the last signature and shall continue in full force for a period of five years or until terminated by written notice to the other parties by any of the parties signing this agreement. This agreement may be amended or revised by agreement between the parties hereto. Action to amend or revise may originate with any of the other participating agencies.

Appendix 2.5.2 INRMP Correspondence and Comments Received

Below correspondence regarding development of the 2013-2017 INRMP for 611 ASG sites is in chronological order, oldest to newest. Requests for final approval signatures are not included. Results of these requests are signatures at the beginning of the INRMP. A signature at the beginning of the INRMP signifies NMFS concurrence. A letter at the end of this appendix from the BLM indicates that agency's decision not to sign the INRMP, but it did review drafts and provide input into the final document.

Gene Stout

From: "Moran, Matthew T Civ USAF PACAF 611 CES/CEAN" <matthew.moran@elmendorf.af.mil>
To: <geoffrey_haskett@fws.gov>; <ann_rappoport@fws.gov>; <cora.campbell@alaska.gov>
Cc: "Gene Stout" <gstout@lpbroadband.net>; <jstrousil@comcast.net>
Sent: Thursday, December 08, 2011 4:17 PM
Subject: 2013-2017 611th INRMP Development Invitation
Sikes Act Partners,

The 611 Air Support Group is in the process of updating our four current Integrated Natural Resources Management Plans (INRMPs) for our 35 remote sites to comply with the Sikes Act and other compliance requirements. A major aspect of this process will be the combining of all four current plans into a single plan, which should significantly reduce total document size and review times.

As our Sikes Act partners, we invite your participation in the development of this INRMP. We have contracted with Gene Stout and Associates to prepare this INRMP, working with our staff and partners. This contractor has more experience with INRMP preparation than any other company, including our previous two INRMP preparation processes and ones for Alaska Army installations.

We plan to have a draft for your review about mid-year 2012. Prior to that, you are welcome to meet with me and/or our contractor to discuss any issues you wish. Regardless, you will receive ample opportunity to review the combined INRMP prior to its completion. We do not anticipate significant changes to our current program, but many aspects of that program will be updated.

We are requesting similar support from other agencies (particularly the National Marine Fisheries Service and Bureau of Land Management), and the public and other interested parties will have opportunities to comment on the plan.

We thank you for your past and ongoing support of our natural resources program. We look forward to producing an INRMP that meets all of our collective needs.

Matthew T. Moran
Natural Resource Program Manager
611 CES/CEAN
10471 20th St, Suite 326
JBER, AK 99506-2201
907-552-0788 (office)
907-552-9563 (fax)

Gene Stout

From: "Moran, Matthew T Civ USAF PACAF 611 CES/CEAN" <matthew.moran@elmendorf.af.mil>
To: <jim.balsiger@noaa.gov>; <kaja.brix@noaa.gov>; <corinne.brown@noaa.gov>;
<JFincher@blm.gov>; <Bob_Schneider@blm.gov>; <JErlich@blm.gov>; <greimer@blm.gov>;
<taquik.hepa@north-slope.org>; <craig.george@north-slope.org>
Cc: "Gene Stout" <gstout@lpbroadband.net>; <jstrousil@comcast.net>
Sent: Thursday, December 08, 2011 4:46 PM
Subject: 2013-2017 611th INRMP Development Invitation
INRMP Interested Parties,

The 611 Air Support Group is in the process of updating our four current Integrated Natural Resources Management Plans (INRMPs) for our 35 remote sites to comply with the Sikes Act and other compliance requirements. A major aspect of this process will be the combining of all four current plans into a single plan, which should significantly reduce total document size and review times.

We invite your participation in the development of this INRMP. We have contracted with Gene Stout and Associates to prepare this INRMP, working with our staff and partners. This contractor has more experience with INRMP preparation than any other company, including our previous two INRMP preparation processes and ones for Alaska Army installations.

We plan to have a draft for your review about mid-year 2012. Prior to that, you are welcome to meet with me and/or our contractor to discuss any issues you wish. Regardless, you will receive ample opportunity to review the combined INRMP prior to its completion. We do not anticipate significant changes to our current program, but many aspects of that program will be updated.

We thank you for your past and ongoing support of our natural resources program. We look forward to producing an INRMP that meets all of our collective needs.

Matthew T. Moran
Natural Resource Program Manager
611 CES/CEAN
10471 20th St, Suite 326
JBER, AK 99506-2201
907-552-0788 (office)
907-552-9563 (fax)

Gene Stout

From: "Moran, Matthew T Civ USAF PACAF 611 CES/CEAN" <matthew.moran@elmendorf.af.mil>
To: "Gene Stout" <gstout@lpbroadband.net>
Sent: Tuesday, December 13, 2011 12:56 PM
Attach: graycol.gif; pic19169.gif; ecblank.gif
Subject: FW: 2013-2017 611th INRMP Development Invitation

-----Original Message-----

From: Ann_Rappoport@fws.gov [mailto:Ann_Rappoport@fws.gov]
Sent: Thursday, December 08, 2011 3:51 PM
To: Moran, Matthew T Civ USAF PACAF 611 CES/CEAN
Cc: Jennifer_Spegon@fws.gov; Sarah_Conn@fws.gov
Subject: Re: 2013-2017 611th INRMP Development Invitation

Thanks for the update! We will endorse your efforts to reduce document size and review times!

Ann

Ann Rappoport, Field Supervisor
Anchorage Fish and Wildlife Field Office
605 W. 4th, Room G-61
Anchorage, AK 99501
(907)271-2787
(907)271-2786 FAX
Inactive hide details for "Moran, Matthew T Civ USAF PACAF 611 CES/CEAN" <matthew.moran@elmendorf.af.mil>"Moran, Matthew T Civ USAF PACAF 611 CES/CEAN" <matthew.moran@elmendorf.af.mil>

The USFWS (Judy Jacobs) was asked to review Table 5.2, *Threatened and Endangered Species Known or Potentially Occurring on or near 611 ASG Sites* on 4/26/2012. The following e-mails document this "consultation." Additional information provided via this consultation on 5/3/2012 was added to Table 5.2 and its related verbiage.

Gene Stout

From: "Moran, Matthew T Civ USAF PACAF 611 CES/CEAN" <matthew.moran@elmendorf.af.mil>
To: <gstout@pbroadband.net>
Sent: Saturday, May 05, 2012 11:09 PM
Attach: graycol.gif; pic22171.gif; ecblank.gif; 2012-0104 Species Table.docx; AK Species.pptx; Haulouts m-f + range.JPG; POBE CH factsheet_11_2010.pdf
Subject: FW: spreadsheet and protection measures
FYI

From: Judy_Jacobs@fws.gov [mailto:Judy_Jacobs@fws.gov]
Sent: Thu 5/3/2012 4:14 PM
To: Moran, Matthew T Civ USAF PACAF 611 CES/CEAN
Subject: Re: spreadsheet and protection measures

Hi Matt--

In response to your request, the attached table and map indicate areas where ESA-listed species may be present on 611th ASG locations. I've also attached a map of walrus haulouts and a description of polar bear critical habitat that you may find useful (if you haven't seen these already).

Please let me know if you have any questions about these attachments or would like to discuss any of this information further.

Thanks for doing a thorough job on the T&E part of the INRMPs. Our consultation number for this project is 2012-0104.

Judy

(See attached file: 2012-0104 Species Table.docx)(See attached file: AK Species.pptx)(See attached file: Haulouts m-f + range.JPG)(See attached file: POBE CH factsheet_11_2010.pdf)

Judy Jacobs
US Fish and Wildlife Service
AFWFO Endangered Species Program
605 W. 4th Avenue, Rm G-61
Anchorage, Alaska 99501
Phone: (907) 271-2768
FAX: (907) 271-2786

Moran, Matthew T Civ USAF PACAF 611 CES/CEAN" <matthew.moran@elmendorf.af.mil>

"Moran, Matthew T Civ USAF PACAF 611 CES/CEAN"
<matthew.moran@elmendorf.af.mil>

To: judy_jacobs@fws.gov
cc
Subject: spreadsheet and protection measures

04/26/2012 12:38 PM

Judy,

Nice talking with you. Thank you for your help. Attached is a draft section of the INRP. See pages 5-15 and 5-16.

Matt Moran
Natural Resource Program Manager
611 CES/CEAN
10471 20th St, Suite 302
JBER, AK 99506-2201
907-552-0788
matthew.moran.3@us.af.mil
[attachment "G-5 Ecosystems and Biotic Environment.doc" deleted by Judy Jacobs/R7/FWS/DOI]

Request from 611 ASG to USFWS for review of Polar Bear Interaction Management Plan (including Pacific Walrus Haulout Avoidance). This Plan is in Appendix 7.15 of this INRMP.

Gene Stout

From: "MORAN, MATTHEW T GS-12 USAF PACAF 611 CES/CEAN" <matthew.moran.3@us.af.mil>
To: <Joel_GarlichMiller@fws.gov>; <Craig_Perham@fws.gov>; <Christopher_Putnam@fws.gov>; <Susanne_Miller@fws.gov>
Cc: <gstout@lpbroadband.net>; "MORAN, MATTHEW T GS-12 USAF PACAF 611 CES/CEAN" <matthew.moran.3@us.af.mil>
Sent: Thursday, August 02, 2012 10:30 AM
Attach: Polar Bear IAM Plan USAF.pdf
Subject: Polar bear IAM with walrus haulout avoidance

Attached is the updated USAF 611th Polar Bear interaction plan which now includes a section of walrus haulout avoidance. Please review and provide any comments you may have. Thank you for your help.

Matt Moran
Natural Resource Program Manager
611 CES/CEAN
10471 20th St, Suite 302
JBER, AK 99506-2201
907-552-0788
matthew.moran.3@us.af.mil

On August 28, 2012 the 611 ASG mailed the following example letter requesting review of the draft INRMP to the following agency personnel.

Ann Rappoport, Field Supervisor
US Fish & Wildlife Field Office
605 West 4th Avenue, Rm G-61
Anchorage, Alaska 99501

Cora Campbell, Commissioner
Alaska Department of Fish and Game
PO Box 115526
1255 W. 8th Street
Juneau, Alaska 99811-5526

Bud C. Cribley, State Director
Bureau of Land Management
222 West 7th Avenue #13
Anchorage, Alaska 99513

James W. Balsiger Ph.D
Regional Administrator, Alaska Region
National Marine Fisheries Service
PO Box 21668
Juneau, Alaska 99802-1668

Taqulik Hepa, Director
North Slope Borough
Department of Wildlife Management
PO Box 69
Barrow, AK 99723

Sarah Conn, Field Supervisor
US Fish & Wildlife Field Office
101 12th Avenue, room 110
Fairbanks, AK 99701

Bill Hanson
Acting Deputy Field Supervisor
Juneau Fish & Wildlife Field Office
3000 Vintage Blvd. Suite 201
Juneau, Alaska 99801

28 August 2012

MEMORANDUM FOR

TO: Cora Campbell, Commissioner
Alaska Department of Fish and Game
PO Box 115526
1255 W. 8th Street
Juneau, Alaska 99811-5526

FROM: 611 CES/CEAN
10471 20th St., Suite 326
JBER, AK 99506-2201

SUBJECT: Review, 2012 Draft 611th Air Support Group Alaska Installations Integrated Natural Resources Management Plan and USAF Polar Bear Interaction Plan

References: (a) Sikes Act (16 U.S.C. 670a-670o)
(b) Endangered Species Act (16 U.S.C. 1631)
(c) Air Force Instruction 32-7064 Integrated Natural Resources Management
(d) DoDI 4715.03 Natural Resource Conservation Program

1. The 2012 Draft 611th Air Support Group (611 ASG) Alaska Installations Integrated Natural Resources Management Plan (INRMP) is attached for review and comment. This document reflects current natural resources management and represents the update and merging of the 2007 Eareckson Air Station, 2007 Alaska Radar System Short and Long Range Radar Sites, 2008 King Salmon Airport Forward Operating Location, and 2009 Inactive Sites INRMPs. Additionally the USAF Polar Bear Interaction Plan has been updated and includes additional walrus haulout protection measures.

2. The Sikes Act (16 U.S.C. 670a-670o) is the cornerstone legislative mandate that provides for natural resources management on Department of Defense (DoD) lands. The Sikes Act requires that, consistent with the use of military installations to ensure the preparedness of the Armed Forces, each INRMP shall, where appropriate and applicable, provide for natural resources management, public access and recreation, and no net loss of military mission. In addition to the Sikes Act, DoD Instruction 4715.03 and Air Force Instruction 32-7064 further elaborate the requirements for natural resources management on military lands, especially the preparation and content of the installation INRMP.

3. Your participation in this effort, through review of this document, is crucial to the success of integrated natural resources management on 611 ASG installations with the goal of no net loss of military mission. Request you send comments to 611 CES/CEAN within 45 days of document receipt. The attached CD contains a PDF and word copy of the 2012 611 ASG INRMP as well as appendices with additional information for each site.

4. The 611 ASG Polar Bear Interaction Plan is integrated into the INRMP and has also been updated to include protection measures of haulout sites for Pacific walrus.

5. Comments should be directed via email to me at matthew.moran.3@us.af.mil. If you have any questions regarding this request, please contact me at 907-552-0788.

MATTHEW T MORAN
Natural Resources Program Manager

Attachment:

2012 Draft 611 Air Support Group Alaska Installations INRMP and USAF Polar bear Interaction Plan(CD)

INRMP Review e-mail

On October 1, 2012, Matthew T. Moran, USAF PACAF 611 CES/CEAN <matthew.moran.3@us.af.mil> sent the following e-mail to ann_rappoport@fws.gov <ann_rappoport@fws.gov>; sarah_conn@fws.gov <sarah_conn@fws.gov>; bill_hanson@fws.gov <bill_hanson@fws.gov>; cora.campbell@alaska.gov <cora.campbell@alaska.gov>; bcribley@blm.gov <bcribley@blm.gov>; jim.balsiger@noaa.gov <jim.balsiger@noaa.gov>; taulik.hepa@north-slope.org taulik.hepa@north-slope.org.

Subject: USAF 611 Alaska Remote Sites Integrated Natural Resources Management Plan Review

All,

The 2012 Draft 611th Air Support Group (611 ASG) Alaska Installations Integrated Natural Resources Management Plan (INRMP) was mailed 28 August 2012 for review and comment. This document reflects current natural resources management and represents the update and merging of the 2007 Eareckson Air Station, 2007 Alaska Radar System Short and Long Range Radar Sites, 2008 King Salmon Airport Forward Operating Location, and 2009 Inactive Sites INRMPs. Additionally, the USAF Polar Bear Interaction Plan has been updated and includes additional walrus haulout protection measures. The 611 would like to have comments back by 22 Oct 2012 in order to update our plan within timeframes. Thank you for your help and support in the effort.

Matt Moran
Natural Resource Program Manager
611 CES/CEAN
10471 20th St, Suite 326
JBER, AK 99506-2201
907-552-0788
907-552-5311 (fax)
matthew.moran.3@us.af.mil

Note: The intent of the e-mail was to document the date of the delivery of the review draft Integrated Natural Resources Management Plan and to urge expedient reviews of this draft. Within one day Mr. Moran received five phone calls from respondents acknowledging the ongoing review process.

BLM review comments

On October 18, 2012, Robert King, BLM-AK State Archaeologist & Paleontology Program Lead sent comments on items missing in the INRMP. However, all comments were related to cultural resources. Thus, Matt Moran forwarded these comments to the 611 ASG Cultural Resources Manager for consideration in the next update of the Integrated Cultural Resources Management Plan.

On October 29, BLM sent 34 comments on the INRMP, primarily involving fire management, coastal zone management, and cultural resources. Appropriate changes were made to address all comments except six, which involved cultural resource issues that should be more appropriately addressed in the Integrated Cultural Resources Management Plan.

On October 30, 2012, Matthew T. Moran, USAF PACAF 611 CES/CEAN <matthew.moran.3@us.af.mil> sent the following e-mail to ann_rappoport@fws.gov <ann_rappoport@fws.gov>; sarah_conn@fws.gov <sarah_conn@fws.gov>; bill_hanson@fws.gov <bill_hanson@fws.gov>; cora.campbell@alaska.gov <cora.campbell@alaska.gov>; bcribley@blm.gov <bcribley@blm.gov>; jim.balsiger@noaa.gov <jim.balsiger@noaa.gov>; taquik.hepa@north-slope.org taquik.hepa@north-slope.org.

All,

The 2012 Draft 611th Air Support Group (611 ASG) Alaska Installations Integrated Natural Resources Management Plan (INRMP) was mailed 28 August 2012 for review and comment. The 611 originally asked for comments back by 22 Oct 2012 and then extended this till 29 October 2012 in order to update our plan within timeframes. At this time we have only received some comments back from the BLM. Please provide comments to me immediately or they will not be able to be captured in this process. If you choose not to comment, please let me know as well. Thank you for your help and support in the effort.

Matt Moran
Natural Resource Program Manager
611 CES/CEAN
10471 20th St, Suite 326
JBER, AK 99506-2201
907-552-0788
907-552-5311 (fax)
matthew.moran.3@us.af.mil

USFWS review comments

On October 31, the USFWS (Fairbanks Field Office) sent the following letter with comments on the Review Draft INRMP. Attachments and files with this letter are not included here, but all comments were addressed in the INRMP and *Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan* (Stout 2012). It is important to note that the 611 ASG worked closely with the Anchorage Office with regard to development of migratory bird, listed species, and *Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan* portions of the INRMP.

On November 16, 2012 Louise Smith, Fish and Wildlife Biologist, USFWS, Fairbanks Office, sent Matt Moran an e-mail with a “track changes” copy of the draft *Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan* (Stout 2012). All comments were addressed with exception of a “consideration” to move one figure, which, due to its landscape orientation and the need to place it on an odd page number, could not be accommodated.



United States Department of the Interior
FISH AND WILDLIFE SERVICE
Fairbanks Fish and Wildlife Field Office
101 12th Avenue, Room 110
Fairbanks, Alaska 99701
October 31, 2012



U.S. Department of Defense/U.S. Air Force
ATTN: Matthew Moran
Manager, Natural Resources Program
611 CES/CEAN
10471 20th St., Suite 326
JBER, AK 99506-2201

Re: 611th ASG Alaska Installations
2012 Draft INRMP and Polar Bear
Interaction Plan

Dear Mr. Moran:

Thank you for the opportunity to comment on the 2012 Draft 611th Air Support Group (ASG) Alaska Installations Integrated Natural Resources Management Plan (INRMP) and U.S. Air Force (USAF) Polar Bear Interaction Plan.

We suggest you contact Ted Swem (ted_swem@fws.gov or 907.456.0441), Branch Chief for Endangered Species in the Fairbanks Field Office, to inquire if formal endangered species consultation, or an updated informal consultation, will be needed for this updated INMP and Polar Bear Interaction Plan.

For ease of revision, we have made specific comments and revisions using track changes in the original documents. No comments were made on the INRMP E-3 Installation Overview, F-4 Physical Environment, H-6 Mission Impacts, and J-8 Management Goals and Objectives and these sections are not included in our submission. General comments regarding the INRMP and Polar Bear Interaction Plan are included below.

611 ASG INRMP

To reduce impacts to migratory birds we suggest adding the following language in Section 7.4.4 Migratory Birds, either under site-specific measures or general measures, as appropriate. This consideration is especially important at coastal sites where bird migration is concentrated along the coastline.

Lighting should be designed so as not to attract birds. Since radiant lights at facilities could be an attractant to birds, especially during periods of inclement weather and/or increasing darkness, shielded lighting will be required at project facilities, to lessen the potential for episodic collision events. Low radiant lighting should be used, and lighting should be directed downward or inward wherever possible so as to prevent "star" effects when viewed offsite. Only lighting necessary for safety should be directed offsite.

Please update Section 7.4.5 Polar Bear Interaction Reduction to reflect that polar bears are now listed as threatened under the Endangered Species Act and include language appropriate to their threatened status.

USAF Polar Bear Interaction Plan

Section 1.0. The FWS-listing of polar bears as a threatened species should be acknowledged in the introductory paragraph of this section. In addition, language should be added noting walrus as a species of special concern:

Polar bears were listed as a threatened species by the U.S. Fish and Wildlife Service in 2008 (73 Federal Register 28212 [May 15, 2008]).

The U.S. Fish and Wildlife Service completed a finding in 2011 that concluded listing the Pacific walrus as an endangered or threatened species is warranted (76 *Federal Register* 7634 [February 10, 2011]). Listing the Pacific walrus is currently precluded by the need to address higher priority species nationwide, but the U.S. Fish and Wildlife Service is scheduled to consider the walrus for listing in 2017.

Section 3.0. Because Pacific walrus are included within the avoidance and minimization measures laid out in the USAF Polar Bear Interaction Plan, we would like to see this document more carefully address this species. The document would benefit from inclusion of some basic walrus biology. In particular, the stampeding behavior of walrus and associated risk of injury and mortality should be emphasized in order to illustrate to site personnel the importance of not disturbing this species. We suggest using language similar to that drafted by this office for the recent National Petroleum Reserve-Alaska Integrated Area Plan Draft EIS (2012), which you should feel free to incorporate within your own document (Attachment 1). Furthermore, we suggest modifying the title of the USAF Polar Bear Interaction Plan to include walrus, thereby ensuring inclusive document searches.

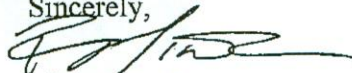
Section 7.0. In general, more consistency in site-specific plans is needed, while still allowing for unique conditions. For example, bear spray should be available at all sites. In addition, the language used for Point Lonely could be placed in all site-specific sections: "Preventative

measures include briefing personnel visiting the site on items included within this plan, providing them with copies of this plan, and other information appropriate to the site visit.” Specific details, such as fencing or lighting requirements, could then follow for each site. There also seems to be inconsistencies in lighting requirements between sites. Unless there are lighting needs specific to each site, lighting requirements should be standardized, preferably to address both polar bear and migratory bird concerns (see above) and included in best management practice standards.

The following language should be added to a few sections (7.9, 7.10): “Site personnel should be aware of the potential for walrus in the vicinity of _____ LRRS.” Although there may not be a history of walrus hauling out in some of these areas, walrus can be found in the waters offshore from these sites. Because walrus are exhibiting new haul out patterns in recent years, it is reasonably foreseeable they could haul out on these sections of coastline during the life of this plan.

These comments are submitted in accordance with provisions of the Endangered Species Act of 1973 (87 Stat. 844) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended: 16 U.S.C. 661 et seq.) and constitute the report of the Department of the Interior. We appreciate this opportunity to comment. Please contact Megan Boldenow (megan_boldenow@fws.gov or 907.456.0227) should you have questions or concerns regarding our comments on the draft INMP and Polar Bear Interaction Plan.

Sincerely,



ROBERT MILLER
ACTING FOR:
Sarah Conn

Field Supervisor,
Fairbanks Fish and Wildlife Field Office

Attachment



United States Department of the Interior



BUREAU OF LAND MANAGEMENT
Alaska State Office
222 West Seventh Avenue, #13
Anchorage, Alaska 99513-7504
<http://www.blm.gov>

MAR 20 2013

In Reply Refer To:
1610 (AK9310)

Matthew Moran
Natural Resources Program Manager
Natural Resource Program Element, 611th Civil Engineer Squadron
10471 20th St, Suite 339
JBER, AK 99506-2201

Dear Mr. Moran:

Thank you for the invitation to engage as an invited collaborator on the recent Integrated Natural Resources Management Plan of the 611th Air Support Group. BLM-Alaska greatly appreciates the opportunity to review and comment on the INRMP; however, I am politely declining your invitation to be a collaborator.

We look forward to continuing to work with you on future projects concerning the management of Alaska's great public lands.

Sincerely,

Bud C. Cribley
State Director

Appendix 5.2. Habitat Summaries for Active and Inactive Former Radar 611 ASG Sites

Wildlife habitat maps were developed for Active 611 ASG sites and Bullen Point, Point Lay, Point Lonely, and Wainwright sites. These maps and detailed explanations of their methodologies are shown and explained in Gene Stout and Associates and Blythe & Trousil Inc. 2007a, 2007b, 2008, and 2009 (based on original publications by Schick *et al.* (2004) and Frost *et al.* (2005a and 2005b).

These maps were updated for five sites (Eareckson AS [Roth and Macander 2009]; King Salmon, Oliktok LRRS, Bullen Point former SRRS, and Wainwright former SRRS [Wells *et al.* 2010]) using the following data sources.

- Eareckson AS’s original 2003 aerial photos were updated using 2008 Worldview-1 imagery.
- King Salmon Airport’s original 2001 aerial photos were updated using 2006 aerial photos and 2007 multi-spectral Quick Bird imagery.
- Oliktok LRRS’s original 1979 and 2000 aerial photos were updated using 2005 multi-spectral Quick Bird and 2005 panchromatic Quick Bird imagery.
- Bullen Point site’s original 2000 aerial photos were updated using 2006 pan-sharpened Quick Bird imagery.
- Wainwright site’s original 1985 and 2000 aerial photos were updated using 2006 pan-sharpened Quick Bird imagery.

The Center for Environmental Management on Military Lands, Colorado State University developed updated wildlife habitat maps for remaining active sites using the most recent imagery found on Google Earth for each site and, if available, 2009-2010 SPOT-5 satellite imagery (<http://www.alaskamapped.org/ortho>).

Below tables summarize the most current habitat data for each of these sites¹. More specific habitat data and maps are in site-specific appendices 3.0, sections 5.2, *Vegetation*, maps 5.2 and tables 5.2.

Eareckson Air Station (2008)

<u>Habitat Class</u>	<u>Acres</u>
Artificial Barrens	665
Artificial Partially Vegetated	66
Coastal Beach	111
Coastal Brackish Water	12
Coastal Dry Leymus Meadow	130
Coastal Dry Seral Herb Meadow	1
Coastal Moist Grass-Herb Meadow	81
Coastal Moist Umbel Meadow	27
Coastal Rock	197
Coastal Wet Graminoid-Herb Tundra	8
Disturbed Moist Graminoid-Herb Meadow	867
Lacustrine Water	72
Lowland Lacustrine Barrens	5

¹ Official acreages (INRMP Table 3.0) and mapped acreages (these tables) are not necessarily the same due to different methods of calculation.

<u>Habitat Class</u>	<u>Acres</u>
Lowland Wet Graminoid-Herb Meadow	58
Riverine Moist Grass-Herb Meadow	12
Tidal River	3
Upland Barren Cliff	14
Upland Barren Rock & Scree	2
Upland Dry Grass-Herb Meadow	18
Upland Dry Leymus Meadow	284
Upland Dwarf Empetrum-Graminoid Scrub	622
Upland Dwarf Ericaceous-Lichen Scrub	67
Upland Moist Grass-Herb Meadow	268
Upland Moist Umbel Meadow	119
<u>Upland Partially Vegetated Barrens</u>	<u>6</u>
Totals	3,716

King Salmon Airport (2006-2007)

<u>Habitat Class</u>	<u>Acres</u>
Artificial (including Artificial Barrens, Artificial Partially Vegetated, and Artificial Vegetated for 2006/2007)	926.2
Lacustrine Water	0.7
Lowland Aquatic Marsh	27.9
Lowland Dwarf Scrub	30.3
Lowland Low Open Scrub	60.0
Lowland Paper Birch Forest	25.7
Lowland Tall Open Shrub Swamp	25.7
Lowland Wet Sedge Tundra	18.2
Riverine Aquatic Sedge Marsh	3.0
Riverine Low Open Willow-Graminoid Scrub	9.3
Riverine Moist Bluejoint-Herb Tundra	48.4
Riverine Open Paper Birch-Balsam Poplar Forest	12.2
Riverine Tall Open Alder-Willow Scrub	2.1
Rivers	3.6
Upland Dry Graminoid Tundra	16.4
Upland Dwarf Mixed Shrub-Tussock Scrub	20.2
Upland Low Open Scrub	46.1
Upland Mixed Forest	169.9
Upland Moist Grass-Herb Tundra	3.2
Upland Paper Birch Forest	89.9
Upland Tall Scrub	131.4
<u>Upland White Spruce Woodland</u>	<u>430.2</u>
Totals	2,092.2

Barter Island (2010)

<u>Habitat Type</u>	<u>Acres</u>	<u>%</u>
Barren Land	166.14	25.20
Dwarf Shrub	12.38	1.88
Emergent Herbaceous Wetlands	74.70	11.33

Habitat Type	Acres	%
Open Water	150.86	22.88
Perennial Ice/Snow	8.89	1.35
Sedge/Herbaceous	246.25	37.35
Totals	659.22	100.00

Cape Lisburne LRRS (2009)

Habitat Type	Acres	%
Barren Land	321.92	28.72
Developed, Low Intensity	74.52	6.65
Dwarf Shrub	194.79	17.38
Emergent Herbaceous Wetlands	11.70	1.04
Evergreen Forest	10.58	0.94
Open Water	33.13	2.96
Sedge/Herbaceous	152.67	13.62
Shrub/Scrub	304.51	27.17
Woody Wetlands	16.95	1.51
Totals	1,120.77	100.00

Cape Newenham LRRS (2004)

Habitat Type	Acres	%
Barren Land	350.48	16.69
Dwarf Shrub	581.36	27.68
Open Water	24.23	1.15
Shrub/Scrub	1,144.50	54.49
Totals	2,100.57	100.00

Cape Romanzof LRRS (2009)

Habitat Type	Acres	%
Barren Land	1,472.43	30.28
Deciduous Forest	7.13	0.15
Developed, High Intensity	1.11	0.02
Developed, Low Intensity	151.33	3.11
Developed, Medium Intensity	34.22	0.70
Dwarf Shrub	1,306.74	26.87
Evergreen Forest	8.06	0.17
Mixed Forest	7.56	0.16
Open Water	13.37	0.27
Perennial Ice/Snow	2.75	0.06
Shrub/Scrub	1,858.27	38.21
Totals	4,862.97	100.00

Cold Bay LRRS (2005)

Habitat Type	Acres	%
Barren Land	24.87	14.22
Dwarf Shrub	21.79	12.46
Emergent Herbaceous Wetlands	17.62	10.08
Grassland	78.27	44.75
Open Water	32.35	18.49
Totals	174.90	100.00

Fort Yukon LRRS (2011)

Habitat Type	Acres	%
Barren Land	4.50	5.33
Deciduous Forest	23.12	27.38
Developed, Low Intensity	31.36	37.15
Developed, Medium Intensity	7.11	8.42
Emergent Herbaceous Wetlands	8.97	10.62
Evergreen Forest	0.44	0.52
Mixed Forest	4.10	4.86
Shrub/Scrub	1.64	1.94
Woody Wetlands	3.19	3.78
Totals	84.42	100.00

Indian Mountain LRRS (2005)

Habitat Type	Acres	%
Barren Land	237.62	2.45
Deciduous Forest	823.28	8.47
Dwarf Shrub	4,239.58	43.63
Evergreen Forest	935.66	9.63
Mixed Forest	876.01	9.02
Sedge Herbaceous	3.33	0.03
Shrub/Scrub	2,600.56	26.77
Totals	9,716.04	100.00

Kotzebue LRRS (2007)

Habitat Type	Acres	%
Barren Land	3.27	0.49
Developed, Low Intensity	60.30	9.10
Developed, Medium Intensity	9.94	1.50
Dwarf Shrub	90.82	13.71
Emergent Herbaceous Wetlands	0.00	0.00
Open Water	13.26	2.00
Sedge/Herbaceous	57.48	8.68
Shrub/Scrub	294.76	44.50
Woody Wetlands	132.58	20.02

Habitat Type	Acres	%
Totals	662.42	100.00

Murphy Dome LRRS (2010)

Habitat Type	Acres	%
Barren Land	1.33	0.15
Deciduous Forest	57.32	6.66
Developed, Low Intensity	49.00	5.69
Developed, Open Space	10.46	1.22
Dwarf Shrub	19.95	2.32
Evergreen Forest	119.00	13.83
Grassland	0.02	0.00
Mixed Forest	47.68	5.54
Shrub/Scrub	550.23	63.93
Woody Wetlands	5.65	0.66
Totals	860.64	100.00

Oliktok LRRS (2005)

Habitat Class	Acres
Artificial (including Artificial Barrens and Artificial Partially Revegetated for 2005)	59.7
Coastal Barrens	20.0
Coastal Brackish Water	104.0
Coastal Salt Marsh	60.6
Coastal Salt-killed Tundra	67.9
Deep Water w/Islands or Polygonized Margins	25.4
Lowland Aquatic Sedge Marsh	6.9
Lowland Dwarf Scrub	27.0
Lowland Lacustrine Barrens	6.4
Lowland Moist Sedge-Shrub Tundra	197.1
Lowland Nonpatterned Wet Tundra	15.8
Lowland Patterned Aquatic Marsh	0.1
Lowland Patterned Wet Tundra	180.2
Lowland Wet-Moist Patterned Tundra Complex	32.8
Marine Water	178.7
Old Basin Wetland Complex (Ice-rich)	123.9
Riverine Barrens	7.0
Rivers and Streams	7.5
Shallow Water	37.5
Shallow Water w/Islands or Polygonized Margins	17.1
Totals	1,175.6

Point Barrow LRRS (2005)

Habitat Type	Acres	%
Barren Land	24.16	9.24
Developed, Low Intensity	29.86	11.42
Emergent Herbaceous Wetlands	20.09	7.68

Open Water	11.70	4.47
Perennial Ice/Snow	9.83	3.76
Sedge/Herbaceous	165.85	63.43
Totals	261.49	100.00

Sparrevohn LRRS (2004)

Habitat Type	Acres	%
Barren Land	33.97	3.05
Deciduous Forest	8.70	0.78
Developed, Low Intensity	30.03	2.70
Dwarf Shrub	508.82	45.73
Evergreen Forest	67.43	6.06
Mixed Forest	5.11	0.46
Shrub/Scrub	458.54	41.21
Totals	1,112.60	100.00

Tatalina LRRS (2010)

Habitat Type	Acres	%
Barren Land	348.25	7.02
Deciduous Forest	831.29	16.75
Developed, Low Intensity	117.80	2.37
Developed, Medium Intensity	27.79	0.56
Developed, Open Space	3.78	0.08
Dwarf Shrub	551.20	11.11
Evergreen Forest	923.47	18.61
Mixed Forest	1,276.84	25.73
Shrub/Scrub	882.60	17.78
Totals	4,963.03	100.00

Tin City LRRS (2004)

Habitat Type	Acres	%
Barren Land	395.26	50.67
Developed, Low Intensity	26.22	3.36
Dwarf Shrub	156.14	20.02
Emergent Herbaceous Wetlands	1.78	0.23
Open Water	26.03	3.34
Perennial Ice/Snow	2.57	0.33
Perennial Ice/Snow	0.19	0.02
Sedge/Herbaceous	169.01	21.67
Shrub/Scrub	2.81	0.36
Totals	780.02	100.00

Bullen Point Former SRRS (2006)

<u>Habitat Class</u>	<u>Acres</u>
Artificial (including Artificial Barrens and Artificial Partially Revegetated for 2006)	38.4
Coastal Barrens	35.2
Coastal Brackish Water	5.2
Coastal Salt Marsh	22.9
Coastal Salt-killed Tundra	37.9
Deep Water	6.5
Deep Water w/ Islands or Polygonized Margins	2.0
Lowland Aquatic Grass Marsh	6.6
Lowland Aquatic Sedge Marsh	2.1
Lowland Dwarf Scrub	8.7
Lowland Lacustrine Barrens	3.5
Lowland Moist Sedge–Shrub Tundra	384.7
Lowland Nonpatterned Wet Tundra	11.4
Lowland Patterned Wet Tundra	19.8
Lowland Wet–Moist Patterned Tundra Complex	74.5
Marine Nearshore Water (Estuarine)	91.0
Marine Waters	277.4
Riverine Barrens	1.1
Rivers and Streams	3.0
Shallow Water	8.3
Shallow Water w/Islands or Polygonized Margins	5.9
Young Basin Wetland Complex (Ice-poor)	46.0
Totals	1,092.0

Point Lay Former LRRS (2000)

<u>Wildlife Habitats and Landcover Types</u>	<u>Acres</u>	<u>%</u>
Marine Nearshore Water (Estuarine)	70.62	3.74
Coastal Barrens	50.06	2.66
Coastal Brackish Water	1.41	0.08
Deep Water	130.34	6.91
Deep Water w/ Islands or Polygonized Margins	40.23	2.13
Shallow Water	5.54	0.29
Shallow Water w/ Islands or Polygonized Margins	0.71	0.04
Lowland Lacustrine Barrens	0.54	0.03
Lowland Aquatic Grass Marsh	23.89	1.27
Lowland Aquatic Sedge Marsh	3.53	0.18
Lowland Patterned Aquatic Marsh	4.48	0.24
Lowland Nonpatterned Wet Tundra	12.22	0.65
Lowland Patterned Wet Tundra	465.80	24.69
Lowland Wet–Moist Patterned Tundra Complex	268.90	14.26
Lowland Moist Sedge–Shrub Tundra	259.64	13.77
Lowland Moist Tussock Tundra	85.85	4.55
Old Basin Wetland Complex (Ice-rich)	340.07	18.03
Lowland Dwarf Scrub	3.11	0.16
Upland Low Shrub–Tussock Scrub	55.14	2.92
Artificial	63.97	3.39
Totals	1886.05	100.00

Point Lonely Former SRRS (2000)

Wildlife Habitats and Landcover Types	Acres	%
Marine Nearshore Water (Estuarine)	240.9	13.0
Coastal Barrens	75.4	4.1
Coastal Brackish Water	9.4	0.5
Coastal Salt Marsh	9.1	0.5
Coastal Salt-killed Tundra	16.1	0.9
Deep Water	14.3	0.8
Deep Water w/ Islands or Polygonized Margins	18.5	1.0
Shallow Water	4.4	0.2
Shallow Water w/ Islands or Polygonized Margins	5.2	0.3
Lowland Lacustrine Barrens	0.5	<0.1
Rivers and Streams	36.6	2.0
Lowland Aquatic Grass Marsh	3.5	0.2
Lowland Aquatic Sedge Marsh	19.8	1.1
Lowland Nonpatterned Wet Tundra	51.4	2.8
Lowland Patterned Wet Tundra	46.5	2.5
Lowland Wet-Moist Nonpatterned Tundra Complex	219.9	11.9
Lowland Wet-Moist Patterned Tundra Complex	411.7	22.2
Lowland Moist Sedge-Shrub Tundra	544.9	29.4
Young Basin Wetland Complex (Ice-rich)	40.8	2.2
Lowland Dwarf Scrub	24.2	1.3
<u>Artificial</u>	<u>60.5</u>	<u>3.3</u>
Totals	1,853	100

Wainwright Former SRRS (2006)

Habitat Class	Acres
Artificial (including Artificial Partially Revegetated, Artificial Barrens, and Artificial Waterbody for 2006)	33.8
Coastal Barrens	21.7
Coastal Brackish Water	58.7
Deep Water	150.8
Deep Water w/Islands or Polygonized Margins	23.1
Lowland Aquatic Grass Marsh	44.4
Lowland Aquatic Sedge Marsh	24.0
Lowland Dwarf Scrub	6.8
Lowland Lacustrine Barrens	0.0
Lowland Moist Sedge-Shrub Tundra	1,400.8
Lowland Moist Tussock Tundra	32.2
Lowland Nonpatterned Wet Tundra	90.7
Lowland Patterned Wet Tundra	66.1
Marine Nearshore Water (Estuarine)	324.9
Old Basin Wetland Complex (Ice-rich)	155.9
Rivers and Streams	5.2
Shallow Water	6.3
<u>Shallow Water w/Islands or Polygonized Margins</u>	<u>3.5</u>
Totals	2,448.6

Appendix 5.4.4. DoD Partners in Flight Species of Concern that May Occur on 611 ASG Sites

611 ASG sites are within DoD Partners in Flight Bird Conservation Region 2, Region 3, and Region 4. Below are DoD Partners in Flight Species of Concern that may occur on 611 ASG sites (www.dodpif.org accessed 8 January 2012). Below lists are taken from individual sites bird species lists within appendices 3.0.

Below lists only specify Active 611 ASG sites as these are the locations where most activities occur that may affect DoD Partners in Flight Species of Concern. Inactive and Excess sites are lumped. Also, it should be noted that many species accounts are only potentially found on these sites. Below lists do not include species federally-listed as Threatened or Endangered.

Region 2, 611 ASG sites include Eareckson AS (EAS); King Salmon Airport (KSA); Cape Newenham (CN), Cape Romanzof (CR), Cold Bay (CB), Kotzebue (OTZ), and Tin City (TNC) LRRSs; and Anvil Mountain, Bethel, Big Mountain, Driftwood Bay, Granite Mountain, Naknek Recreation Camps, Nikolski, Nome Field POL, North River, and Port Heiden Excess sites.

Table 5.4.4a DoD Partners in Flight Bird Species of Concern (Region 2) that Have Been Recorded or May Occur on 611 ASG Sites.

Species	Birds of Conservation Concern	Game Birds Below Desired Condition	Non-migratory Bird Species of Concern	North American Waterbird Conservation Plan	North American Waterfowl Management Plan	Partners in Flight	Shorebird Conservation Plan	611 ASG Sites (Active listed by site; Inactive/Excess sites listed by IA/E; * = Confirmed)
Aleutian Tern	X			High		High Regional		EAS*, KSA, CN, CR, CB*, OTZ, TNC, IA/E
American Golden-plover	X						High	KSA*, CR*, OTZ, TNC, IA/E
American Widgeon		X			Moderately High	High Regional		EAS*, KSA*, CN, CR*, CB, OTZ, TNC, IA/E
Ancient Murrelet	X			High				EAS*, CB, TNC, IA/E
Arctic Loon						High Regional		EAS*, OTZ, TNC*, IA/E
Arctic Tern	X			High				EAS*, KSA*, CN, CR*, CB, OTZ*, TNC*, IA/E
Arctic Warbler	X							EAS*, CN, CR*, OTZ, TNC*, IA/E
Barrow's Goldeneye					Previous Years			EAS*, KSA*, CN, CR*, CB, IA/E
Bar-tailed Godwit	X					High Overall	High	EAS*, KSA, CN, CR*, CB, OTZ, TNC, IA/E
Black-bellied Plover							Moderate	EAS*, KSA*, CN, CR* , CB, OTZ, TNC, IA/E
Blackpoll Warbler	X					High Overall		KSA*, CN, CR*, OTZ, IA/E
Black Scoter					High		High	EAS*, KSA*, CN*, CR*, CB, OTZ, TNC, IA/E
Black Turnstone	X					High Overall		KSA*, CN, CR*, CB, OTZ*, TNC, IA/E
Bonaparte's Gull				Moderate				KSA*, CN, CR*, IA/E
Brant					Highest	Additonal Watch List		EAS*, KSA*, CN, CR*, CB, OTZ*, TNC*, IA/E
Bristle-thighed Curlew	X					High Overall	High	EAS*, KSA, CN, CR*, OTZ, TNC, IA/E

Species	Birds of Conservation Concern	Game Birds Below Desired Condition	Non-migratory Bird Species of Concern	North American Waterbird Conservation Plan	North American Waterfowl Management Plan	Partners in Flight	Shorebird Conservation Plan	611 ASG Sites (Active listed by site; Inactive/Excess sites listed by IA/E; * = Confirmed)
Bufflehead					Previous Years			EAS*, KSA*, CN, CR*, CB, IA/E
Cackling Goose					Highest			EAS*, KSA*, IA/E
Canada Goose		X			Highest			KSA*, CN, CR*, CB, OTZ*, TNC, IA/E
Cassin's Auklet				Moderate				CB, IA/E
Common Eider		X			High			EAS*, KSA, CN, CR*, CB, OTZ, TNC*, IA/E
Common Goldeneye					Previous Years			EAS*, KSA*, CN, CR*, CB, IA/E
Common Murre				Moderate				EAS*, KSA, CN*, CR*, CB, OTZ, TNC*, IA/E
Common Snipe							Moderate	EAS*, OTZ*, TNC, IA/E
Crested Auklet				Moderate				EAS*, CN, OTZ, TNC*, IA/E
Dunlin							Moderate	EAS*, KSA*, CN, CR*, CB, OTZ, TNC*, IA/E
Emperor Goose		X			Highest	High Overall		EAS*, KSA, CN*, CR*, CB, OTZ, TNC*, IA/E
Eurasian Dotterel						High Regional		EAS*
Fox Sparrow						Additional Watch List		KSA*, CN, CR*, CB, OTZ*, TNC*, IA/E
Greater Scaup		X			Moderately High			EAS*, KSA*, CN*, CR*, CB*, OTZ*, TNC, IA/E
Greater White-fronted Goose		X						EAS*, KSA*, CN, CR*, CB, OTZ, TNC*, IA/E
Green-winged Teal					Moderately High			EAS*, KSA*, CN, CR*, CB*, OTZ*, IA/E
Glaucous-winged Gull				Low		High Regional		EAS*, KSA*, CN*, CR*, CB*, TNC, IA/E
Harlequin Duck		X			Moderately High			EAS*, KSA*, CN*, CR*, CB, OTZ, TNC*, IA/E
Hoary Redpoll						High Regional		EAS*, KSA*, CN, CR*, CB, TNC*, IA/E
Horned Grebe						High Regional		EAS*, KSA*, CN, CR, CB, OTZ, TNC, IA/E
Horned Puffin				Moderate				EAS*, CN*, CR*, CB, OTZ, TNC*, IA/E
Hudsonian Godwit	X					High Overall		

Species	Birds of Conservation Concern	Game Birds Below Desired Condition	Non-migratory Bird Species of Concern	North American Waterbird Conservation Plan	North American Waterfowl Management Plan	Partners in Flight	Shorebird Conservation Plan	611 ASG Sites (Active listed by site; Inactive/Excess sites listed by IA/E; * = Confirmed)
King Eider					High			EAS*, KSA, CN*, CR*, CB, OTZ, TNC*, IA/E
Kittlitz's Murrelet	X			High				EAS*, KSA, CN, CB, OTZ, TNC*, IA/E
Leach's Storm-Petrel				High				EAS*, KSA, CB, IA/E
Least Auklet				Moderate				EAS*, KSA, CN, CB, OTZ, TNC, IA/E
Least Sandpiper							Moderate	KSA*, CN*, CB, OTZ, TNC, IA/E
Long-tail Duck/Oldsquaw					High			EAS*, CN, CR*, CB, OTZ*, TNC*, IA/E
Mallard		X			Previous Years			EAS*, KSA*, CN, CR*, CB*, OTZ*, TNC, IA/E
Marbled Godwit	X							KSA*, IA/E
Marbled Murrelet	X			High				EAS*, KSA, CN, CR*, CB, IA/E
McKay's Bunting	X					High Overall		EAS*, KSA*, CN*, CR*, CB*, IA/E
Northern Fulmar				Moderate				EAS*, IA/E
Northern Pintail		X			Highest			EAS*, KSA*, CN*, CR*, CB, OTZ*, TNC*, IA/E
Northern Shoveler					Moderately High			EAS*, KSA*, CN, CR*, CB, OTZ, TNC, IA/E
Pacific Golden Plover	X					High Overall	High	EAS*, CN, CR*, CB, OTZ*, TNC, IA/E
Pelagic Cormorant				High				EAS*, KSA*, CN, CR*, CB, OTZ, TNC*, IA/E
Peregrine Falcon	X					High Regional		EAS*, KSA*, CN*, CR*, CB, OTZ*, TNC*, IA/E
Pigeon Guillemot				Moderate		High Regional		EAS*, CN*, CR*, CB, TNC*, IA/E
Pine Grosbeak						High Regional		EAS*, KSA*, CN, CR, IA/E
Red-breasted Merganser					Previous Years	Additonal Watch List		EAS*, KSA*, CN*, CR*, CB, OTZ, TNC, IA/E
Red-faced Cormorant	X			High		High Overall		EAS*, KSA, CN, CR*, CB, IA/E
Red-necked Phalarope							Moderate	EAS*, KSA*, CN, CR*, CB, OTZ*, TNC, IA/E

Species	Birds of Conservation Concern	Game Birds Below Desired Condition	Non-migratory Bird Species of Concern	North American Waterbird Conservation Plan	North American Waterfowl Management Plan	Partners in Flight	Shorebird Conservation Plan	611 ASG Sites (Active listed by site; Inactive/Excess sites listed by IA/E; * = Confirmed)
Red-necked Stint						High Overall		EAS*, TNC
Red-throated Loon	X							EAS*, KSA, CN, CR*, CB, OTZ*, TNC*, IA/E
Rock Ptarmigan			X					EAS*, KSA*, CN, CR*, CB, OTZ, TNC*, IA/E
Rock Sandpiper	X					High Overall	Moderate	EAS*, KSA*, CN*, CR*, CB*, OTZ, TNC*, IA/E
Sandhill Crane						High Overall		EAS*, KSA*, CN, CR*, CB, OTZ*, TNC*, IA/E
Short-billed Dowitcher	X					High Regional		KSA*, CN, CR, CB, IA/E
Short-eared Owl						High Regional		EAS*, KSA*, CN, CR*, CB*, OTZ*, TNC, IA/E
Solitary Sandpiper						High Regional		KSA, IA/E
Surfbird	X					High Overall		KSA*, CN, CR*, IA/E
Surf Scoter					Previous Years			EAS*, KSA, CN*, CR*, CB, OTZ, TNC*, IA/E
Thick-billed Murre				Moderate				EAS*, KSA, CN, CR*, OTZ, TNC, IA/E
Three-toed Woodpecker						High Regional		KSA*, IA/E
Trumpeter Swan						High Overall		IA/E
Tundra Swan					High			EAS*, KSA*, CN, CR*, CB*, OTZ, TNC*, IA/E
Varied Thrush						High Regional		KSA*, CN, CR*, OTZ, TNC*, IA/E
Western Sandpiper						High Overall	High	EAS*, KSA*, CN*, CR*, CB, OTZ*, TNC*, IA/E
Willow Ptarmigan			X					KSA*, CN, CR*, CB*, OTZ, TNC, IA/E
Whimbrel	X						High	EAS*, KSA*, CN, CR*, CB, OTZ*, IA/E
Whiskered Auklet				Moderate				EAS*, KSA, IA/E
White-fronted Goose					High			EAS*, KSA*, CN, CR*, CB, OTZ, TNC*, IA/E

Species	Birds of Conservation Concern	Game Birds Below Desired Condition	Non-migratory Bird Species of Concern	North American Waterbird Conservation Plan	North American Waterfowl Management Plan	Partners in Flight	Shorebird Conservation Plan	611 ASG Sites (Active listed by site; Inactive/Excess sites listed by IA/E; * = Confirmed)
White-winged Scoter					Previous Years			EAS*, KSA*, CN*, CR*, CB, OTZ, TNC, IA/E
Wilson's Warbler						High Regional		EAS*, KSA*, CN, CR*, CB, OTZ, TNC, IA/E
Yellow-billed Loon	X							EAS*, CN, CR*, CB, OTZ, TNC*, IA/E

Region 3, 611 ASG sites include Barter Island (BTI), Cape Lisburne (LUR), Oliktok (OLI), and Point Barrow (BRW) LRRSs and Bullen Point, Point Lay, Point Lonely, and Wainwright Inactive sites.

Table 5.4.4b DoD Partners in Flight Bird Species of Concern (Region 3) that Have Been Recorded or May Occur on 611 ASG Sites.

Species	Birds of Conservation Concern	Game Birds Below Desired Condition	Non-migratory Bird Species of Concern	North American Waterbird Conservation Plan	North American Waterfowl Management Plan	Partners in Flight	Shorebird Conservation Plan	611 ASG Sites (Active listed by site; Inactive sites listed by IA; * = Confirmed)
Aleutian Tern				High				IA
American Golden-plover	X						High	BTI*, LUR*, OLI*, BRW*, IA
Arctic Tern				High				BTI, LUR, OLI*, BRW*, IA
Baird's Sandpiper						High Regional	Low	BTI*, LUR, OLI*, BRW*, IA
Bar-tailed Godwit	X							LUR, OLI, IA
Black-bellied Plover							Moderate	BTI, LUR, OLI*, BRW, IA
Black Turnstone							High	LUR
Brant					Highest			BTI, LUR*, OLI*, BRW*, IA
Bristle-thighed Curlew							High	LUR, OLI, IA
Buff-breasted Sandpiper	X					High Overall	High	BTI, OLI*, BRW*, IA
Canada Goose					High			BTI, LUR*, OLI*, BRW, IA
Common Eider		X			Highest	High Regional		BTI*, LUR*, OLI*, BRW*, IA
Common Murre				Moderate				LUR*, BRW
Common Snipe		X					Moderate	BTI*, LUR, OLI, BRW, IA
Dunlin	X						Moderate	BTI, LUR, OLI*, BRW*, IA
Emperor Goose						High Overall		LUR
Eurasian Dotterel						High Regional		LUR, IA
Greater White-fronted Goose		X						BTI*, LUR, OLI*, BRW*, IA
Gyr Falcon						High Overall		BTI, LUR*, OLI*, BRW*, IA
Hoary Redpoll						High Regional		LUR*, OLI*, BRW*, IA

Species	Birds of Conservation Concern	Game Birds Below Desired Condition	Non-migratory Bird Species of Concern	North American Waterbird Conservation Plan	North American Waterfowl Management Plan	Partners in Flight	Shorebird Conservation Plan	611 ASG Sites (Active listed by site; Inactive sites listed by IA; * = Confirmed)
Horned Grebe						High Regional		LUR
Horned Puffin				Moderate				LUR*
Hudsonian Godwit						High Overall		LUR
King Eider					High	High Regional		BTI, LUR, OLI*, BRW*, IA
Kittlitz's Murrelet				High				LUR*, BRW, IA
Least Sandpiper							Moderate	BTI, LUR, IA
Long-tail Duck/Oldsquaw					High	High Overall		BTI*, LUR*, OLI*, BRW*, IA
Mallard		X						BTI*, LUR, OLI*, IA
Northern Fulmar				Moderate				BRW*
Northern Pintail		X			High			BTI*, LUR*, OLI*, BRW*, IA
Pacific Golden Plover							High	LUR
Pectoral Sandpiper						High Regional	Low	BTI*, LUR*, OLI*, BRW*, IA
Pelagic Cormorant				High				LUR*
Peregrine Falcon	X					High Overall		BTI*, LUR, OLI, BRW*, IA
Pigeon Guillemot				Moderate				LUR*
Red-breasted Merganser					Previous Years			BTI, LUR, OLI*, BRW, IA
Red Knot							High	LUR
Red-necked Phalarope							Moderate	BTI*, LUR, OLI*, BRW*, IA
Red Phalarope							Moderate	BTI*, LUR, OLI*, BRW*, IA
Rock Ptarmigan			X					BTI, LUR*, IA
Ruddy Turnstone							High	BTI, LUR, OLI*, BRW*, IA
Sanderling							High	BTI, LUR, IA
Semipalmated Sandpiper						High Regional	Moderate	BTI*, LUR*, OLI*, BRW*, IA
Short-eared Owl						High		BTI, BRW, IA

Species	Birds of Conservation Concern	Game Birds Below Desired Condition	Non-migratory Bird Species of Concern	North American Waterbird Conservation Plan	North American Waterfowl Management Plan	Partners in Flight	Shorebird Conservation Plan	611 ASG Sites (Active listed by site; Inactive sites listed by IA; * = Confirmed)
						Overall High Regional		
Snow Goose		X			High			BTI, LUR*, OLI*, BRW, IA
Snowy Owl						High Regional		BTI, LUR*, OLI*, BRW*, IA
Stilt Sandpiper						High Overall	Moderate	LUR, IA
Thick-billed Murre				Moderate				LUR*, BRW
Tundra Swan					High	High Overall		BTI*, LUR, OLI*, BRW, IA
Western Sandpiper						High Overall	High	LUR*, OLI, BRW*, IA
Willow Ptarmigan			X					BTI, LUR, OLI*, BRW, IA
Whimbrel	X						High	BTI, IA
White-crowned Sparrow						Additional Watch List		LUR*, BRW*, IA
White-fronted Goose					High			BTI*, LUR, OLI*, BRW*, IA
White-rumped Sandpiper						High Regional	Low	BTI, OLI*, BRW*, IA
Yellow-billed Loon	X							BTI, LUR, OLI*, BRW*, IA

Region 4, 611 ASG sites include Fort Yukon (FYU), Indian Mountain (UTU), Murphy Dome (MDM), Tatalina (TLI), and Sparrevohn (SVW) LRRSs; Campion and Lake Louise Inactive sites; and Bear Creek, Beaver Creek, and Kalakaket Creek Excess sites.

Table 5.4.4c DoD Partners in Flight Bird Species of Concern (Region 4) that Hve Been Recorded or May Occur on 611 ASG Sites.

Species	Birds of Conservation Concern	Game Birds Below Desired Condition	Non-migratory Bird Species of Concern	North American Waterbird Conservation Plan	North American Waterfowl Management Plan	Partners in Flight	Shorebird Conservation Plan	611 ASG Sites (Active listed by site; Inactive/Excess sites listed by IA/E; * = Confirmed)
Alder Flycatcher						High Regional		FYU*, UTU*, MDM*, TLI*, SVW, IA/E
American Golden-plover	X					High Overall	High	FYU, UTU, MDM, TLI, SVW, IA/E
American Widgeon		X			High	High Regional		FYU, UTU, MDM, TLI, SVW, IA/E
Arctic Tern								FYU, UTU, MDM, TLI, SVW, IA/E
Arctic Warbler	X							FYU, UTU, MDM, TLI*, SVW, IA/E
Bank Swallow						Additional Watch List		FYU*, UTU, MDM*, TLI*, SVW, IA/E
Barrow's Goldeneye					Moderately High	High Overall		FYU, UTU, MDM, TLI, SVW, IA/E
Black-backed Woodpecker						High Overall		FYU, UTU, MDM, TLI, SVW
Black-bellied Plover								FYU, UTU, MDM, TLI, SVW, IA/E
Blackpoll Warbler						High Overall		FYU, UTU, MDM, TLI*, SVW*, IA/E
Black Scoter					Previous Years			FYU, UTU, MDM, TLI, SVW, IA/E
Black Turnstone						High Overall		FYU, UTU, MDM, TLI, SVW
Blue-winged Teal					Previous Years			FYU*, UTU*, MDM, TLI*, SVW*, IA/E
Bonaparte's Gull				Moderate				FYU, UTU, MDM, TLI, SVW, IA/E
Boreal Chickadee						Additional Watch List		FYU*, UTU*, MDM, TLI*, SVW*, IA/E
Boreal Owl						High Regional		FYU, UTU, MDM, TLI, SVW, IA/E
Bufflehead					Moderately			FYU, UTU, MDM, TLI, SVW, IA/E

Species	Birds of Conservation Concern	Game Birds Below Desired Condition	Non-migratory Bird Species of Concern	North American Waterbird Conservation Plan	North American Waterfowl Management Plan	Partners in Flight	Shorebird Conservation Plan	611 ASG Sites (Active listed by site; Inactive/Excess sites listed by IA/E; * = Confirmed)
					High			
Canada Goose					Previous Years			FYU, UTU, MDM, TLI, SVW, IA/E
Canvasback		X			Moderately High			FYU, UTU, MDM, TLI, SVW, IA/E
Common Goldeneye					Previous Years			FYU, UTU, MDM, TLI, SVW, IA/E
Common Snipe							Moderate	FYU*, UTU, MDM, TLI*, SVW, IA/E
Dark-eyed Junco						Additional Watch List		FYU*, UTU*, MDM*, TLI*, SVW*, IA/E
Fox Sparrow								FYU*, UTU*, MDM*, TLI*, SVW*, IA/E
Gray-cheeked Thrush						High Regional		FYU, UTU, MDM, TLI*, SVW*, IA/E
Gray-crowned Rosy-finch						High Regional		FYU, UTU, MDM, TLI, SVW, IA/E
Gray Jay						Additional Watch List		FYU, UTU*, MDM, TLI, SVW*, IA/E
Greater Scaup		X			Previous Years	High Regional		FYU, UTU, MDM, TLI, SVW, IA/E
Greater White-fronted Goose		X						FYU, UTU, MDM, TLI, SVW, IA/E
Greater Yellowlegs							Moderate	FYU*, UTU, MDM, TLI, SVW, IA/E
Green-winged Teal					Moderately High			FYU, UTU*, MDM, TLI*, SVW, IA/E
Glaucous-winged Gull								FYU, UTU, MDM, TLI, SVW, IA/E
Gyr Falcon						High Overall		FYU, UTU, MDM, TLI, SVW, IA/E
Hammond's Flycatcher						High Overall		FYU, UTU*, MDM, TLI*, SVW, IA/E
Harlequin Duck		X			Moderately High			FYU, UTU, MDM, TLI, SVW, IA/E
Hoary Redpoll								FYU, UTU, MDM, TLI, SVW*, IA/E
Horned Grebe								FYU, UTU, MDM, TLI, SVW, IA/E
Hudsonian Godwit	X					High Overall	High	FYU, UTU, MDM, TLI, SVW

Species	Birds of Conservation Concern	Game Birds Below Desired Condition	Non-migratory Bird Species of Concern	North American Waterbird Conservation Plan	North American Waterfowl Management Plan	Partners in Flight	Shorebird Conservation Plan	611 ASG Sites (Active listed by site; Inactive/Excess sites listed by IA/E; * = Confirmed)
Killdeer							Moderate	FYU, UTU, MDM, TLI, SVW, IA/E
Least Sandpiper							Moderate	FYU, UTU, MDM, TLI, SVW, IA/E
Lesser Scaup		X			High			FYU, UTU, MDM, TLI, SVW, IA/E
Lesser Yellowlegs						Additional Watch List	Moderate	FYU*, UTU*, MDM, TLI, SVW, IA/E
Long-tail Duck/Oldsquaw					Previous Years			FYU, UTU, MDM, TLI, SVW, IA/E
Mallard		X			High			FYU, UTU, MDM, TLI*, SVW*, IA/E
Northern Goshawk						High Regional		FYU, UTU, MDM, TLI*, SVW, IA/E
Northern Hawk Owl						High Overall		FYU, UTU*, MDM, TLI, SVW, IA/E
Northern Pintail		X			High			FYU*, UTU, MDM, TLI, SVW, IA/E
Northern Shoveler					Moderately High			FYU*, UTU, MDM, TLI, SVW, IA/E
Northern Shrike						High Regional		FYU, UTU, MDM, TLI, SVW, IA/E
Northern Waterthrush						Additional Watch List		FYU*, UTU, MDM, TLI*, SVW, IA/E
Olive-sided Flycatcher						High Regional		FYU*, UTU, MDM, TLI*, SVW, IA/E
Peregrine Falcon	X							FYU, UTU, MDM, TLI, SVW*, IA/E
Pine Grosbeak						High Regional		FYU, UTU, MDM, TLI, SVW
Red-breasted Merganser					Previous Years			FYU, UTU, MDM, TLI, SVW, IA/E
Red-necked Phalarope							Moderate	FYU, UTU, MDM, TLI, SVW, IA/E
Redhead		X			Previous Years			FYU, UTU, MDM, TLI, SVW, IA/E
Red-throated Loon								FYU, UTU, MDM, TLI, SVW, IA/E
Rock Ptarmigan			X					FYU, UTU*, MDM, TLI*, SVW*, IA/E
Sandhill Crane								FYU*, UTU, MDM, TLI*, SVW, IA/E
Short-eared Owl						High Regional		FYU, UTU, MDM, TLI, SVW, IA/E

Species	Birds of Conservation Concern	Game Birds Below Desired Condition	Non-migratory Bird Species of Concern	North American Waterbird Conservation Plan	North American Waterfowl Management Plan	Partners in Flight	Shorebird Conservation Plan	611 ASG Sites (Active listed by site; Inactive/Excess sites listed by IA/E; * = Confirmed)
Snow Goose					High			FYU, UTU, MDM, TLI, SVW, IA/E
Solitary Sandpiper						High Regional	High	FYU, UTU, MDM, TLI, SVW, IA/E
Spotted Sandpiper						Additional Watch List	Low	FYU, UTU*, MDM, TLI*, SVW*, IA/E
Spruce Grouse			X					FYU, UTU, MDM, TLI*, SVW, IA/E
Surfbird	X					High Overall	High	FYU, UTU*, MDM, TLI, SVW, IA/E
Surf Scoter					High			FYU, UTU, MDM, TLI, SVW, IA/E
Swainson's Thrush						High Regional		FYU*, UTU*, MDM, TLI*, SVW*, IA/E
Three-toed Woodpecker						High Regional		FYU, UTU, MDM, TLI, SVW, IA/E
Trumpeter Swan		X			High	High Overall		FYU, UTU, MDM, TLI, SVW, IA/E
Tundra Swan					High			FYU, UTU, MDM, TLI, SVW, IA/E
Varied Thrush						High Regional		FYU, UTU, MDM, TLI*, SVW, IA/E
Wandering Tattler							Moderate	FYU, UTU, MDM, TLI, SVW, IA/E
Western Sandpiper								FYU, UTU, MDM, TLI, SVW, IA/E
Willow Ptarmigan			X					FYU, UTU, MDM*, TLI*, SVW, IA/E
Whimbrel	X						High	FYU, UTU*, MDM, TLI, SVW, IA/E
White-crowned Sparrow						Additional Watch List		FYU*, UTU*, MDM*, TLI*, SVW*, IA/E
White-fronted Goose					Highest			FYU, UTU, MDM, TLI, SVW, IA/E
White-winged Crossbill						Additional Watch List		FYU*, UTU*, MDM, TLI*, SVW, IA/E
White-winged Scoter					Moderately High			FYU, UTU, MDM, TLI, SVW, IA/E
Wilson's Warbler						Additional Watch List		FYU, UTU, MDM, TLI*, SVW*, IA/E

Appendix 7.4.5. Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan

POLAR BEAR INTERACTION MANAGEMENT AND PACIFIC WALRUS HAULOUT AVOIDANCE PLAN

Prepared For

The Department of Defense
U.S. Air Force
611th Air Support Group
611th Civil Engineer Squadron
Joint Base Elmendorf-Richardson, Alaska



Updated By

Gene Stout
Gene Stout and Associates
Loveland, Colorado

November 2012

POLAR BEAR INTERACTION MANAGEMENT AND PACIFIC WALRUS HAULOUT AVOIDANCE PLAN

November 2012

Prepared For

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Table of Contents

1.0	Introduction	1
2.0	Site Histories and Description	2
3.0	Polar Bear and Pacific Walrus Biology	2
4.0	Laws and Regulations Concerning Polar Bears	7
4.1	State	7
4.2	Federal	7
4.3	611 ASG Policy	9
5.0	Preventing Human-Bear Interactions	9
5.1	Attraction to Human Activity	9
5.2	Preventing Polar Bear Attraction and Encounters	9
6.0	Bear Avoidance and Encounters	12
6.1	Response	12
6.2	Harassment Permits.....	17
6.3	Deterrent Methods.....	17
7.0	Site Specific Descriptions and Encounter Prevention	18
7.1	Barter Island LRRS	18
7.2	Bullen Point Former SRRS.....	20
7.3	Oliktok LRRS.....	20
7.4	Point Lonely Former SRRS	21
7.5	Point Barrow LRRS	21
7.6	Wainwright Former SRRS.....	22
7.7	Point Lay Former LRRS	22
7.8	Cape Lisburne LRRS	22
7.9	Kotzebue LRRS.....	23
7.10	Tin City LRRS.....	23
7.11	Former Nome POL Site	24
7.12	Anvil Mountain Former Radio Relay Site.....	24
7.13	Cape Newenham LRRS.....	25
8.0	Ongoing Education and Training.....	25
9.0	Walrus Haulout Considerations.....	25
10.0	Future Planning	26
11.0	Conclusion.....	26
12.0	USFWS Reporting Forms	27
13.0	References.....	29
Appendix 7.0	Maps of Affected 611 ASG Sites.....	33

List of Figures

Figure 1. 611th Air Support Group Sites in Polar Bear Range.....	3
Figure 2. Polar Bear Encounter Notification Requirements.....	13
Appendix 7.0, Figure 1. Barter Island LRRS.....	35
Appendix 7.0, Figure 2. Bullen Point Former SRRS	36
Appendix 7.0, Figure 3. Oliktok LRRS.....	37
Appendix 7.0, Figure 4. Point Lonely Former SRRS	38
Appendix 7.0, Figure 5. Point Barrow LRRS.....	39
Appendix 7.0, Figure 6. Wainwright Former SRRS	40
Appendix 7.0, Figure 7. Point Lay Former LRRS.....	41
Appendix 7.0, Figure 8. Cape Lisburne LRRS.....	42
Appendix 7.0, Figure 9. Kotzebue LRRS	43
Appendix 7.0, Figure 10. Tin City LRRS.....	44
Appendix 7.0, Figure 11. Nome Field POL Site.....	45
Appendix 7.0, Figure 12. Anvil Mountain Former Site.....	46

Acronyms

BOS	Base Operations Support
CBS	Chukchi/Bering Sea stock
ESA	Endangered Species Act
LRRS	Long Range Radar Site
MMPA	Marine Mammal Protection Act of 1972
SRRS	Short Range Radar Site
SBS	Southern Beaufort Sea stock
USAF	United States Air Force
USFWS	United States Fish and Wildlife Service

1.0 Introduction

The United States Air Force (USAF) operates/maintains or conducts restoration activities at 10 active or inactive remote radar stations and two other facilities along the northern coastline of Alaska. Operations at these sites pose unique challenges because they occur in polar bear (*Ursus maritimus*) habitat and occasionally attract polar bears. The polar bear is a significant threat to the safety of USAF and its contractor personnel operating or conducting other activities at these sites. Human safety is of the utmost importance to the USAF while operating in polar bear habitat. Operations, maintenance, demolition, restoration, and construction activities associated with these sites must be conducted in such a way that humans, polar bears, and property are unharmed. Personnel must be familiar with issues and precautions associated with working in polar bear habitat. Awareness and prevention of human-bear interactions will ensure the safety of workers as well as wildlife.

Polar bears are a valuable resource to Alaska Native cultures, society, and the Arctic ecosystem. For centuries polar bears have provided Alaska Natives with food, materials for clothing and handicrafts, and focal points for myths, stories, and legends. Society values polar bears as a symbol of the mystique and adventure of the Arctic. Polar bears are one of the few apex predators of the unique and fragile Arctic ecosystem. They are a key component to the balance of the arctic food chain, and their well-being affects a host of other organisms.



Polar bear, *Ursus maritimus*, near Barrow , AK.
Photo courtesy of <http://images.fws.gov>.

The Marine Mammal Protection Act (MMPA) of 1972, as amended, gave the USFWS responsibility for managing polar bears in Alaska. The MMPA prohibits take of polar bears except for specified purposes. Take is defined as to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill polar bears. In addition, polar bears were listed as a threatened species by the USFWS in 2008 (73 Federal Register 28212 [May 15, 2008]), thus they are subject to the Endangered Species Act. This Plan will help maintain compliance with the Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) regulations as well as various project permit conditions concerning operations within polar bear habitat.

The purpose of this Polar Bear Interaction Management and Pacific Walrus Haulout Avoidance Plan (hereinafter referred to as the Polar Bear/Walrus Plan) is to help minimize human-bear interactions and conflicts that can result from these interactions. This plan describes USAF sites where polar bear interactions are possible, polar bear biology, polar bear attraction to human activities, how to avoid this attraction, bear deterrence, and recommendations for further education. As long as humans continue to work in the Arctic, they will come into contact with polar bears; this plan is designed to reduce the likelihood that human-bear encounters will result in personal injury, injury to a polar bear, and/or property damage.

In addition, this Plan includes basic information to avoid disturbance of hauled out Pacific walrus on or near USAF sites. The U.S. Fish and Wildlife Service completed a finding in 2011 that concluded listing the Pacific walrus as an endangered or threatened species is warranted (76 Federal Register 7634 [February 10, 2011]). Listing the Pacific walrus is currently precluded by the need to address higher priority species nationwide, but the U.S. Fish and Wildlife Service is scheduled to consider the walrus for listing in 2017.

2.0 Site Histories and Description

The USAF 611th Air Support Group (611 ASG) and 611th Civil Engineer Squadron (611 CES), based at Joint Base Elmendorf-Richardson in Anchorage, Alaska, are responsible for 10 active or inactive radar sites and two other located along the northern coastline of Alaska. These sites were constructed in the early 1950s and designed to operate and maintain radar systems and their support systems that protect U.S. national security. There are six active and one inactive Long Range Radar Sites (LRRS), three inactive Short Range Radar Sites (SRRS), one former Radio Relay Site, and one former petroleum, oil, and lubricants (POL) site. Going westward and southward, these are Barter Island LRRS (Barter Island), Bullen Point SRRS (Bullen Point), Oliktok LRRS (Oliktok), Point Lonely SRRS (Point Lonely), Point Barrow LRRS (Point Barrow), Wainwright SRRS (Wainwright), Point Lay Former LRRS (Point Lay), Cape Lisburne LRRS (Cape Lisburne), Kotzebue LRRS (Kotzebue), Tin City LRRS (Tin City), Nome Field POL Site (Nome), and Anvil Mountain former Radio Relay Site (Anvil Mountain) (Figure 1).



Radome at Point Barrow LRRS in summer of 2007. Photo courtesy of Haley Ohms, OASIS Environmental, Inc.

Polar bears frequent the Chukchi and Beaufort Sea coastlines and are confirmed at or near all but the Cape Romanzof site, where they potentially occur. The operational status of these sites ranges from actively manned, to inactive, and finally excess. Actively manned stations typically have two to four personnel present on-site year-round. Actively manned sites are Barter Island, Oliktok, Point Barrow, Kotzebue, Cape Lisburne, Tin City, and Cape Romanzof. All actively manned operational sites are maintained and operated by 611 ASG Base Operations Support (BOS) Contractor. Inactive and

excess sites are sites that are no longer operational and are only visited by personnel for demolition or restoration type activities. All but the above sites are

inactive or excess. Regardless of site status, polar bear encounters at each of these sites are possible due to their locations in polar bear habitat.

The Pacific walrus is known on or near 15 611 ASG sites. It has confirmed haulout sites at or near Cape Lisburne, Cape Newenham, Point Barrow, Point Lay, and Wainwright (Judy Jacobs, USFWS, e-mail to Matt Moran on May 3, 2012), which potentially include 611 ASG sites. Of particular concern to the USFWS, due to its increasingly frequent use by Pacific walrus, is the haulout near Point Lay former LRRS.

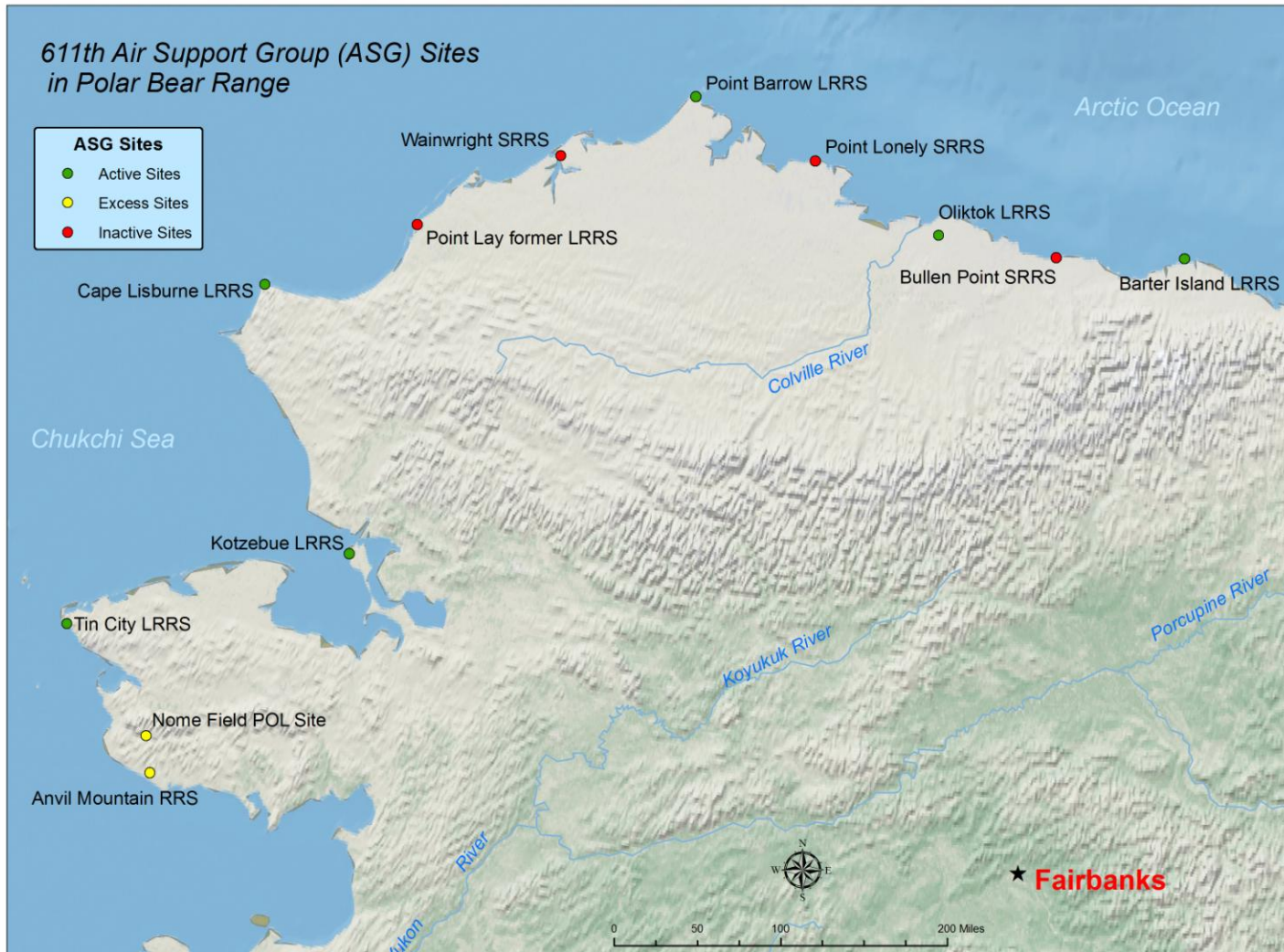
3.0 Polar Bear and Pacific Walrus Biology

Polar bears are the largest of the bear species and are distinguished by their white to yellow fur (Department of Interior (DOI) 2007). Considered marine mammals, because they reside primarily on the sea ice (Amstrup 2003), adult female polar bears can weigh between 400 to 700 pounds, while male polar bears can weigh up to 1,440 pounds (DOI 2007). Males can measure 5 feet tall at the shoulder and 8-10 feet in length, while female polar bears tend to be smaller (Lentfer 1985). Polar bears have been recorded as old as 32 years, but most do not live beyond 20 years (Stirling 1988, 1990).

Size Comparison of Polar Bears (larger) and Grizzly Bears (smaller).



Figure 1. 611th Air Support Group Sites in Polar Bear Range



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There are two recognized polar bear stocks that inhabit the Alaskan arctic: the Southern Beaufort Sea stock (SBS) and the Chukchi/Bering Sea stock (CBS) (Amstrup *et al.* 2005). The SBS stock inhabits the Baillie Islands, Canada west to Point Hope, Alaska, and the CBS stock inhabits Point Barrow west to the eastern Siberian Sea (MMS 2006). Ranges of these two stocks overlap between Point Barrow and Point Hope, centering around Point Lay, and bears from either stock are commonly found in this area (Garner *et al.* 1990, 1994; Amstrup 1995).

Polar bears have been documented as far north as 88N latitude and as far south as St. Matthew Island and Pribilof Islands in the Bering Sea (Lentfer 1985). Bears make extensive north-south migrations with the seasonal advance and retreat of pack ice. Each month a bear can travel 116-306 miles, and yearly they can travel approximately 903-3,854 miles (Amstrup 1995). Annual home ranges vary from 4,916 miles² to 230,429 miles² and extend to 186 miles offshore from Cape Bathurst, Canada to Pt. Hope, Alaska (Amstrup 1995).

The primary diet of the polar bear is the ringed seal (Stirling and McEwan 1975, Larsen 1985), although they are also known to consume bearded seal, walrus, beluga whale, bird eggs, vegetation, and carrion (Amstrup and DeMaster 1988, Smith 1985, Smith and Hill 1996, Derocher *et al.* 2000). Polar bears capture ringed seals by waiting at breathing holes or at the edge of cracks in the ice, stalking them as they rest on top of the ice, and by pouncing on pupping chambers to catch young seals in the lairs (Lentifer 1985).

The bears concentrate along the southern-most edge of the sea ice hunting ringed seals (Durner *et al.* 2004), and as the sea ice extent changes seasonally, polar bears must migrate with the ice to continue to have access to their prey. During fall and winter, polar bears are found along the coastline where active ice movement creates openings that are used by seals (MMS 2006). In the spring, the ice pack begins to move offshore, and the bears move onto the ice and remain on offshore ice through summer. Polar bears do not hibernate and are active on land and sea ice at all times of the year.

In fall, female polar bears seek out suitable habitat for maternity dens where they will give birth to one or two cubs in December and care for the cubs until March or early April. Dens are located on pack ice, landfast ice, and on land where sufficient snow can accumulate for den excavation (Clough *et al.* 1987). Newborn polar bears are extremely susceptible during the first two months of life and undisturbed maternal dens are crucial to their survival (Amstrup 2000). Cubs remain with their mother until they are just over two years old (DOI 2007).

Increased global temperatures and the recent reduction of sea ice has affected polar bears and their habitat. Climate change has been linked to decreased body condition and reproductive performance in polar bears (Stirling *et al.* 1999) and increased bear-human conflicts in Western Hudson Bay, Canada (Amstrup *et al.* 2006). Current climate models predict continued increases in temperatures and continued decreases in arctic sea ice (Johannessen 2004). This reduction in sea ice will have drastic effects on polar bear populations (DOI 2007).



Steve Amstrup with a sedated polar bear. This bear was fitted with a radio-transmitter and tracked to study distribution and movements of southern Beaufort Sea polar bears. Photo courtesy of <http://www.photolib.noaa.gov>.

Native Alaskans have co-existed with polar bears in the Arctic for many generations. Sightings in the Beaufort Sea area by non-Natives have regularly occurred since the initial development of the Distant Early Warning Line sites in the 1950s. Since then and since the development of Prudhoe Bay in the 1970s and subsequent oil fields, the number of polar bear/human interactions involving USAF, oil field, and other personnel has been minimal (Blank 2012). This is due in part to the education/ outreach efforts of government and industry safety and environmental personnel (in concert with state and federal biologists), improved food waste management procedures, and improved landfill management practices.

Pacific walrus¹ are very social and gregarious animals. They tend to travel in groups and haul-out on ice or land in groups. Walrus spend about one-third of their time hauled out on ice or land. When hauled out, walrus tend to lie in close physical contact with each other; and youngsters often lie on top of adults.

Disturbance events can cause walrus to stampede into the water and have been known to cause injuries and mortalities. The risk of stampede-related injuries increases with the number of animals hauled out (Ovsyanikov 1994). Calves and young animals at perimeters of herds are particularly vulnerable, and trampling-related injuries and mortalities have been reported at coastal walrus haulouts used by adult females and young (Fay and Kelly 1980, Ovsyanikov 1994, Kavry *et al.* 2008).

Historically, haulouts, often of thousands of walrus, have occasionally occurred on coasts in Chukotka (Kochnev 2006). Large onshore aggregations of walrus were unknown on the Alaskan side of the Chukchi Sea until 2007 (Fischbach *et al.* 2009) but have become a nearly regular occurrence since then. In recent years walrus have been observed hauling out in large numbers (hundreds to thousands) along the Chukchi Sea coast in late August-October when there was no offshore sea ice in the vicinity. In September 2010 10,000-20,000 walrus congregated on a Kasegaluk Lagoon barrier island northwest of Point Lay (U.S. Geological Survey 2011).

Walrus are especially vulnerable to disturbance when they are hauled out on land, as illustrated by a mortality incident from the vicinity of Icy Cape in September 2009 when researchers documented 131 fresh carcasses of juvenile walrus (Fischbach *et al.* 2009). Events that led to the deaths of the animals are unknown. Records indicate the eastern Chukchi Sea continental shelf was free of sea ice for more than 25 days prior to the discovery of the carcasses, and strong winds were recorded for the region in the weeks immediately prior to the discovery of the carcasses (Fischbach *et al.* 2009). In the absence of sea ice, strong winds result in heavy seas. Walrus cannot remain at sea indefinitely without rest. Telemetry data from walrus in ice-bearing waters of the northern Bering Sea revealed that walrus generally hauled out and rested every day or so, and that 98% of their in-water bouts lasted no longer than 7.5 days, with none exceeding 13 days (Udevitz *et al.* 2009).

In response to recent summer aggregations of walrus on the Alaskan Chukchi coastline, several conservation partners, including the North Slope Borough, Eskimo Walrus Commission, Federal Aviation Authority, and the U.S. Fish and Wildlife Service, have developed guidelines for pilots, marine vessels, and land-based viewing to discourage activities that could disturb walrus and cause them to stampede into the water (U.S. Fish and Wildlife Service News Release [September

¹ Information on the Pacific walrus for this section was taken from the Draft National Petroleum Reserve-Alaska Integrated Area Plan/Environmental Impact Statement (Department of the Interior 2012). References within this section are found in that document.

14, 2010]). The guidelines are communicated to individuals in communities closest to haulouts and others that use the area.

4.0 Laws and Regulations Concerning Polar Bears

A summary of state and federal laws and regulations applicable to marine mammals is provided below.

4.1 State

The protection of marine mammals is included in the following state statutes:

- 18 AAC 75.620(a)(1) includes the definition of critical marine environments for the purpose of enacting civil penalties for the discharges of oil (AS 46.03.758).
- 5 AAC 41.240(2)(A)(iii) states any proposed aquatic site or facility will not adversely affect above habitats.
- 5 AAC 92.033. *Permit For Scientific, Educational, Propagative, Or Public Safety Purposes*. A permit may be issued to take an animal in the interest of public safety.
- 5 AAC 92.410. *Taking Game In Defense Of Life Or Property*. **Note that polar bears may only be taken by lethal means in defense of life, not property, as described in the MMPA, section 101(c), which overrides this state law when referring to polar bears.** “A person may take game in defense of life or property if: the necessity for the taking is not brought about by harassment or provocation of the animal, or by an unreasonable invasion of the animal's habitat; the necessity for the taking is not brought about by the improper disposal of garbage or a similar attractive nuisance; and all other practicable means to protect life and property are exhausted before the game is taken.” An animal taken in defense of life or property becomes the property of the state; salvaged meat or hide shall be immediately surrendered.
- 5 AAC 92.230. *Feeding of Game*. A person may not intentionally feed a moose (except under terms of a permit issued by the department), bear, wolf, coyote, fox, or wolverine, or negligently leave human food, pet food, or garbage in a manner that attracts these animals.

4.2 Federal

Polar bears are protected wherever they occur in the United States under both the Marine Mammal Protection Act of 1972 (MMPA) and the Endangered Species Act of 1973. The 2008 listing of polar bears as threatened under the ESA does not alter the existing MMPA requirements. Both laws prohibit take of polar bears, with few exceptions.

The protection of marine mammals and polar bears specifically is included in the following federal statutes:

- **Endangered Species Act** of 1973 (PL 95-632, 16 USC 1531 *et seq.*). On May 15, 2008, the USFWS published a Final Rule in the Federal Register (73 CFR 28212) listing the polar bear as a threatened species under the ESA. This listing is based on the best available science, which shows that loss of sea ice threatens and will likely continue to threaten polar bear habitat. Any significant changes in the abundance, distribution, or existence of sea ice could have effects on the number and behavior of these animals and their prey. This loss of habitat could put polar bears at risk of becoming endangered in the foreseeable future, the standard established by the ESA for designating a threatened species.
- The USFWS designated denning and feeding critical habitat for polar bears on December

7, 2010 (**75 CFR 76086**). Critical habitat was defined for a large acreage of sea-ice, terrestrial denning habitat (extending 20 miles inland east of the Kavik River, and 5 miles inland between the Kavik River and Barrow), and barrier island habitat. The USFWS considered but determined not to designate critical habitat on 611 ASG sites within polar bear range because the 611 ASG's INRMP, as implemented, is a legally operative INRMP that "provides a benefit to the species for which critical habitat [was] proposed for designation," per section 218 of the 2004 National Defense Authorization Act and ESA Section 4(a)(3)(b)(i).

- 16 USC Sections 1361-1407, 50 CFR Sections 18.1-18.129. **Marine Mammal Protection Act.** The Act prohibits the take or harassment of any marine mammals with some exceptions, primarily for scientific and educational purposes. Under section 101(a)(5) of the Act, citizens engaging in certain activities shall be allowed incidental take of small numbers of marine mammals when such take is incidental to but not the purpose of an authorized activity. Further, incidental take is only authorized when it will have a negligible impact on the species of concern and will not interfere with the availability of the species for subsistence use by Alaska Natives. Under Section 101(c) of the Act, lethal take is only permitted if such taking is imminently necessary in self-defense or to save the life of a person in immediate danger and such taking is reported to the U.S. Fish and Wildlife Service within 48 hours. "**Harassment**" means "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild; or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to migration, breathing, nursing, breeding, feeding, and sheltering." Harassment is divided into two categories: 1) Level A harassment, which is defined as "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild;" and 2) Level B harassment, which is defined as "any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering." "**Take**" as defined means "to harass, hunt, capture or kill, or attempt to harass, hunt, capture or kill any marine mammal." Under the MMPA, take is defined as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture or kill" any marine mammal, including polar bears. "Take" includes feeding or attempting to feed a marine mammal in the wild. The "taking" of polar bears is allowed for Alaska Native subsistence hunting. The Act and supporting regulations also make provision to "take" marine mammals in the course of scientific research or other legitimate work in polar bear habitat. The organization granting such authorization in the northern region of Alaska is the U.S. Fish and Wildlife Service (USFWS) Marine Mammal Management Office in Anchorage.
- **50 CFR 216.** *The Taking and Importing of Marine Mammals.* Regulations implement the MMPA, which, among other things, restricts the taking, collection, possession, transportation, selling, offering for sale, and importing of marine mammals and marine mammal parts.

Federal regulations allow non-Natives to collect parts from some dead marine mammals found on the beach or land within one-quarter mile of the ocean on state or federal public lands. Collection is prohibited on National Park Service lands, and collection on private lands is contingent upon permission of the landowner.

Skulls, bones, teeth or ivory from beach-found polar bear, sea otter, walrus and non-endangered whales may be collected. Skins, meat and organs from these animals may not be collected. Parts of endangered whales (managed by the National Marine and Fisheries Service) may not be collected. Endangered whales (bowhead, humpback, and fin whales) can be typically

differentiated from non-endangered whales by their size (greater than 25 feet in length). Fossil ivory collection is prohibited on state or federal public lands, but collection is allowed on private lands with permission of the landowner.

Collected polar bear, sea otter and walrus parts must be presented to and registered and/or tagged by the USFWS. Parts must be registered within 30 days of the find. For more information contact: USFWS, Marine Mammals Management Office - (907) 786-3800 or 1-800 362-5148.

4.3 611 ASG Policy

It is a 611 ASG responsibility to ensure that persons who desire to enter 611 ASG sites for purposes of conducting research, monitoring, or nature study involving polar bears or walrus be authorized to conduct such activities. Such persons, including agency personnel, must receive permission to work on specific 611 ASG sites; permission to enter sites is controlled by 611 ASG Reality (611 CES/CEAO).

5.0 Preventing Human-Bear Interactions

The main concern of the USAF is the safety of all personnel and polar bears. The best way to ensure the safety of personnel and polar bears is to avoid and minimize human-bear interactions and conflicts. Early detection and prevention is the basis of this interaction plan and will minimize the risks to both humans and polar bears. This can be accomplished by:

- identifying polar bear attractants
- limiting and/or isolating these attractants
- early detection of polar bears
- effective warning and communication systems
- educated and safe response

5.1 Attraction to Human Activity

Polar bears are extremely motivated to find food and are attracted to anything unusual that might provide a meal. They are also inherently curious and are attracted to things that are new. Once bears are attracted to a site, they become much more hazardous because the chance of an encounter increases. Potential attractants must be identified to avoid attracting a bear. Examples of polar bears attractants include:

- food;
- food associated waste;
- trash;
- chemicals;
- denning habitat;
- novelties - objects and materials that are new to polar bears, may include plastics (e.g., fuel cans), weather stations, and snowmobiles;
- petroleum products;
- sewage; and
- gray water.

5.2 Preventing Polar Bear Attraction and Encounters

The attractiveness of a site must be minimized to minimize human-polar bear interaction. Every successful foraging trip into human-populated areas increases the chances of that bear returning to the same site or to a similar site. Young bears tend to be especially curious, are

typically more food-stressed, and are the most likely bears to be attracted to human activities. Any encounter with a polar bear presents a hazard. Bears have damaged or destroyed property and have caused work stoppages and restrictions. Throughout their range, encounters have caused death for both humans and bears.

Correctly handling food and associated waste is the single biggest action an individual can take to avoid attracting bears. Regardless of whether a polar bear is intentionally or unintentionally fed; once it associates the site with food, it becomes very difficult to avoid conflict with the bear. Feeding wildlife on site is strictly prohibited, as mandated by federal and state laws. The following guidelines will help reduce the potential for human-bear interactions due to food and associated waste.

- Food and beverages should only be consumed inside buildings or vehicles.
- Food and beverages should be stored in secure areas and not left outside or in unoccupied vehicles.
- Food and beverage waste should be disposed of in indoor receptacles or outside in bear-proof dumpsters and should not be available to wildlife.
- Food and associated waste should be incinerated or removed to an off-site garbage facility regularly.
- Personnel should be particularly aware of bears around the kitchen area or during meal preparation.

Trash and chemicals should also be treated as bear attractants and dealt with accordingly. Non-food materials (e.g., plastic, rubber, motor oil, and chemicals) have attracted bears in the past. The following guidelines will help reduce the potential for bear attraction due to trash and hazardous materials.

- All trash and chemicals should be stored inside or outside in bear-proof dumpsters or containers. Inside storage is always preferred, when possible.
- Accessible trash should never be left unattended outside.
- Trash waiting for pickup should be stored outside in bear-proof containers or inside and brought outside only when the garbage truck arrives.
- Kitchen associated trash, non-metallic trash, and non-toxic trash should be incinerated on a regular basis, or removed from the site on a regular basis and not left to accumulate in large amounts.
- Toxic wastes should be stored and handled properly in secure areas and containers.
- If a toxic spill should occur, it should be cleaned up properly and immediately. This includes even small spills or leaks from vehicles or machinery.

Man-made features that facilitate snow accumulation can also provide good denning habitat, including snow drifts created by structures, snow piles below roofs, or berms caused by snow removal. Female polar bears enter dens in November to give birth to cubs and protect them through March. Dens are located in areas of sufficient snow accumulation (three feet or deeper), which generally includes bluffs along rivers, coastlines and barrier islands, and rough sea ice. The USFWS mitigates potential disturbance to known polar bear dens by implementing a one-mile buffer around the den. The following are guidelines to avoid the establishment of a polar bear den on or near site.

- Personnel should be aware on or near the site of where natural drifts accumulate.
- Where possible, personnel should remove snow from areas of accumulation to improve visibility on the site in order to eliminate suitable denning and observe mobile bears.
- Personnel should be aware of any present or past denning sites.

- Personnel should report any suspected dens on or near the site, using the procedure detailed in Section 6.1.

While any encounter with a polar bear is dangerous, a surprise encounter is particularly dangerous. Bears may respond to a surprise encounter defensively and aggressively. The following guidelines describe ways to minimize surprising a polar bear.

- Personnel should always be aware of their surroundings by checking for signs of polar bears, including paw prints, scat, disturbed trash, or destroyed items.
- Personnel should be made aware that bears can hide under buildings or stairs, behind dumpsters, connexes, stacked and stored materials, snow drifts, etc.
- Personnel should make lots of noise when walking into an area with poor visibility.
- The exterior of all buildings should be well lit to increase visibility.
- Exterior doors should have windows, or windows nearby, that allow personnel to clearly see outside to check for polar bears.
- Before exiting the building, personnel should always check for polar bears through windows; once outside, check under the building and stairwells.
- Snow should be removed from areas of accumulation to improve visibility and in such a way that it does not hinder the view or provide areas for bears to hide.
- Stacked or stored materials should be kept to a minimum because they provide places for bears to hide and can create snow drifts.
- Open areas under raised buildings or stairways should be fenced in to prevent access by bears.

Polar bears have been known to enter buildings (such as occurred at Oliktok in 1993), which can be extremely dangerous for personnel, the bear, and equipment. Once a polar bear has entered a building, a positive ending is very unlikely. These preventative measures should be taken to avoid having a polar bear enter a building.

- Keep snow cleared from under windows so that snow does not pile up or drift allowing a polar bear to climb on the snow and enter the building through the window.
- Doors should open outward to easily block a potential intruder.
- Doors and windows should not be left open at any time.
- Oval-shaped door knobs should be used on exterior doors instead of handle-type knobs.
- Lighting around the building should be maintained such that a potentially intrusive bear is identified before it comes too close to the building.
- Grates should be placed over windows to limit entry, yet meet fire codes.



Polar bear walking along the Beaufort Sea coast. Polar bears are very curious animals and are often drawn to human activities. Photo courtesy of <http://images.fws.gov>.

Novelties can arbitrarily attract bears and can be difficult to avoid or contain. It is best to be aware of these novelties that the bears might be attracted to and avoid leaving these unsecured and/or exposed. Novelties often include plastics, new smells, chemicals, vehicles, machinery,

and unique structures. Bears will chew on plastics, and this material should be disposed of properly.

Occasionally native hunters will harvest whales near USAF facilities, particularly at Barter Island/Kaktovik, Barrow, and Oliktok/Nuiqsut. Communication between LRRS personnel and the community is essential to keep all USAF personnel aware of whaling activities. In the event that a whale is harvested, personnel should be aware of butchering and carcass disposal areas, avoid these areas, and recognize that they serve as strong polar bear attractants.

6.0 Bear Avoidance and Encounters

The potential for bear encounters always exists, even when all precautions are taken to eliminate attractants. After taking precautions against attracting polar bears to the site, early detection of polar bears on or near the site is the best way to avoid an encounter. Guidelines for early detection are as follows.

- Morning rounds should be performed by trained personnel on a daily basis to look for any bears or any signs of bears. Bear signs include tracks, scat, and disturbed trash or materials.
- Morning rounds should be conducted in a two-person team, in a vehicle if possible, with a light source, a method of personal protection, and a reliable form of communication, such as a cell phone or radio.
- Personnel should always be observant for bears and always be aware of their surroundings.
- Utilize a bear guard or a trained employee to specifically watch for bears when working outside and at off-site locations.
- Daily communication should take place with the community and other organizations regarding polar bear activity in the area, if possible.

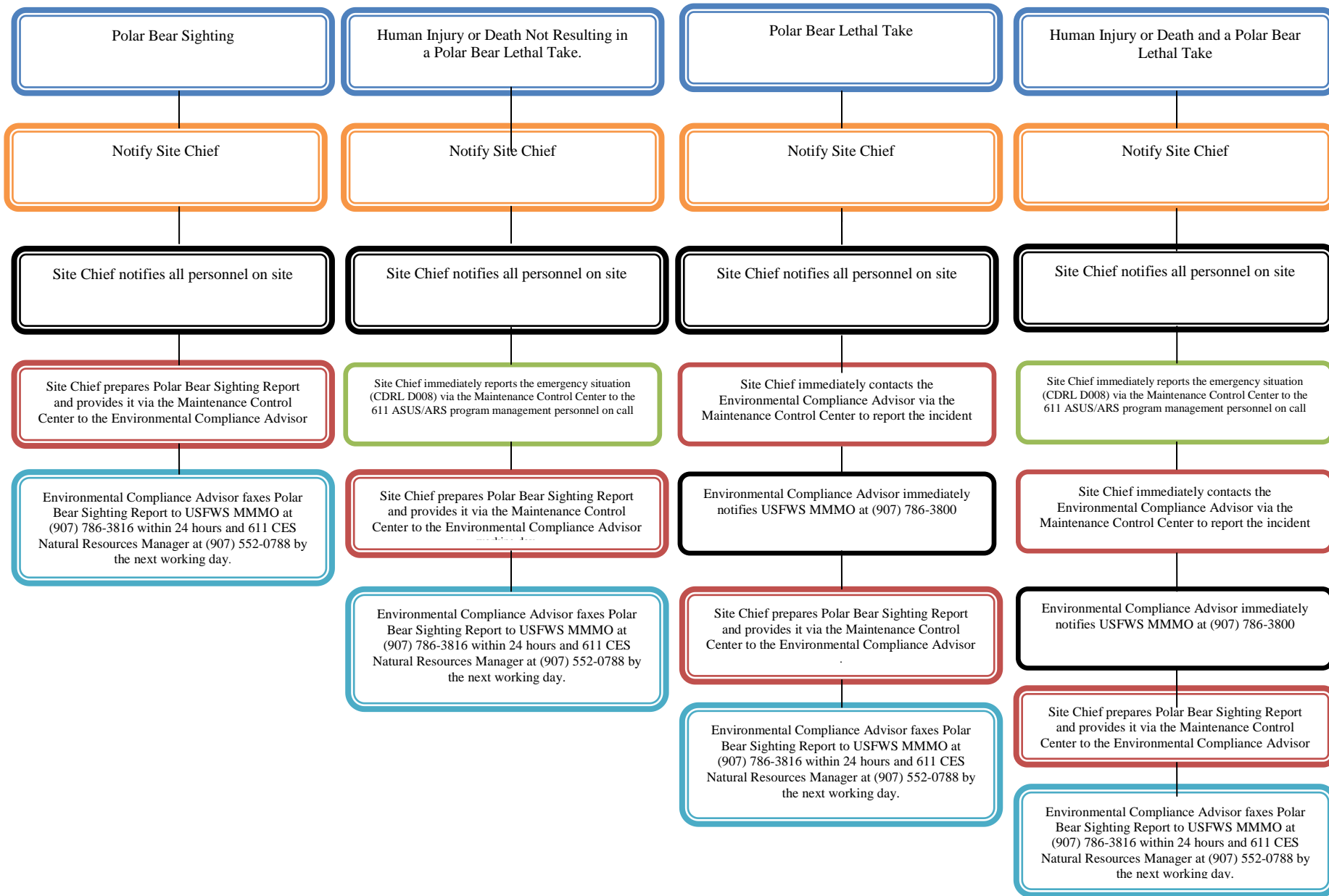
6.1 Response

Polar bear encounters may still occur, even if all necessary precautions of avoidance and early detection have taken place. Polar bear encounters will always be variable, and the correct response will depend on your location relative to the bear and the bear's behavior. Always put your safety and the safety of your coworkers first. No equipment is more valuable than your or someone else's life. Never attempt to photograph polar bears from an exposed location.

Any and all polar bear sightings will be immediately reported to the Site Chief. Any other information regarding polar bear presence (*i.e.*, one observed 5 miles from the site) should also be relayed to the Site Chief (Figure 2). A standard of notification amongst all crews will be established in the event of a polar bear on site or other emergencies. This could include a PA system, radios that every person or the crew carry, cellular phones, or any form of reliable communication. Each site is unique, and the standard of notification implemented at each site should reflect individual needs of that site. If necessary, work activities will be altered or stopped to avoid interactions with polar bears. In general, the bear should be left alone, unless there is imminent danger to human life.

If a bear remains on-site or near the site for an extended period of time, the Site Chief can notify the USFWS Marine Mammals Management Office at (907) 786-3800 for advice. If a polar bear den has been found, the Site Chief should immediately notify the USFWS Marine Mammals Management Office (same as above) for guidance, and the area should immediately be avoided by all personnel.

Figure 1. Polar Bear Encounter Notification Requirements



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All polar bear observations and any human-bear interactions must be reported to the USFWS Marine Mammals Management Office (MMMO) within 24 hours of the event. See Figure 2 for proper chain of reporting. The USFWS Polar Bear Sighting Report form in Section 10 must be completed and faxed to (907) 786-3816.

Should any personnel observe or come into contact with a polar bear, the most effective response will depend on the bear's behavior. The following highlights common polar bear behaviors and the appropriate responses, as described in *Safety in Polar Bear Country* (Bromley 1996).

If a polar bear is unaware of your presence, the best response is as follows.

- Remain calm; do not run away or make loud noises.
- Quietly retreat to a safe location.
- Do not approach or crowd the bear. Every bear has "personal space," the distance at which they feel comfortable or threatened. The more distance between personnel and the bear, the less likely a conflict will arise.
- Once you are at a safe location, immediately notify the Site Chief, who will then notify all personnel.
- Watch the bear until it leaves the site.
- The Site Chief will complete the USFWS Polar Bear Sighting Report included in Section 10 and provide it via the Maintenance Control Center to the Environmental Compliance Advisor.
- The Environmental Compliance Advisor will fax the Polar Bear Sighting Report to USFWS MMMO at (907) 786-3816 within 24 hours and the 611 CES Natural Resources Manager at (907) 552-0788 by the next working day.

If a polar bear is aware you are present and curious, it will be exhibiting such behaviors as standing on hind legs and sniffing, moving slowly with frequent stops, moving head from side to side, or sniffing the air. The best response is as follows.

- Remain calm.
- Speak calmly to the bear; help it understand that you are a human.
- Begin to move away slowly to a safe location, do not run away.
- Do not approach or crowd the bear. Every bear has "personal space," the distance at which they feel comfortable or threatened. The more distance between personnel and the bear, the less likely a conflict will arise.
- Once you are at a safe location, immediately notify the Site Chief, who will then notify all personnel.
- Watch the bear until it departs the area.
- The Site Chief will complete the USFWS Polar Bear Sighting Report included in Section 10 and provide it via the Maintenance Control Center to the Environmental Compliance Advisor.
- The Environmental Compliance Advisor will fax the Polar Bear Sighting Report to USFWS MMMO at (907) 786-3816 within 24 hours and the 611 CES Natural Resources Manager at (907) 552-0788 by the next working day.

If a polar bear is threatened or agitated, it could exhibit such behaviors as lowering its head with ears laid back, growling, jaw-popping, hissing, panting, or huffing. The best response follows.

- Remain calm; do not run away or make loud noises.
- Avoid the bear, if possible.
- Move away slowly to a safe location.
- Prepare approved deterrent methods, as appropriate. These methods are described in

Section 6.2.

- Talk to the bear in a calm, non-aggressive manner.
- Once you are at a safe location, immediately notify the Site Chief, who will then notify all personnel.
- Watch the bear until it departs the area.
- The Site Chief will complete the USFWS Polar Bear Sighting Report included in Section 10 and provide it via the Maintenance Control Center to the Environmental Compliance Advisor.
- The Environmental Compliance Advisor will fax the Polar Bear Sighting Report to USFWS MMMO at (907) 786-3816 within 24 hours and the 611 CES Natural Resources Manager at (907) 552-0788 by the next working day.

It can be difficult to always accurately read bear behavior. Regardless of the bears previous behavior, if the bear attacks the best response is to:

- Remain calm.
- Use approved deterrent methods, as appropriate. These methods are described in Section 6.2.
- If contact is made, play dead.
- If the attack becomes prolonged, fight back. This bear might view you as food; you should do everything within your power escape the attack.
- Move to a safe location as soon as the attack subsides and it is safe to do so. Use any means available to call for help. The Site Chief will immediately report the emergency situation (CDRL D008) via the Maintenance Control Center to the 611 ASUS/ARS program management personnel on-call.
- Stay calm. Seek medical attention as necessary.
- Check that everyone in the group is accounted for.
- Immediately notify the Site Chief, who will then notify all personnel.
- Observe the bear until it departs the area.
- The Site Chief will complete the USFWS Polar Bear Sighting Report included in Section 10 and provide it via the Maintenance Control Center to the Environmental Compliance Advisor.
- The Environmental Compliance Advisor will fax the Polar Bear Sighting Report to USFWS MMMO at (907) 786-3816 within 24 hours and the 611 CES Natural Resources Manager at (907) 552-0788 by the next working day.

Should a polar bear encounter escalate into a life threatening situation, no authorization is required for a lethal take in the defense of human life under section 101(c) of the MMPA. If a lethal take occurs despite preventative actions, the following must be accomplished.

- Move to a safe location as soon as the attack subsides and it is safe to do so.
- Use any means available to call for help
- Stay calm.
- Seek medical attention as necessary.
- Check that everyone in the group is accounted for.
- Immediately notify the Site Chief, who will then notify all personnel.
- The Site Chief will immediately contact the Environmental Compliance Advisor via the Maintenance Control Center to report the incident.
- The Environmental Compliance Advisor will immediately notify USFWS MMMO at (907) 786-3800.
- The Site Chief will complete the USFWS Polar Bear Sighting Report included in Section 10 and provide it via the Maintenance Control Center to the Environmental Compliance Advisor.

- The Environmental Compliance Advisor will fax the Polar Bear Sighting Report to USFWS MMMO at (907) 786-3816 within 24 hours and the 611 CES Natural Resources Manager at (907) 552-0788 by the next working day. The USFWS will provide guidance on what to do with the carcass.

6.2 Harassment Permits

The 611 CES and 611 ASG BOS Contractor will have separate permits granted to them by the USFWS authorizing the incidental “take” of polar bears (*i.e.*, harassment) for the protection of both human and polar bear life under Sections 101(a)4(A), 109 (h)(1) and 112(c) of the Marine Mammal Protection Act. Depending upon the amount of outdoor activities and time of year, either a different contractor or 611 ASG personnel accomplishing a project (*e.g.*, construction, environmental restoration, and/or demolition) will have permits for incidental take and coordinate with the Site Chief. This authorization will not authorize lethal take of a polar bear. The authorization will be issued specifically to the BOS Contractor or 611 ASG who is responsible for ensuring that trained and qualified personnel are assigned the task to haze, deter, or otherwise non-lethally harass polar bears.

6.3 Deterrent Methods

There are a variety of deterrent methods that can be used, each of which will be effective in different situations. Non-pain inducing stimulus should always be used first, and if not effective, followed by pain-inducing stimulus. There is always potential for pain-inducing deterrent methods to injure the bear, which should always be avoided. Non-lethal deterrent methods may include:

- expressive motions, such as grouping together, waving your arms, jumping up and down;
- loud noises, such as yelling, air horns, vehicle horns;
- chemical repellents, such as capsaicin spray, which should be available at all sites; and
- projectiles, such as flares, cracker shells, screamers, bean bags, or rubber bullets.

A recent incident on an oil/gas industry site involving the death of a polar bear due to a long-range hazing round being inadvertently used at short-range has demonstrated the need to keep different hazing rounds in separate locations (C. Putnam, USFWS, personal communication with G. Stout, March 26, 2012).

Contractors working on 611 ASG sites may use polar bear guards who have the option to use non-lethal ammunition. The following is applicable for these personnel.

A maximum of 25 rounds of each type of ammunition will be carried. Ammunition will be containerized in different colored containers. Containers will be inspected by the officer assigned to bear hazing duties at the beginning of each shift to verify the number and types of rounds in possession. Only lethal ammunition will be carried in a shotgun magazine (tube). If non-lethal rounds are to be used they will be loaded into the firearm immediately prior to discharge.

The preferred practice for ammunition handling in the field will be to leave the rounds in their color-coded containers at all times. The firearm handler must always inspect each cartridge casing for color and text to verify which type of round is being loaded. Rounds should be loaded into the firearm directly from the box immediately before use. Carrying ammunition in other containers (*e.g.*, coat pockets) should be avoided. If a situation arises where a hazer must carry ammunition out of the containers (such as they must walk to an area where the vehicle cannot travel, and color-coded containers cannot be brought with them), then ammunition may be carried in other manners, although they should remain segregated (*e.g.*, different coat pockets or

bags for different types of rounds). It is vital to know exactly what type of round is in the firearm at all times so that they are used appropriately.

Personal firearms used for hazing polar bears on USAF facilities are regulated under policies beyond the scope of this document. Refer to the Site Chief for information regarding possession of a firearm on site.

7.0 Site Specific Descriptions and Encounter Prevention

Each of the sites pose unique risks and concerns associated with polar bears. While all sites are located within polar bear habitat, they do not all have the same amount of human or bear activity. Many sites are inactive, and the general lack of human presence at these sites makes defining the potential polar bear danger difficult. In general for all sites, when personnel are present at a site, it should be assumed that there is potential to come in contact with a polar bear. Regardless of specific circumstances at each site, avoidance and responses to polar bears should follow guidelines outlined previously. However, because each site is unique, site-specific mitigation measures were outlined for each site. Current mitigation measures and recommended mitigation improvements for each site are described in more detail below. Site maps are in Appendix 7.0.

For all sites, preventative measures include briefing personnel visiting or operating the site on items included within this plan, providing them with copies of this plan, and other information appropriate to the site visit. Bear spray and cracker shells are available on-site for all manned sites.

7.1 Barter Island LRRS

Barter Island LRRS is located on 641 acres of low-lying tundra, on the Arctic coastal plain of the Beaufort Sea, between Arey and Kaktovik lagoons. The village of Kaktovik is one mile northwest of the site. Barter Island is an actively manned site, and two personnel are present on site year-round. Clean Sweep activities were completed in 2007. Inactive structures; towers, buildings, tanks, pipelines, pads, etc. were removed. Much of the material removed (2,200 tons of material) was barged to the Oxbow Landfill in Deadhorse, and other nonhazardous wastes were transported to the Kaktovik landfill (personal communication, S. Slagle 2006, as reported in Gene Stout and Associates, and Bythe & Trousil, Inc. 2007). The facility now comprises an active runway and associated hangar, two building trains, a radome, and several storage buildings (Appendix 7.0, Figure 1).

Public Land Order No. 715 (1951) that withdrew lands for military purposes includes a provision that allows *"the right of the natives to hunt, fish, trap, and otherwise use the land in their customary manner."* Future plans for the site are to reduce the Air Force Public Land Order withdrawal to about 50 acres. Excess property held under this order will be relinquished through the Bureau of Land Management and transferred to the village of Kaktovik, Kaktovik Inupiat Corporation, with excess facilities, including the airfield and hangar. There is an Air Force lease to the North Slope Borough for use of the airfield and hangar as the community airport (personal communication, J. Smith 2007, as reported in Gene Stout and Associates, and Bythe & Trousil, Inc. 2007).

The responsibility of water and sewer and trash pickup is contracted to the village of Kaktovik. The village provides runway snow removal. Around the site and the road to the site is conducted by the O&M contractor. An incinerator was installed so all trash is incinerated before it is hauled away to the local landfill.

Village safety officers are contacted if there is a problem with a polar bear. On occasion, polar bears have destroyed runway lighting. During fall and winter, polar bears have been observed hunting on coastal and shorefast ice off the coast of Kaktovik. Historically, this offshore area has also been utilized as denning habitat from November to March (Bridges 2001).

Kaktovik has a strong community culture guiding human-polar bear interactions. Some below information is taken from *A Summary of Polar Bear Viewing/Tourism in Alaska* (Miller 2011). Natives of Kaktovik conduct whale hunts annually in the fall. Captured whales may be butchered near their capture site, sometimes on the seaward side of the eastern end of the runway. If a whale carcass is present, polar bears tend to aggregate on the carcass to feed, creating a potential risk to arriving airplanes and personnel disembarking from the aircraft.

More recently, professional photographers and tourists have been visiting the bone pile to view polar bears, which has increased the risk of human-polar bear interactions. The USFWS has studied bear behavior at this site using radio collars and is working with the Kaktovik community to ensure responsible viewing of these threatened bears (Susanne Miller, USFWS Polar Bear Biologist, Gene Stout personal telephone communication March 27, 2012).

The USFWS is working closely with the community to establish guidelines and viewing practices (USFWS undated) that will help ensure that viewing activities are conducted in a legal manner under the Marine Mammal Protection Act, which allows for bear viewing, as long as bears are not disturbed in the process. The underlying principle is that, the further away you are from bears, the less likely you are to disturb them, and therefore, the safer the situation for both humans and bears. The USFWS also worked with the community to: 1) standardize viewing practices among guides; 2) erect a barrier to keep people further away from bone pile; 3) develop various outreach materials for both residents and visitors.

The USFWS is often contacted by commercial filmers for information on how they can view bears. USFWS guidance to them includes the following:

- Polar bear viewing is an inherently dangerous activity, and they do so at their own risk.
- If viewing on Arctic National Wildlife Refuge lands and waters around Barter Island, they must be accompanied by a locally permitted guide and must follow viewing guidelines (USFWS undated).
- Permitted guides must follow permit conditions designed to minimize impacts to polar bears.
- If commercial filming activity has the potential to disturb polar bears, it is possible to obtain a permit from the Washington DC office (Division of Management Authority), which allows for a small amount of "take" (non-injurious harassment) for commercial purposes.
- If requested to film polar bears at the bone pile, the USFWS advises them that it does not manage bone pile lands that are under USAF jurisdiction, but that if accompanied by a local guide that is following the established guidelines, they are more likely to be in compliance with the MMPA.

Present preventative measures by the 611 ASG include:

- fencing under buildings,
- grates on windows,
- installation of an incinerator,
- communication between village of Kaktovik and site personnel, and

- adequate lights at doors.

7.2 Bullen Point Former SRRS

Bullen Point former SRRS, also known as Flaxman Island, occupies 605 acres adjacent to Mikkelsen Bay on the east-central shore of the Beaufort Sea, 40 miles west of Deadhorse. This site is located near the oil industry's Badami production facility. This site is inactive and is visited as part of site restoration activities. Length of stay for personnel varies. Demolition and remediation of inactive facilities under the Clean Sweep program occurred in 2006-2007, leaving only a few then-active buildings. Since then, the site has been deactivated. Debris removal is scheduled for 2013.

The site is accessed by an airstrip located one-half mile away; after landing, personnel walk to the site. Remaining site facilities include an airstrip, technical services building, fuel storage, two satellite ground terminals, and a radar tower facility (Appendix 7.0, Figure 2). All trash is stored inside and backhauled on the trip out.

Polar bears have been observed moving through and resting at this site, and the possibility of denning polar bears exists from November to May (Bridges 2001). During the 2002-03 winter season a polar bear denned in the snow drift of the airstrip ramp (Perham 2007). Because this site generally has low human activity, there may be a higher risk of polar bear encounters when personnel are on site. Personnel should contact the USFWS for information about current bear activity in the area prior to arriving at the site.

7.3 Oliktok LRRS

Oliktok LRRS is located east of the Colville River on 832 acres along the Beaufort Sea coast. It is adjacent to the village of Nuiqsut and 35 miles west of Prudhoe Bay. This site is actively manned by two personnel year-round and is accessed by a road from Prudhoe Bay. Operational facilities include a building train that encompasses the radome, a warehouse, and a garage, as well as an inactive airstrip and the associated hangar (Appendix 7.0, Figure 3). Both the garage and warehouse are separate from the main building train and can only be accessed by exiting the main building train. Snow removal is conducted by the O&M contractor. All trash is incinerated before it is hauled away by an oil field service company.

Polar bears often travel this shoreline, especially in the fall when they travel east to west following the bowhead whale migration. Natives of the village Nuiqsut hunt whales in the fall and, similar to the Kaktovik region, polar bears can be found feeding on the butchered whale carcasses (Bridges 2001). Denning habitat is present near this site, and denning polar bears may be present from November to March (Bridges 2001). Oil industry security patrols this area for polar bears and reports any sightings or incidents to radar site personnel. On November 30, 1993, a polar bear broke into a building train window and mauled an employee. The employee was critically injured, and a bear was killed (Bridges 2001). In September of 2000 claw marks on a pickup truck were observed, and the bear also pushed the incinerator room door open (Bridges 2001). Extreme cases such as these have declined in more recent years; however, the chance for an encounter with a polar bear remains. Personnel should take extreme caution at this site.

Present preventative measures include:

- fencing under main building train,
- grates on windows, installation of an incinerator, and
- adequate lighting between main building train, garage and warehouse facilities.

7.4 Point Lonely Former SRRS

Point Lonely Former SRRS (1,802 acres) is located between Smith and Harrison bays on the Beaufort Sea coast. The nearest village is 40 miles away at Nuiqsut; an oil industry camp is also located nearby. This inactive site is visited as part of site restoration activities. Length of stay for personnel varies. Several large structures are present on site, including a warehouse, hangar, building train and airstrip (Appendix 7.0, Figure 4). Personnel arrive at an airstrip nearby and walk to the site. Clean Sweep began at Point Lonely in 2006 and is scheduled to continue till 2015. Because the Bureau of Land Management manages the land, the Air Force is using a right of entry permit to gain access to buildings, structures and to conduct environmental cleanup and demolition activities.

Polar bears are present along this coastline, and denning polar bears may be present at the station from November to May (Bridges 2001). Because personnel are rarely present at this site, the chance for a polar bear incident is decreased. However, as crews continue to disassemble this site, the chance for a polar bear incident is again increased. It is especially important to be aware at this site that polar bears could have taken advantage of the shelter or denning habitat opportunities provided by these facilities while no personnel are present. Personnel arriving at this site should have increased awareness of the possibility for a polar bear to be present on site.

7.5 Point Barrow LRRS

Point Barrow LRRS occupies 266 acres on the Barrow Peninsula, 5 miles east of the village of Barrow. The Peninsula is bordered on the east by Elson Lagoon and on the west by the Chukchi Sea. This is an actively manned site, and 5 Air Force and contract personnel are present year-round. A Department of Defense facility is located adjacent to radar site facilities. Clean Sweep demolition and debris removal at Point Barrow LRRS occurred in 2011. Long-term management began in 2012. Active facilities include a garage, two building trains, and an attached radome (Appendix 7.0, Figure 5). An offsite cold storage facility is also utilized. The adjacent runway is inactive, and all air traffic uses the village runway. An incinerator was installed so all trash is incinerated before it is hauled away to the local landfill.

Polar bears are common in the vicinity of this site, hunting for seals on the sea ice or searching out denning habitat. Winter and fall are the most common times for bears to be present; however, they have been observed near Barrow LRRS year-round. The village of Barrow hunts whales in both spring (June and July) and fall (September and October). Polar bears are primarily attracted to this area because of whale carcasses but sometimes go into village of Barrow looking for food (Bridges 2001). During one whaling season 30 polar bears were observed around Barrow (Bridges 2001). If any polar bear issues arise at the site, a Barrow village safety officer is notified.

Present preventative measures include:

- fencing under main building trains,
- elevated and enclosed walkway between building trains,
- installation of an incinerator,
- adequate lighting between main building train and garage and warehouse facilities, and
- communication between village of Barrow and site personnel.

Hauled out Pacific walrus have been confirmed on or near Point Barrow LRRS.

7.6 Wainwright Former SRRS

Wainwright SRRS occupies 1,519 acres at the mouth of the Kuk River, on the Chukchi Sea shore, about 5 miles south of the village of Wainwright. It was constructed in 1953 and inhabited until 1989. This site (Appendix 7.0, Figure 6) is inactive and is visited as part of site restoration activities. Length of stay for personnel varies. When deactivated, a building train, radar tower, satellite ground terminals and airstrip remained at this site. Clean Sweep building demolition and clean up occurred in 2009-12 and included about 80 different items, such as water and fuel tanks and pipelines, buildings, etc. Demolition and removal of contaminated soils are scheduled for 2013. All trash and other waste is removed from the site when crews depart.

Polar bears migrate along this coastline and numerous bears have been harvested near the village of Wainwright, as part of the Native subsistence harvest (Bridges 2001). Denning habitat is present near this site. Whales harvested by Natives in Wainwright are far enough away that they do not draw bears near the radar site. Similar to Bullen Point, the lack of full time personnel at this site decreases the overall possibility for a polar bear encounter; however, the possibility for an encounter remains. In some cases the chance of surprising a polar bear is actually higher because a polar bear could have become accustomed to the lack of human activity at this site.

Hauled out Pacific walrus have been confirmed on or near Wainwright former SRRS.

7.7 Point Lay Former LRRS

Point Lay Former LRRS is located on the shoreline of the Chukchi Sea on 1,442 acres approximately 2 miles south of the village of Point Lay. This is an inactive site that was inhabited from 1955 to 1999. The site is currently only visited occasionally for environmental restoration work, which is mostly complete. Clean Sweep occurred in 2005; other remediation occurred in 2012. The site is accessed by an adjacent runway, and personnel walk to the site. There are few structures at this site; only a small storage shed and an aircraft hangar are present (Appendix 7.0, Figure 7).

Polar bears are common in this area traveling along the Chukchi coastline in search of food (Bridges 2001) Historically, polar bears have utilized denning habitat in the offshore area near Point Lay from November to March (Bridges 2001). The most recent polar bear-caused human death took place in Point Lay in December 1990 (Bridges 2001). A couple walking through the village came in contact with a polar bear; the woman was able to escape, but the man was attacked and killed. Because Point Lay Former LRRS is very rarely visited, the chance for a polar bear encounter is low. However, personnel visiting this site should take precautions and be aware that this site might have attracted unsuspecting polar bears in the absence of people. This awareness is especially prudent during demolition and restoration activities.

Hauled out Pacific walrus have been confirmed on or near Point Lay former LRRS.

7.8 Cape Lisburne LRRS

Cape Lisburne LRRS is located 35 miles northeast of the village Point Hope, along the Chukchi Sea coastline. The site (1,125 acres) is divided into a lower Camp and an upper Camp that are connected by a 3.9-mile winding road. Radar equipment is located in the upper camp, and support facilities are located in the lower camp (Appendix 7.0, Figure 8). The site is actively manned with four personnel present year-round. The site is accessed by a runway located one-quarter mile away. Trash is stored inside, incinerated on site, and then buried in a landfill located approximately one mile from the site.

Polar bears migrate south through this area in the fall and winter then north in the spring and summer. Denning habitat has historically been utilized on offshore Chukchi Sea ice from

November to March (Bridges 2001). This is the center of where both CBS and SBS polar bear stocks overlap their ranges. Polar bear tracks under windows and paw prints on windows were observed during a site investigation associated with the draft of the 2001 Polar Bear Interaction Management Plan (Bridges 2001). Polar bears have been observed wandering along the runway and into camp (Cooley 2007). This site is not located near any villages or oil industry activities; therefore, any polar bear hazing or deterrence is conducted by personnel on site. Commonly a truck and truck horn are used to scare polar bears away from the site (Cooley 2007).

Present preventative measures that have been accomplished:

- trash is stored inside, incinerated, and buried;
- windows have been installed on all doors; and
- adequate lighting at site.

Hauled out Pacific walrus have been confirmed on or near Cape Lisburne LRRS.

7.9 Kotzebue LRRS

Kotzebue LRRS is approximately four miles from the village of Kotzebue and occupies 676 acres on the Kotzebue Sound. The site became operational in 1950 and is currently operated as a Minimal Attended Radar, meaning it is attended by one person who lives in the village of Kotzebue and travels to the site daily by vehicle. All visiting personnel arrive via aircraft to the state-maintained airport in Kotzebue and are transported to the site via vehicle. Facilities at this site include a radome and emergency generator building; the entire site is surrounded by chain-link fencing (Appendix 7.0, Figure 9). There are no sleeping or dining facilities on site. All trash is transported to the village of Kotzebue dump; no trash is stored on site.

Polar bear activity tends to be lower at this site than the other radar stations because there are fewer polar bears migrating through this area, and hunting pressure from the village of Kotzebue is high. Polar bear denning near this site is possible, but far less likely than at other stations farther north, such as Barrow or Barter Island (Bridges 2001). Should a polar bear come near the site, a Kotzebue safety officer would be alerted. Although there has never been a polar bear encounter at this site (Cooley 2007), personnel should remain aware and diligent in minimizing the attractiveness of this site.

Present preventative measures that have been accomplished:

- trash is stored inside, the removed from site,
- fencing around the perimeter of the site,
- adequate lighting at site, and
- communication between village of Kotzebue and site personnel.

Site personnel should be aware of the potential for walrus in the vicinity of Kotzebue LRRS.

7.10 Tin City LRRS

Tin City LRRS lies on the Bering Sea coast at the tip of the Seward Peninsula, five miles southeast of the village of Wales on 723 acres. This site is actively manned by four personnel year-round. The site has an Upper Camp, Lower Camp, and a runway (Appendix 7.0, Figure 10). Lower Camp is one-half mile west of the Tin City mine site at the mouth of Cape Creek and includes a three composite building that is used for radar operations, an Alascom Earth Station, incinerator building, a cold storage facility, and a tank farm. Upper Camp is west of Lower Camp on top of Cape Mountain at 2,289 feet above mean sea level. Facilities at Upper Camp include a radome and living quarters. A roadway accesses the Upper Camp in snow-free months,

and top camp is accessed by a tracked vehicle when the road is closed. Trash is stored inside, incinerated, then transported to a landfill away from the camp.

Polar bears are extremely rare at Tin City LRRS, even though they are common on the opposite side of the mountain near the village of Wales (Cooley 2007). November to March would be most likely times to observed polar bears near this site (Bridges 2001). Regardless of the previous lack of polar bear observations or incidents, due diligence should be maintained in mitigating any polar bear attractions or interactions.

Present preventative measures that have been accomplished:

- trash is stored inside, incinerated, and transported to the dump; and
- adequate lighting at site.

Site personnel should be aware of the potential for walrus in the vicinity of Tin City LRRS.

7.11 Former Nome Field POL Site

The Nome Field POL (petroleum, oil and lubricants) Site (excess site) is on the southern coast of the Seward Peninsula, about two miles west of the City of Nome. Nome is about 580 miles northwest of Anchorage, Alaska. The site occupies seven acres near the Snake River (Appendix 7.0, Figure 11). West Nome Tank Farm (as it has been commonly called) was established as a POL storage facility in 1944 to support the former Marks AFB. West Nome Tank Farm was leased to various companies for commercial use from 1957 to 1991. The site was partially dismantled, primarily the tanks, and demolished in 1992. Some underground piping and the pumphouse were not removed. The POL pipeline over the Snake River was removed in 1994. The property was declared surplus in 1974; however, the Air Force still retains ownership.

Nome is within polar bear range. Thus, the Nome Field POL Site has been added to this Polar Bear/Walrus Plan. The site is scheduled to be visited annually as part of long term management of an excess facility. The presence of regular human activity near the site reduces, but does not eliminate, possible human-polar bear interactions during these site visits.

7.12 Anvil Mountain Former Radio Relay Site

The Anvil Mountain excess site is on the Seward Peninsula, about three miles north of the City of Nome, Alaska). Nome is about 539 miles northwest of Anchorage, Alaska. The site occupies 12 acres on the summit of Anvil Mountain (Appendix 7.0, Figure 12). The Anvil Mountain site was developed in 1956 as a Radio Relay Site to support the air defense system constructed in Alaska during the early 1950s. The site was active until 1979 when it was replaced with a commercial satellite earth terminal. The site was declared excess in 1981. In 1989 the two 70,000-gallon fuel tanks, five 1,000-gallon above-ground fuel tanks, and the vehicle maintenance building were transferred to the Nome Public School District. Demolition of remaining facilities, except the four WACS tropospheric antennas and the concrete slab where the temporary garage had been, occurred in 1999 and 2000. The four tropospheric antennas are to remain as a landmark. In 2011 some structures were demolished and removed.

Nome is within polar bear range. Thus, the Anvil Mountain Site has been added to this Polar Bear/Walrus Plan. The site is visited as needed as part of long term management of an excess facility. The presence of regular human activity near the site reduces, but does not eliminate, possible human-polar bear interactions during these site visits.

7.13 Cape Newenham LRRS

Polar bear interactions are not an issue at this site. Hauled out Pacific walrus have been confirmed on or near Cape Newenham LRRS.

8.0 Ongoing Education and Training

Education is a key component in effectively avoiding polar bear encounters and conflict. When personnel are aware of bear behavior and potential dangers, they are much more likely to hazards and avoid them. The following guidelines will help identify ways to keep all personnel and visitors educated.

- Initial site orientation should include videos, such as “Polar Bears: A Guide to Safety”, as well as access to informational pamphlets, posters and this Polar Bear/Walrus Plan.
- Training should be provided to on-site staff that describes bear behavior, safety concerns, and appropriate employee behavior while operating in polar bear habitat. Examples of this are informative staff meetings and ongoing safety education.
- This plan, the recently revised pamphlet, and the most recent USFWS poster should be posted for personnel to read and to promote ongoing awareness.
- Select contractor personnel may be required to take 3-hour Deterrence Training Program that has been approved by ADFG and USFWS. .
- Personnel operating at sites with walrus haulouts will be provided with information and any specific protection measures to be utilized in these areas.

Further education and training can be provided by the USFWS. Contact Marine Mammals Management office in Anchorage at (907) 786-3800

9.0 Walrus Haulout Considerations

At the request of the USFWS, this plan includes considerations for minimizing disturbance of known Pacific walrus haulouts on or near 611 ASG sites. In addition, projects VNMHOS140777 (2014) and VNMH199001 (2019) (both titled Management, Species; Steller Sea Lion) have been adjusted to include better determination of haulout sites for Pacific walrus (and seals) on 611 ASG sites and sites used by sea otters and sea lions. These projects may also be useful for monitoring effects of loss of sea ice, which could lead to changes in use of terrestrial haulout sites.

Based on a July 26, 2012 e-mail from Joel Garlich-Miller USFWS, Marine Mammals Management, Anchorage, AK to Matt Moran, Natural Resources Program Manager, 611 ASG, the following steps will be taken by the 611 ASG to minimize impacts of 611 ASG operations on walrus haulout sites.

- Timing is the most important consideration for minimizing interactions at haulouts. The 611 ASG will minimize operations that may affect haulouts during the mid-August through end of September haulout season to drastically reduce the likelihood of interactions. When barge landing and other operations are required during this period, site personnel will wait until haulouts that may be affected are clear of walrus before bringing the barge to shore.
- Marine vessels servicing 611 ASG sites will attempt to maintain a buffer from walrus hauled out on land or ice to avoid disturbance. Vessels less than 100 feet will be requested to remain at least 0.5 miles from hauled out walrus. Vessels greater than 100 feet will be requested to remain at least 1.0 mile from hauled out walrus.
- Sound carries long distances across water and often reverberates off cliffs and bluffs adjacent to haulouts, amplifying the noise level. 611 ASG barge operations will minimize noise levels near haulouts when compatible with mission requirements. Such operations

will avoid sudden changes in engine noise, using loud speakers, loud deck equipment, or other operations that produce noise in the vicinity of walrus haulouts.

- Vessels traveling in a predictable manner appear to be less disturbing to animals. Barge operations will avoid excessive speed or sudden changes in speed or direction when approaching or departing walrus haulouts. Harassment or pursuit of marine mammals is prohibited by law. Never attempt to herd, chase, or separate groups of walrus.

In addition, the 611 ASG will continue to minimize disturbance of haulouts by aircraft servicing sites near haulouts, as addressed in the 2013-2017 INRMP. The Air Force is educating pilots servicing 611 ASG sites about the sensitive nature of haulouts. Flight patterns at sites where runway approaches could create marine mammal disturbance are modified to protect haulout sites. The issue involves both stewardship and compliance. Pilots can be assessed civil and criminal penalties and imprisonment. USFWS personnel, as well as installation personnel, observe these areas for violations and report violations to enforcement personnel. Aircraft servicing these sites should avoid flight below 2,000 feet above ground level except on arrival and departure from landing strips and act according to site-specific advisories and restrictions. As an example from Cape Newenham LRRS, aircraft traffic should remain east of the site. The Air Force will continue to work to minimize disturbance, consistent with aircraft safety requirements.

If, in spite of these efforts, there is a potential for “take” of any kind for Pacific walrus on or near 611 ASG sites, the 611 ASG will cooperate with the USFWS to obtain required permits for such take. Notification procedures for polar bears in Figure 1 of this Polar Bear/Walrus Plan will also be used to report walrus encounters.

10.0 Future Planning

This plan will be updated every 5-10 years. The goal will continue to be to provide up-to-date, useful information for avoiding conflict with polar bears and minimizing disturbance to walrus while working in the Arctic. Accomplishing this goal will require feedback from personnel using the plan. Any suggestions for improvements are greatly appreciated. Please send recommendations to the 611 ASG Natural Resource Program Manager, 10471 20th St., Ste 361, Joint Base Elmendorf-Richardson, AK 99506-2200.

11.0 Conclusion

As long as humans continue to conduct activities in the Arctic, there will be the potential for polar bear-human conflicts. Each employee is responsible for their actions in polar bear country. By staying alert and recognizing there may be a polar bear around the next corner or snow pile, the potential for a bear encounter is minimized. The frequency and severity of conflicts can be greatly reduced by decreasing the attractiveness of a site, knowing how to respond to a polar bear encounter, and continually improving our methods to mitigate negative interactions.



Photo courtesy of <http://images.fws.gov>

This Polar Bear/Walrus Plan gives people on remote 611 ASG sites the tools needed to minimize and prevent polar bear encounters. If followed, polar bears and people should seldom have an

encounter that results in more than a record of a polar bear observation and an opportunity for a photograph. Implementation of this Polar Bear/Walrus Plan should also result in minimized disturbance of walrus at haulouts.

12.0 USFWS Reporting Form

The below form needs to be sent to the USFWS and a copy sent to the 611 ASG Natural Resource Program Manager, 10471 20th St., Ste 361, Joint Base Elmendorf-Richardson, AK 99506-2200.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. Tudor Road
Anchorage, Alaska 99503-6199

POLAR BEAR SIGHTING REPORT

Date: _____ Observer name: _____
Time: _____ Contact number/email: _____

Location: _____

Latitude: _____ Longitude _____ Datum: _____

Weather conditions: Fog _____ Snow _____ Rain _____ Clear _____ Temperature _____ F/C

Wind speed _____ mph/kts Wind direction _____ Visibility: Poor
Fair
Good
Excellent _____

Number of bears:

_____ Adult M/F	_____ Sow/cub(s)
_____ Sub-adult	_____ Sow/yearling(s)
_____ Unknown	_____ Sow/2YO(s)

Estimated distance of bear(s) from personnel _____ (meters) and facility: _____ (meters)
(closest point) (closest point)

Possible attractants present: _____

Bear behavior: Curious _____ Aggressive _____ Predatory _____ Passing through _____ Other _____

Description of encounter: _____

Duration of encounter: _____

Deterrents used/distance:

_____ Vehicle	_____ Bean bag	_____ Other
_____ Crackershell	_____ Horn/siren	_____
_____ Rubber bullet	_____ Spotlight/Headlight	_____

Agency/Contacts:

USFWS_Craig Perham (786-3810) (FAX: 786-3816)	Time _____	Date _____
ADF&G_Dick Shideler (459-7283) (FAX: 456-3091)	Time _____	Date _____
CLIENT _____	Time _____	Date _____

13.0 References

- Amstrup, S.C. and D.P. DeMaster. 1988. *Polar bear*. In: *Selected marine mammals of Alaska: species accounts with research and management recommendations*. J.W. Lentfer, Ed. Marine Mammal Commission. Washington, DC. pp. 39-56.
- Amstrup, S.C. and G. Garner. 1994. *Polar bear maternity denning in the Beaufort Sea*. *Journal Wildlife Management* 58:1-10.
- Amstrup, S.C. 1995. *Movements, distribution, and population dynamics of polar bears in the Beaufort Sea*. Ph.D. Dissertation. University of Alaska Fairbanks, Fairbanks, Alaska. 299 p.
- _____. 2000. *Polar bear*. In: *The natural history of an Arctic oil field: development and biota*, Chapter 7, J. C. Truett and S. R. Johnson, eds. Academic Press, San Diego pp. 133-157.
- Amstrup, S.C., T.L. McDonald, and I. Stirling. 2001. *Polar bears in the Beaufort Sea: A 30-year mark-recapture case history*. *Journal of Agricultural, Biological, and Environmental Statistics* 6:221 – 234.
- Amstrup, S.C. 2003. *Polar bear, (*Ursus maritimus*)*. In *Wild mammals of North America: biology, management, and conservation*. G.A. Feldhamer, B.C. Thompson, and J.A. Chapman eds. John Hopkins University Press, Baltimore, Maryland. Pages 587-610.
- Amstrup, S.C., G.M. Durner, G. York, E. Regehr, K.S. Simac, D. Douglas, T.S. Smith, S.T. Partridge, T. O'Hara, T. Bentzen, and C. Kirk. 2006. *USGS Polar bear research in the Beaufort Sea, 2005*. PBTC Meeting, St. Johns, Newfoundland, February 2006.
- Blank, J. 2012. *ConocoPhillips Polar bear avoidance and Interaction plan*. Prepared for Caryn Rea, Senior Staff Biologist, ConocoPhillips Alaska, Inc. by Weston Solutions, Inc.. 16 pp + appendices.
- Bridges, J.W. 2001. *Polar bear interaction management plan*. U.S. Fish and Wildlife Service, Region 7; Marine Mammals Management. Prepared for U.S. Air Force; Pacific Air Support Group; 611th Air Support Group; 611th Civil Engineer Squadron/Environmental Flight; Elmendorf Air Force Base, Alaska. February 2001.
- Bromley, M. 1996. *Safety in polar bear country*. Northwest Territories Renewable Resources, Yellowknife, NWT. 24 pp.
- Clough, N.K., P.C. Patton, and A.C. Christensen, eds. 1987. *Arctic National Wildlife Refuge, Alaska, coastal plain resource assessment - report and recommendation to the Congress of the United States and final legislative environmental impact statement*. U.S. Fish and Wildlife Service, U.S. Geological Survey, and Bureau of Land Management, Washington DC.
- Cooley, Paul. 2007. Personal communication with Haley Ohms OASIS Environmental, Inc. March 28, 2007.
- Department of the Interior. 2007. Federal Register Part II Endangered and Threatened Wildlife and Plants; *12-Month Petition Finding and Proposed Rule To List the Polar Bear (*Ursus maritimus*) as Threatened Throughout Its Range*; Proposed Rule. Fish and Wildlife Service. January 2007.

- _____. 2012. *National Petroleum Reserve-Alaska Integrated Area Plan/Environmental Impact Statement*. Draft. Bureau of Land Management in cooperation with North Slope Borough, State of Alaska, U.S. Bureau of Ocean Energy Management, and U.S. Fish and Wildlife Service, Anchorage, AK.
- Derocher A.E., O. Wiig, and G. Bangjord. 2000. *Predation of Svalbard reindeer by polar bears*. *Polar Biology* 23:675-678.
- Durner, G.M., S.C. Amstrup, R. Neilson, and T. McDonald. 2004. *The use of sea ice habitat by female polar bears in the Beaufort Sea*. OCS Study MMS 2004-014. Anchorage, AK: U. S. Geological Survey, Alaska Science Center.
- Garner, G.W., S.T. Knick, and D.C. Douglas. 1990. *Seasonal movements of adult female polar bears in the Bering and Chukchi seas*. *International Conference of Bear Researchers and Managers* 8:219-226.
- Garner, G.W., S.C. Amstrup, I. Stirling, and S. E. Belikov. 1994. *Habitat considerations for polar bears in the North Pacific Rim*. *Transactions of the North American Wildlife and Natural Resources Conference* 59:111-120.
- Gene Stout and Associates, and Blythe & Trousil, Inc. 2007. *Integrated Natural Resources Management Plan, Alaska Radar System, Alaska, Short and Long Range Radar Sites*. Prepared for U.S. Air Force, 611th Air Support Group, 611th Civil Engineer Squadron, Environmental Flight, Elmendorf Air Force Base, AK. Loveland, CO and Cheyenne, WY, (respectively). 158 pp. + appendices.
- Johannessen, O.M., L. Bengtsson, M.W. Miles, S.I. Kuzmina, V.A. Semenov, G.V. Alekseev, A.P. Nagurnyi, V.F. Zakharov, L.P. Bobylev, L.H. Petterson, K. Hasselmann, H.P. Cattle. 2004. *Arctic climate change: observed and modeled temperature and sea-ice variability*. *Tellus A* 56 (5), 559–560.
- Larsen, T. 1985. *Polar bear denning and cub production in Svalbard, Norway*. *J. Wildlife Management* 49:320-326.
- Lentfer, J. W. 1985. *The polar bear (*Ursus maritimus*)*. In *Marine mammals of Alaska: species accounts*. J. Burns, K. J. Frost, L. F. Lowry, eds. Marine Mammal Commission, Washington, D.C. pp. 27-30.
- McDonald, T.L., and S.C. Amstrup. 2001. *Estimation of population size using open capture-recapture models*. *Journal of Agriculture, Biological and Environmental Statistics* 6(2): 206-220.
- Miller, S. 2011. *A summary of polar bear viewing/tourism in Alaska*. Unpublished report. U.S. Fish and Wildlife Service, Anchorage, AK. 3 pp.
- Perham, Craig (USFWS). Personal communication with Haley Ohms, OASIS Environmental, Inc., June 14, 2007.
- Putnam, Chris (USFWS). 2012. Personal communication with Gene Stout, Gene Stout and Associates, March 26, 2012.
- Smith, A.E. and M.R.J. Hill. 1996. *Polar bear, *Ursus maritimus*, depredation of Canada goose, *Branta canadensis*, nests*. *The Canadian Field-Naturalist* 110:339-340.

- Smith, T.G. 1985. *Polar bears, Ursus maritimus, as predators of belugas, Delphinapterus leucas*. The Canadian Field-Naturalist 99:71-75.
- Stirling, I. and E.H. McEwan. 1975. *The caloric value of whole ringed seals (Phoca hispida) in relation to polar bear (Ursus maritimus)*. Ecology and Hunting Behavior. Can. J. Fish. Aquat. Sci. 538:1021-1027.
- Stirling, I. 1988. *Polar bears*. University of Michigan Press, Ann Arbor, Michigan. 220 p.
- _____. 1990. *Polar bears and oil: ecological perspectives*. Pages 223–34 in Geraci, J.R. and D.J. St. Aubin, eds. *Sea mammals and oil: confronting the risks*. Academic Press, San Diego, California.
- Stirling, I., N.J. Lunn, and J. Iacozza. 1999. *Long-term trends in the population ecology of polar bears in western Hudson Bay in relation to climate change*. Arctic 523:294-306.
- U.S. Department of the Interior, Minerals Management Service. 2006. *Chukchi Sea Planning Area, Oil and Gas Lease Sale 193 and seismic surveying activities in the Chukchi Sea*. Draft Environmental Impact Statement. Volume I. OCS EIS/EA MMS 2006-060. Alaska OCS Region. Pages III-77 through III-82.
- U.S. Fish and Wildlife Service. Undated. *Polar bear viewing information*. Prepared for Arctic National Wildlife Refuge, AK. Fairbanks, AK. 15 pp.

Appendix 7.0 Maps of Affected 611 ASG Sites

Figure 1. Barter Island LRRS



Figure 2. Bullen Point Former SRRS



Figure 3. Oliktok LRRS



Figure 4. Point Lonely Former SRRS

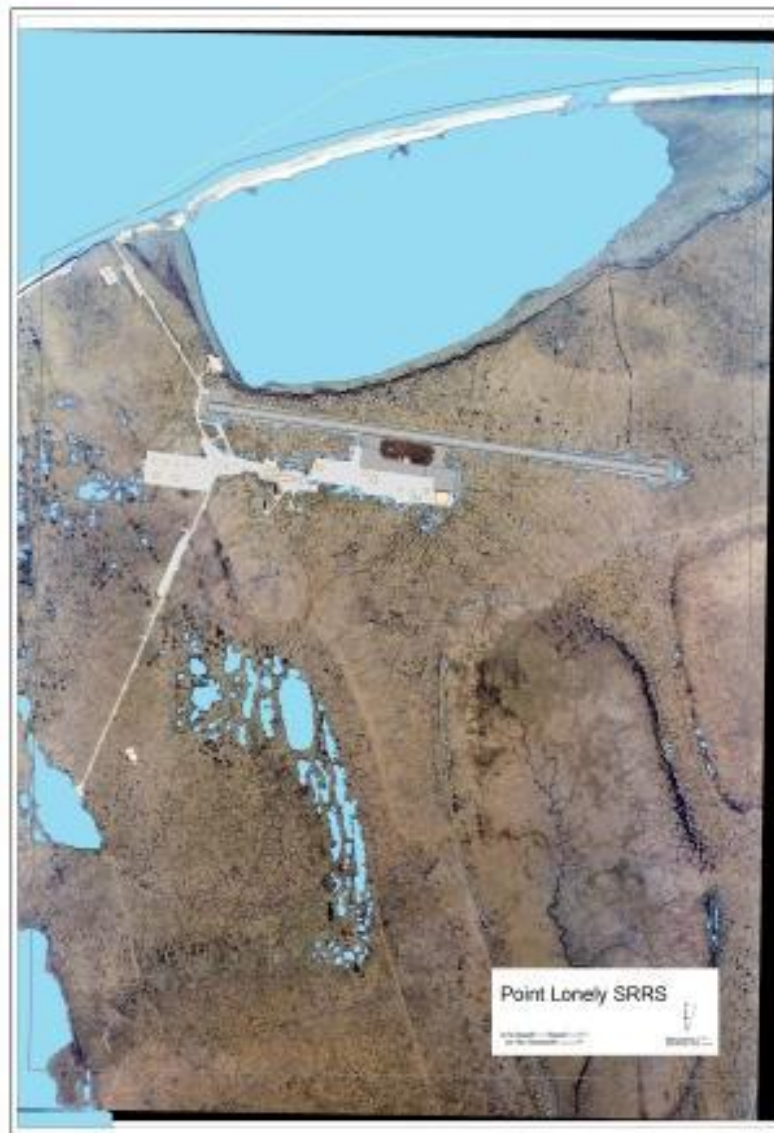


Figure 5. Point Barrow LRRS

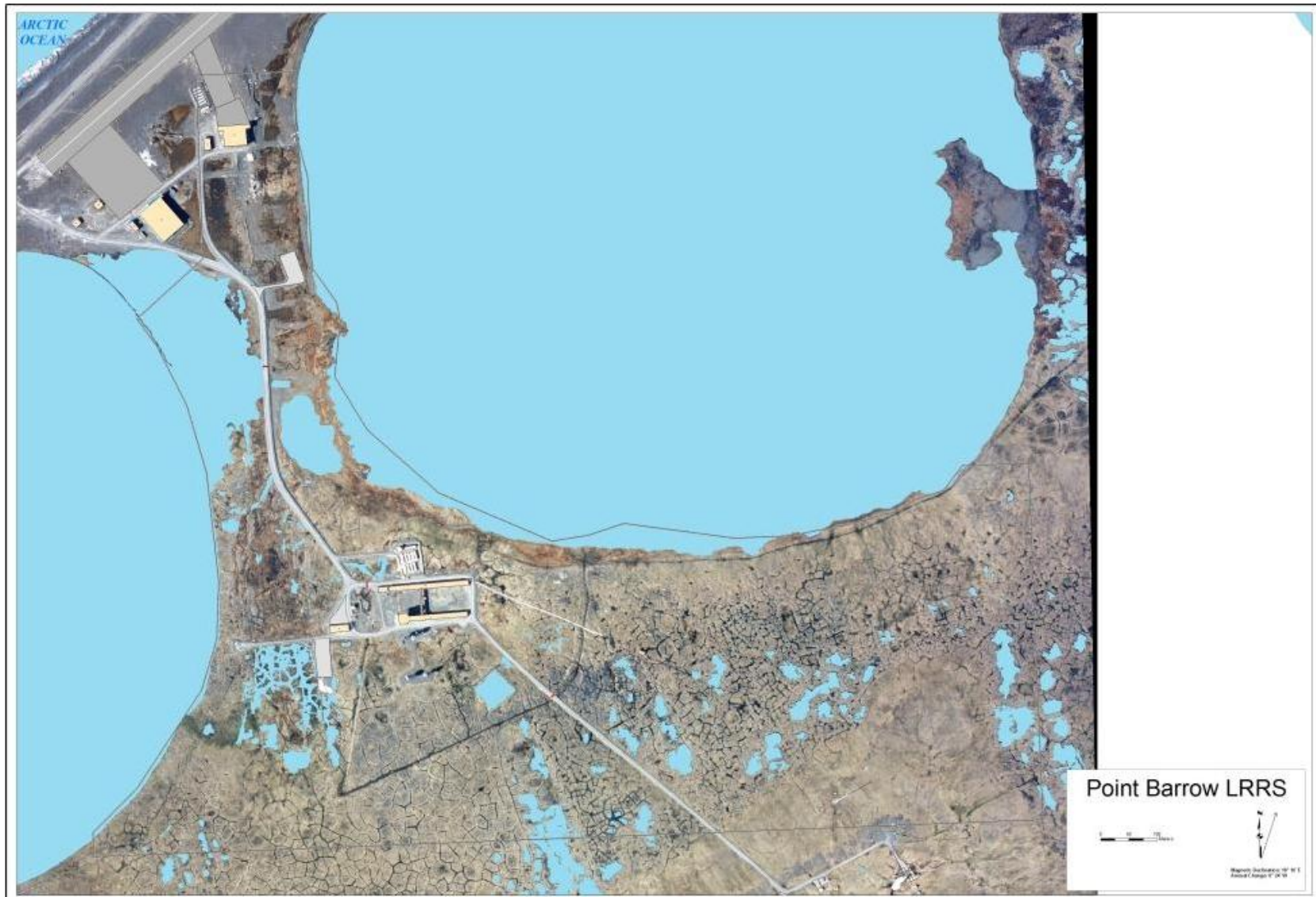


Figure 6. Wainwright Former SRRS



Figure 7. Point Lay Former LRRS



Figure 8. Cape Lisburne LRRS

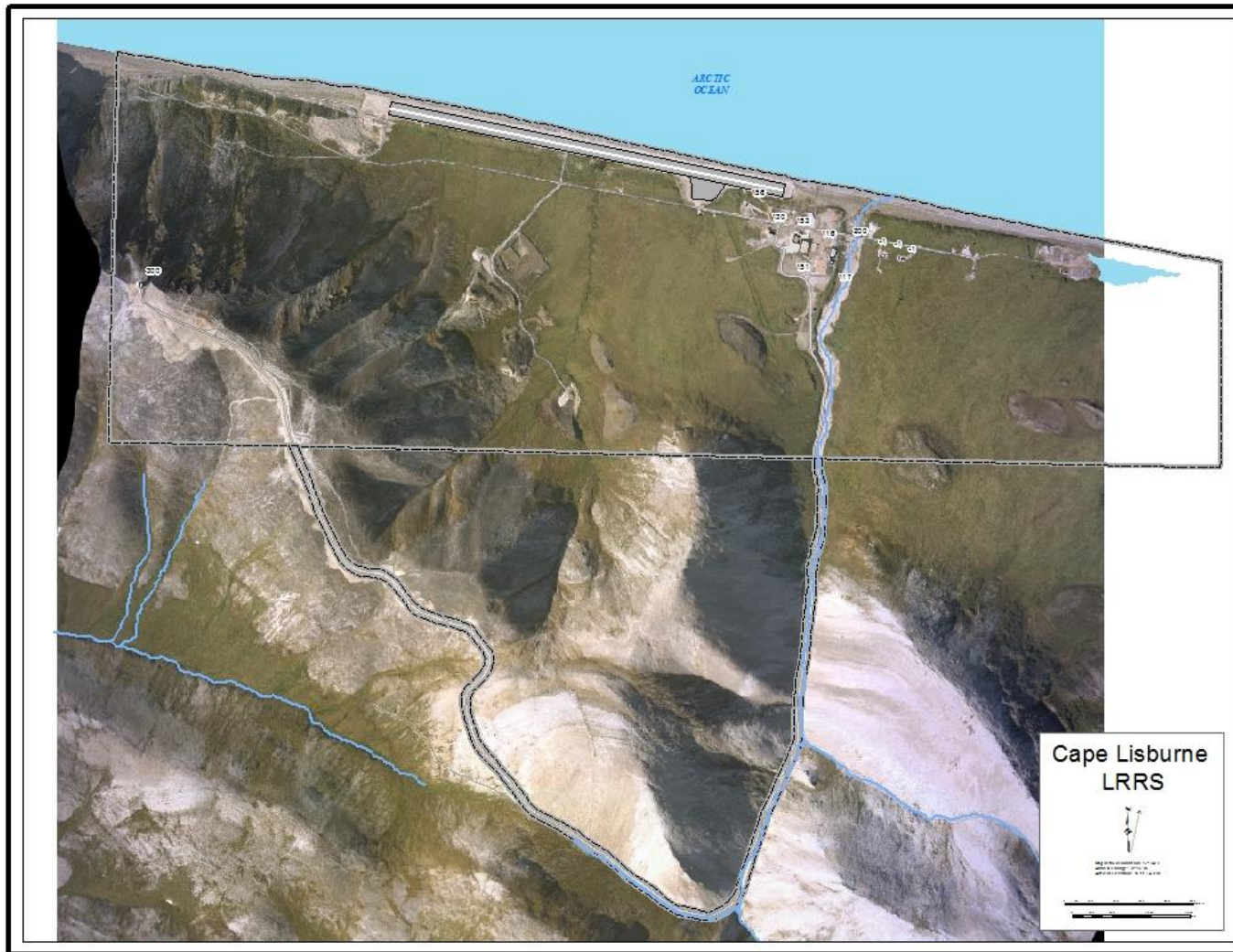


Figure 9. Kotzebue LRRS



Figure 10. Tin City LRRS

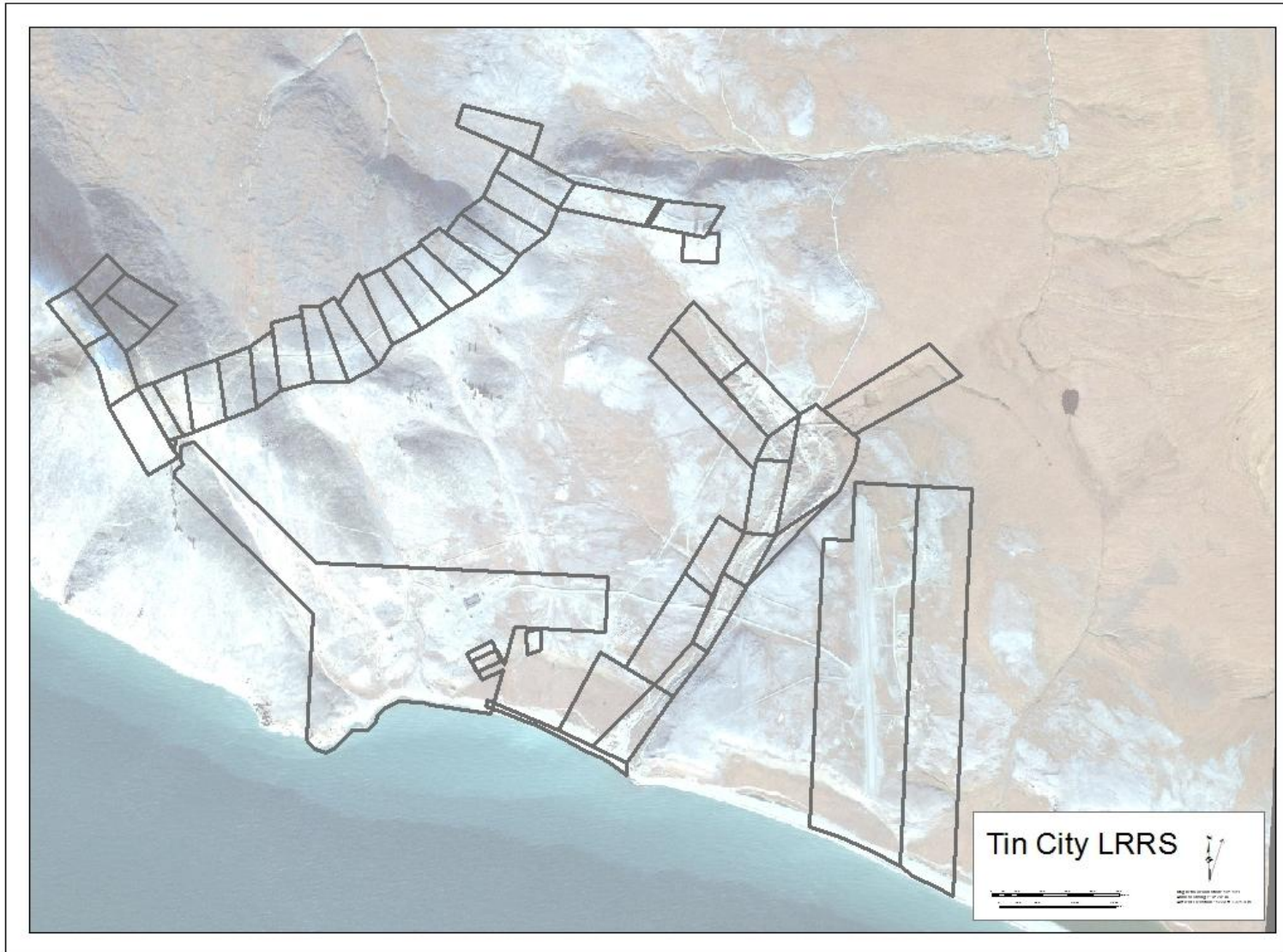


Figure 11. Nome Field POL Former Site

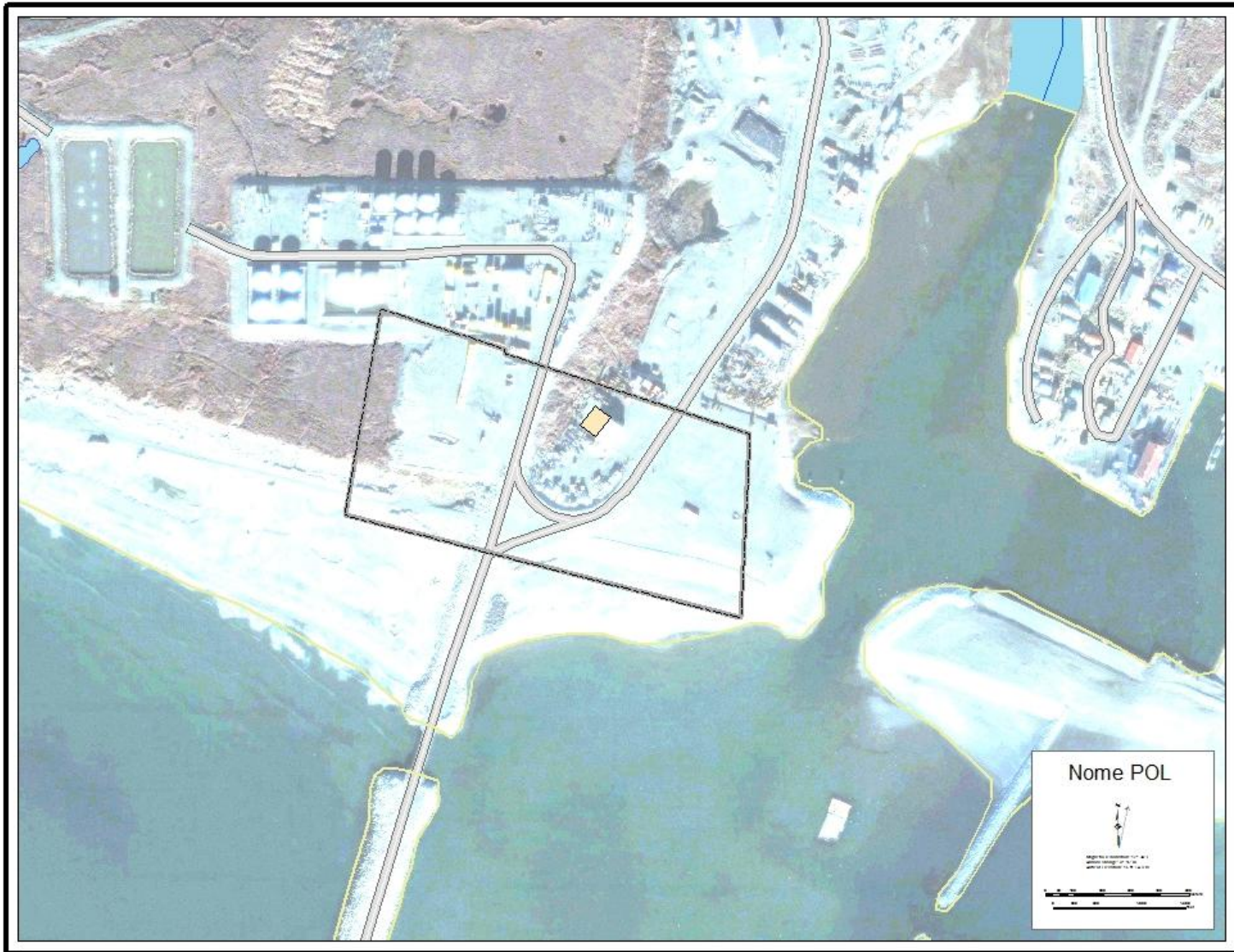


Figure 12. Anvil Mountain Former Site



Appendix 7.15. 611 ASG Project Environmental Questionnaire

611 ASG Project Environmental Questionnaire

The project questionnaire is a diagnostic tool that will identify the state and federal permit requirements and other regulatory requirements, including 611 ASG environmental policies for your project. You must answer all questions. If you answer "Yes" to any of the questions, please call the appropriate 611 ASG environmental point of contact for further instructions to avoid project delays.

A complete project packet includes accurate maps and plan drawings at scales large enough to show details, copies of your state and federal permits or permit applications, and your answers to this questionnaire.

PROJECT INFORMATION

Name
Address
City/State/Zip
Daytime Phone
E-mail Address

PROJECT POINT OF CONTACT INFORMATION

Yes No

1. This activity is a: new project modification or addition to an existing project
2. If this is a modification or an addition, do you currently have any State, federal or local approvals for this activity? Yes No

NOTE: Approval means any form of authorization. If "yes," please list below:

Approval Type	Approval #	Issuance Date	Expiration Date

PROJECT DESCRIPTION

Attach a complete and detailed narrative description of your new project or of your modification/addition including ALL associated facilities and changes to the current land or water use (if not already attached as part of an agency application). Clearly delineate the project boundaries and all property owners, including owners of adjacent land, on the site plan. The scale of the maps and plan drawings must be large enough to show pertinent details. Identify your proposed footprint or disturbed area. If this project is a modification to an approved project, identify existing facilities and proposed changes on the site plan.

Proposed starting date for project: _____ Proposed ending date for project: _____

Project Area: Please provide or attach a map of your project location and your proposed work. (Including nearest community, the name of the nearest land feature or body of water, and other legal description such as a survey or lot number.)

Nearest Community: _____

Nearest Waterbody: _____

Legal Survey Description: _____

ACCESS

Yes No

1. Is the proposed project on State-owned land or water or will you need to cross State-owned land for access? (NOTE: State land includes the land below the ordinary high water line of navigable streams, rivers and lakes, and in marine waters, below the mean high tide line seaward for three miles. State land does not include Alaska Mental Health Trust Land or University of Alaska Land.)

If you answered yes to the question above, contact the Chief, Asset Optimization, 907-552-0790 or a Realty Specialist, 907-552-8757, 907-552-5226, 907-552-3528, or 907-552-5230 for information.

MATERIALS

Yes No

- 1. Do you plan to dredge or otherwise excavate or remove materials such as rock, sand, gravel, peat, or overburden from any land regardless of ownership? Yes No
- a) Location of excavation site if different than the project site: _____ Yes No
- 2. At any one site (regardless of land ownership), do you plan any of the following? Yes No
 - Excavate five or more acres over a year's time
 - Excavate 50,000 cubic yards or more of materials (rock, sand, gravel, soil, peat, overburden, etc.) over a year's time
 - Have a cumulative, un-reclaimed, excavated area of five or more acres
- 3. Do you plan to place fill or excavated material on State-owned land? Yes No
 - a) Location of fill or material disposal site if different than the project site: _____

If you answered yes to any question above contact the 611 ASG Natural Resources Program Manager (907 522-0788) for information.

WILDLIFE AND WILDLIFE HABITAT APPROVALS

Yes No

1. Will you work in, remove water or material from, or place anything in, a stream, river or lake? (NOTE: This includes work or activities below the ordinary high water mark or on ice, in the active flood plain, on islands, in or on the face

of the banks, or, for streams entering or flowing through tidelands, above the level of mean lower low tide. If the proposed project is located within a special flood hazard area, a municipal floodplain development permit may be required. Contact the affected city or borough planning department for additional information and a floodplain determination.)

a) If yes, name of waterbody: _____

If you answered yes to the question above, contact the 611 ASG Natural Resource Manager (907 522-0788) for information.

2. Could your project result in the destruction of active bird nests or nestlings (vegetation clearing, demolition, etc.)?

If so contact the 611 ASG Natural Resources Program Manager (907 522-0788) to avoid violations of the Migratory Bird Treaty Act, Executive Order 13186, Bald and Golden Eagle Protection Act, or other laws protecting birds. Note: The DoD exemption of the Migratory Bird Treaty Act for training for military readiness does not apply to most activities on 611 ASG sites.

3. Does your project involve Point Barrow LRRS, Oliktok LRRS, or Bullen Point, Point Lay, Point Lonely, or Wainwright sites?

If so contact the 611 ASG Natural Resources Program Manager (907 522-0788) to avoid potential violations of the Endangered Species Act regarding the Steller's Eider or Spectacled Eider..

4. Does your project involve a site where polar bears or walrus or seal haulouts may be encountered?

If so, contact the 611 ASG Natural Resources Program Manager (907 522-0788) to ensure your operations are consistent with the 611 ASG Polar Bear Interaction Management Plan (including Pacific Walrus Haulout Avoidance).

5. Does your project include disturbance of natural vegetation or other activities that may involve revegetation, erosion control, or the introduction of invasive plant or animal species?

If so, contact the 611 ASG Natural Resources Program Manager (907 522-0788) to ensure your operations are consistent with 611 ASG policies and Best Management Practices for the protection of native vegetation and avoid violations of the Clean Water Act, Executive Order 13112, Military Land Withdrawal Act, Sikes Act Improvement Act, and other laws and regulations?

6. Could your project affect subsistence rights (hunting, fishing, gathering, etc.)?

If so contact the 611 ASG Natural Resources Program Manager (907 522-0788) to avoid violations of the Alaska National Interest Lands Conservation Act (ANILCA).

Yes No

HISTORY & ARCHAEOLOGY

1. Will your project disturb the ground surface?

2. Is your project taking place in a building that is 45 years old or older?

3. Will you investigate, remove, or impact historical, archaeological or paleontological resources (anything over 50 years old)?

4. Has there been a survey of ground surface and built environment affected by your project for historic properties?

If you answered yes to the questions #1, #2, or #3 or no or I don't know for #4, contact the 611 ASG Cultural Resources Program Manager (907 522-5057) for information.

WATER AND WASTE

Yes No

1. Will this project or development divert, impound, withdraw, or use any fresh water (regardless of land ownership)?

(NOTE: If you know of other water users who withdraw from the same source or any potential conflicts affecting this use of water, contact the Water Section. If you are obtaining water exclusively from either an existing Public Water Supply or from a rainwater catchment system, you are not required to contact the DNR Water Section regional office.)

a) Check all points-of-withdrawal or water sources that apply:

- Stream or Lake (name): _____
- Well
- Rain catchment system
- Other: _____

b) Intended use(s) of water: _____

c) Amount (maximum daily, not average, in gallons per day): _____

d) Is the point of water withdrawal on property you own?

2. Do you plan to build or alter a dam (regardless of land ownership)?

If you answered yes to any above question, contact the 611 ASG Natural Resources Manager (907 522-0788) for information.

3. Will the proposed project have a discharge to any waters?

- a) Will a discharge of non-domestic wastewater to lands, waters, or the subsurface of the state occur? (NOTE: Non-domestic wastewater includes wastewater from commercial or industrial facilities, excavation projects, wastewater from man-made containers or containment areas, or any other non-domestic wastewater disposal activities see 18 AAC 72.990 for definitions.)
- b) Will a discharge of domestic wastewater or septage to lands, waters or the subsurface of the state occur? (see 18 AAC 72.990 for definitions.)
- c) Will the wastewater disposal activity require a mixing zone or zone of deposit to meet Water Quality Standards (WQS)? (Many disposal activities require a mixing zone to meet WQS, contact DEC if unsure.)
- d) Will the project include a stormwater collection/discharge system?
- e) Will the project include placing fill in wetlands?
- f) Is the surrounding area inundated with water at any time of the year?
- g) Do you intend to construct, install, modify or use any part of a domestic or non-domestic wastewater treatment or disposal system?
- 4. Does your project qualify for a general permit for wastewater?
- 5. Will you dispose of sewage sludge?
- 6. Will construction of your project disturb 1 or more acres of soil? (NOTE: This applies to the total amount of land disturbed, even if disturbance is distributed over more than one season, and also applies to areas that are part of a larger common plan of development or sale.
- 7. Is your project an industrial facility that will have stormwater discharge directly related to industrial activities as described in the State of Alaska ADPES Multi-Sector General permit. If you answered yes to c) or d), your project may require an APDES Stormwater permit

If you answered yes to any question above, contact the 611 ASG Environmental Compliance Manager (907 522-4151) for information.

- 8) Will any sewage solids or biosolids be disposed of or land-applied to the site? (NOTE: Sewage solids include wastes that have been removed from a wastewater treatment plant system, such as a septic tank lagoon dredge, or wastewater treatment sludge that contain no free liquids. Biosolids are the solid, semi- solid or liquid residues produced during the treatment of domestic septage in a treatment works which are land applied for beneficial use.) ..
- 9. Will your project require application of oil, pesticides, and/or any other broadcast chemicals?
- 10. Does your project qualify for a general permit for solid waste?

If you answered yes to questions 3 through 10 above, contact the 611 ASG Environmental Compliance Manager (907 522-4151) for information.

AIR QUALITY

- | | Yes | No |
|--|--------------------------|--------------------------|
| 1. Will you have an asphalt plant designed to process no less than five tons per hour of product? | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Will you have a thermal remediation unit with a rated capacity of at least five tons per hours of untreated material? .. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Will you have a rock crusher with a rated capacity of at least five tons per hour? | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Will you have one or more incinerators with a cumulative rated capacity of 1,000 pounds or more per hour? | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Will you have a facility with the potential to emit no less than 100 tons per year of any regulated air contaminant?..... | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Will you have a facility with the potential to emit no less than 10 tons per year of any hazardous air contaminant or 25 tons per year of all hazardous air contaminants?..... | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Will you be constructing a new stationary source with a potential to emit greater than: | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> 15 tons per year (tpy) of PM-10 | | |
| <input type="checkbox"/> 40 tpy of nitrogen oxides | | |
| <input type="checkbox"/> 40 tpy of sulfur dioxide | | |
| <input type="checkbox"/> 0.6 tpy of lead; or | | |
| <input type="checkbox"/> 100 tpy of CO within 10 km of a nonattainment area | | |
| 8. Will you be commencing construction or (if not already authorized under 18 AAC 50) relocating an emission unit with a rated capacity of 10 million Btu or more per hour in a sulfur dioxide special protection area established under 18 AAC 50.025? | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Will you be commencing a physical change to or a change in the method of construction of an existing stationary source with a potential to emit an air pollutant greater than an amount listed in g) that will cause for that pollutant an emission increase (calculated at your discretion) as either an increase in potential to emit that is greater than: | <input type="checkbox"/> | <input type="checkbox"/> |

- 10 tpy of PM-10
- 10 tpy of sulfur dioxide
- 10 tpy of nitrogen oxides; or
- 100 tpy of CO within 10 km of a nonattainment area; or

actual emissions and a net emissions increase greater than:

- 10 tpy of PM-10
- 10 tpy of sulfur dioxide
- 10 tpy of nitrogen oxides; or
- 100 tpy of CO within 10 km of a nonattainment area

10. Will you be commencing construction or making a major modification of a Prevention of Significant Deterioration stationary source under 18 AAC 50.306?

11. Will you be commencing construction or making a major modification of a nonattainment area major stationary source under 18 AAC 50.311?

12. Will you be commencing construction or reconstructing a major stationary source under 18 AAC 50.316, for hazardous air pollutants? Definition of Regulated Air Pollutants can be found at <http://www.epa.gov/ttn/oarpg/t5/memoranda/rapdef.pdf>

If you answered yes to any questions above, contact the 611 ASG Environmental Compliance Manager (907 522-7303) for information.

■ FEDERAL APPROVALS

Yes No

U.S. ARMY CORPS OF ENGINEERS (USACE)

1. Will you discharge dredged and/or fill material or perform dredging activities in waters of the U.S? Section 404 of the Clean Water Act requires that a Department of the Army permit be obtained for the placement or discharge of dredged and/or fill material into waters of the U.S., including wetlands (33 U.S.C. 1344). (*Your application to the USACE would also serve as application for DEC Water Quality Certification.*)

2. Will you place fill or structures or perform work in waters of the U.S? Section 10 of the Rivers and Harbors Act of 1899 requires that a Department of the Army permit be obtained for structures or work in or affecting navigable waters of the U.S. (33 U.S.C. 403) (*Waters of the U.S. include marine waters subject to the ebb and flow of the tide, rivers, streams, lakes tributaries, and wetlands. If you are not certain whether your proposed project is located within a wetland, contact the USACE Regulatory Division to request a wetlands determination. For additional information about the Regulatory Program, visit www.poa.usace.army.mil/reg*)

If you answered yes to any of the questions above, contact the 611 ASG Natural Resource Manager (907 522-0788) for information.

BUREAU OF LAND MANAGEMENT (BLM)

Yes No

1. Is the proposed project located on BLM land, or will you need to cross BLM land for access?

If you answered yes to the question above, the 611 ASG Natural Resource Manager (907 522-0788) for information.

U.S. COAST GUARD (USCG)

Yes No

1. Do you plan to construct a bridge or causeway over tidal (ocean) waters, or navigable rivers, streams or lakes?

2. Does your project involve building an access to an island?

If you answered yes to any question above, contact the 611 ASG Environmental Compliance Manager (907 522-4151) for information.

Yes No

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

1. Will the proposed project have a discharge to any waters?

2. Will you dispose of sewage sludge?

3. Will construction of your project disturb 1 or more acres of soil? (*NOTE: This applies to the total amount of land disturbed, even if disturbance is distributed over more than one season, and also applies to areas that are part of a larger common plan of development or sale.*)

4. Is your project an industrial facility that will have stormwater discharge directly related to industrial activities as described in the State of Alaska ADPES Multi-Sector General permit. If you answered yes to c) or d), your project may

require an APDES Stormwater permit

If you answered yes to any question above, contact the 611 ASG Environmental Compliance Manager (907 522-4151) for information.

Yes No

FEDERAL AVIATION ADMINISTRATION (FAA)

1. Is your project located within five miles of any public airport?

2. Will you have a waste discharge that is likely to decay within 5,000 feet of any public airport?

If you answered yes to any question above, contact the 611 ASG Natural Resource Manager (907 522-0788) for information.

U.S. FOREST SERVICE (USFS)

Yes No

1. Does the proposed project involve construction on USFS land?

2. Does the proposed project involve the crossing of USFS land with a water line?

If you answered yes to any question above, contact the 611 ASG Natural Resource Manager (907 522-0788) for information.

U.S. FISH AND WILDLIFE SERVICE (USFWS)

Yes No

1. Is your proposed project on land managed by the USFWS?

2. Does your project require a Right of Way from the USFWS under 50 C.F.R. 29 and 50 C.F.R 36?

If you answered yes to any question above, contact the 611 ASG Natural Resource Manager (907 522-0788) for information.

OTHER FEDERAL AGENCY APPROVALS

Yes No

19. Have you applied for any other federal permits or authorizations?

.....

Agency	Approval Type	Date Submitted

Note: You may need additional permits from other agencies or the affected city and borough government to proceed with your activity. Attach the documentation requested under the Project Description.

Appendix 8.2. INRMP Goals, Objectives, Inhouse Actions, and Projects

The below list of chapters 7 and 9 (Action/Project discussion) and Chapter 8 (*goals, objectives*, inhouse actions, and projects) is presented in the order they appear in this INRMP.

Chapters 7, 8, and 9 Sections	Sections/Goals/Objectives/Inhouse Actions, and Projects	Implementation Year				
		Indefinitely /Annually/ Ongoing/ As Needed	13	14	15	16
7.2, 8.2.1	Ecosystem Management					
	Goal 1: Implement Ecosystem Management as the overall management system to ensure sustained ecosystem functionality on 611 ASG sites.					
	<i>Objective 1.1: Manage land use to sustain 611 ASG sites' natural resources in concert with military mission requirements.</i>					
	Use adaptive management principles to manage 611 ASG natural resources, using ecosystem monitoring to guide management actions.	X				
	Promote biodiversity via the use of native species, protection of sensitive areas, and restrictions on activities that negatively affect biodiversity.	X				
	<i>Objective 1.2: Use coordinated planning to fully integrate the 611 ASG sites natural resources program.</i>					
	Project: Plan Update INRMP, Alaska Remote Sites. Review and update of this INRMP annually (except during time of major revision) using INRMP goals, objectives, inhouse actions, and projects to guide reviews; revise projects and budgets as required; coordinate significant changes with the USFWS, ADFG, and if necessary NMFS.			X	X	X
	Project: Plan Update INRMP, Alaska Remote Sites. Implement the five year revision/ update of the 611 ASG INRMP with the goal of completion for implementation in 2018; coordinate update with USFWS, ADFG, NMFS, BLM, and other partners.					X
7.3, 8.2.2	Geographic Information System					
	Goal 2: Provide spatial products and analyses to support 611 ASG natural resources program implementation.					
	<i>Objective 2.1: Implement GIS through use of the 611 CES GeoBase program.</i>					
	Use GeoBase analyses and products to support natural resources management.	X				
	Coordinate and exchange data with the Joint Base Elmendorf-Richardson GeoBase program.	X				
	Establish priorities for collecting and entering GIS data into the 611 CES GeoBase geodatabase and conduct data development.	X				

Chapters 7, 8, and 9 Sections	Sections/Goals/Objectives/Inhouse Actions, and Projects	Implementation Year					
		Indefinitely /Annually/ Ongoing/ As Needed	13	14	15	16	17
	Ensure contracts to outside agencies or contractors require that any spatial data developed be incorporated into a compatible GIS format.	X					
	Solicit partnering agencies for additional relevant natural resources data layers.	X					
	Use GeoBase databases to respond to USAF data calls.	X					
	Provide change analyses maps and data to monitor ecosystem changes.	X					
	Ensure GIS coverage supports presentation of natural resources in E-Plan INRMP.	X					
7.4, 8.2.3	Fish and Wildlife Management						
	Goal 3: Maintain fish and wildlife populations and habitats as a part of naturally functioning ecosystems to support the military mission and enhance readiness by providing natural environments for training and minimizing conflicts between mission requirements and natural resources and their uses.						
	<i>Objective 3.1: Protect, conserve, and manage fish and wildlife and their habitats as vital elements of an integrated natural resources program and perform studies to enhance and maintain healthy sustainable populations.</i>						
	Cooperate with the Alaska Landbird Monitoring System (as needed).Conserve migratory bird populations through implementation of DoD Partner’s in Flight strategies.	X					
	Implement requirements of Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, as established in the MOU between DoD and the USFWS.	X					
	Implement requirements of the Final Rule – Migratory Bird Permits; Take of Migratory Birds by Department of Defense.	X					
	Discourage raven use of Point Barrow, Oliktok, and Barter Island LRRSs and Wainwright and Bullen Point former SRRSs to protect indigenous, ground-nesting birds in the immediate area that are particularly vulnerable to raven predation.	X					
	Use guidelines discussed in Section 7.4.4, Migratory Birds to minimize Brant disturbance at Oliktok LRRS.	X					
	Minimize disturbance to seabird colonies from quarry blasting, minimize the spread of debris from facilities, and reduce or eliminate the disturbance of seabird colonies by approaching and departing aircraft at Cape Lisburne LRRS.	X					
	Educate pilots about the sensitive nature of breeding seabird colonies and haulout sites in the Cape Newenham area and discourage them from approaching too closely to haulout and nesting areas.	X					

Chapters 7, 8, and 9 Sections	Sections/Goals/Objectives/Inhouse Actions, and Projects	Implementation Year					
		Indefinitely /Annually/ Ongoing/ As Needed	13	14	15	16	17
	Maintain and update species lists as studies provide new information.	X					
	Support Christmas Bird Counts on Eareckson AS, if volunteers are available.	X					
	Provide bird monitoring information for use in generating the Bird Avoidance Model.	X					
	Provide reminders prior to expected increases in wildlife activities at Cape Romanzof and Tin City LRRSs. The notices will be originated by the Natural Resource Program Manager and provided through the Alaska Radar System Program Management Office to BOS contract personnel per 611 ASG Bird/Wildlife Hazard Working Group instructions.	X					
	Limit use of dock lights at Eareckson AS to only those times when necessary for barge loading/ off-loading operations that must be performed after dark to protect Leach's Storm-Petrels. Evaluate if directional lighting could be used to modify or restrict the area of illumination as necessary to minimize bird attraction (Leach's Storm-Petrels).	X					
	Integrate wildlife/habitat issues into land-use planning and decision-making processes.	X					
	Minimize fragmentation by promoting natural landscapes and connectivity of habitats.	X					
	Monitor installations for potential revegetation sites and monitor results of revegetation projects.	X					
	Pursue all actions available to increase visibility, decrease perching suitability, and potentially reduce avian species collisions with wind turbines by addressing issues such as turbine height, tower design, and color patterns of the rotors.	X					
	Project: Management, Habitat, Native Ecosystems (ARS). Conduct ecosystem monitoring to detect habitat changes on active LRRSs. Compare results with previous monitoring for 2000-2002 (Schick <i>et al.</i> 2004), for 2005-2008 (Wells <i>et al.</i> 2010), and that conducted for this INRMP to monitor changes in the quality of the ecosystem to determine impacts of site operations at these sites.		X				
	Project: Management, Habitat, Native Ecosystems (EAS & KS). Conduct ecosystem monitoring to detect habitat changes on Eareckson AS and King Salmon Airport. Compare results with previous monitoring for 2000-2002 (Frost <i>et al.</i> 2005a and 2005b), for 2005-2008 (Roth and Macander 2009, Wells <i>et al.</i> 2010), and that conducted for this INRMP to monitor changes in the quality of the ecosystem to determine the impact of site operations at these sites.			X			
	Project: Management, Habitat, Native Ecosystems. Conduct ecosystem monitoring to detect habitat changes	2021 Information					

Chapters 7, 8, and 9 Sections	Sections/Goals/Objectives/Inhouse Actions, and Projects	Implementation Year					
		Indefinitely /Annually/ Ongoing/ As Needed	13	14	15	16	17
	on Eareckson AS, King Salmon Airport, and active LRRSs. Compare results with previous monitoring for 2000-2002 (Frost <i>et al.</i> 2005a and 2005b, Schick <i>et al.</i> 2004), for 2005-2008 (Roth and Macander 2009, Wells <i>et al.</i> 2010), that conducted for this INRMP, and those conducted by above two projects to monitor changes in the quality of the ecosystem to determine the impact of site operations at these sites.	only					
	Project: Management, Species, Arctic Fox. Continue a study from 2008 on the condition of foxes on Shemya Island and investigate their generally poor health. The work will include additional analysis of samples already obtained, histology of teeth and jaw tissues, assessment of genetic diversity, and screening of tissues for possible environmental contaminants that were identified in 2008 project. Additional field study is also necessary to determine causes of these pathologic conditions and to identify measures that will improve fox health.				X		
	Project: Management, Species, Migratory Bird Protection. Conduct surveys of wildlife at Shemya including Emperor Geese, threatened Steller's Eiders, and other winter waterfowl and seabirds, as well as threatened sea otters and endangered Steller sea lions and Arctic foxes to compare populations with historic counts funded by the Legacy Program and more recent surveys.		X	X	X	X	X
	Project: Management, Invasive Species. Eradicate rats and ensure measures to prevent rat re-introduction are implemented.		X	X	X	X	X
	Project: Update Wildlife Hazard Management Plan. Update the Wildlife Hazard Management Plan and present it to the Bird Hazard Working Group for review and approval.	2020 Information only					
	Objective 3.2: Minimize human-wildlife conflicts at 611 ASG sites.						
	Reduce human-wildlife conflicts with large, potentially dangerous animals, particularly polar bears, through an aggressive program of public education, garbage management, and enforcement	X					
	Implement and update the Polar Bear Interaction Management Plan.	X					
	Conduct aversive conditioning of nuisance or dangerous wildlife and monitor results.	X					
	Discourage arctic ground squirrel presence and burrowing activity damages to airfields, helipads, and other fill areas.	X					
7.5, 8.2.4	Management of Threatened and Endangered Species						
	Goal 4: Conserve and maintain self-sustaining populations of threatened and endangered species and species of special concern, consistent with military policy, mission sustainability, and carrying capacity of						

Chapters 7, 8, and 9 Sections	Sections/Goals/Objectives/Inhouse Actions, and Projects	Implementation Year				
		Indefinitely /Annually/ Ongoing/ As Needed	13	14	15	16
	the ecosystem; and avoid jeopardizing the continued existence of threatened and endangered species within 611 ASG sites.					
	<i>Objective 4.1: Maintain mission flexibility through the conservation and management of federal and state-listed species and species of special concern.</i>					
	Protect and conserve endangered and threatened species and species of special concern and their critical habitat.	X				
	Coordinate with the USFWS and implement recommendations for Spectacled and Steller's Eiders (USFWS 2004b) to the best of its capability.	X				
	As lighting is upgraded at 611 ASG sites, there will be considerations to install green lights and/or to either shield lights or orient them downward to minimize bird hazard risks.	X				
	Coordinate with NMFS in the event a project may affect a marine threatened and endangered species under its jurisdiction.	X				
	Protect suitable nesting habitat for Kittlitz's Murrelet at active sites where the species is known to nest.	X				
	Protect populations of Arctic springbeauty, wormwood, Chukchi primrose, and Barneby's milkvetch at active sites where the species are known to exist.	X				
	Consider the use of National Bald Eagle Guidelines (USFWS 2007e) in any actions that might affect eagle nests on or near 611 ASG sites.	X				
	In the unlikely event that take of eagles or removal of eagle nests become necessary, apply for a take/removal permit by coordinating with USFWS for technical assistance in assembling the permit application.	X				
	Review available surveys and documents on the presence or absence of federal- and state-protected species.	X				
	Protect and monitor species of special concern to the best extent possible considering budget and military mission requirements.	X				
	Project: Management, Species, Threatened Eider. Conduct threatened Eider inventory and monitoring at Bullen Point, Point Lonely and Wainwright former SRRSs; Point Lay former LRRS; Point Barrow and Oliktok LRRSs, and other sites where these birds potentially occur. This project surveys for the presence, habitats, seasonal use, and nesting locations of these birds.		X			X
	Project: Management, Species, Species, Steller Sea Lion. Conduct survey 611 ASG sites that have Endangered Steller sea lions as well as identify Proposed for Listing ringed and bearded seals, sea otter, and Pacific walrus. These species need to be surveyed for ongoing operations and cleanup of coastal 611 sites. Project will also determine haulout sites for walruses and seals on 611			X		

Chapters 7, 8, and 9 Sections	Sections/Goals/Objectives/Inhouse Actions, and Projects	Implementation Year				
		Indefinitely /Annually/ Ongoing/ As Needed	13	14	15	16
	ASG sites and sites used by sea otters and sea lions. Besides determining potential sensitive sites that need to be managed for candidate and proposed for listing species, changes in haulout sites may be used as a baseline for monitoring effects of loss of sea ice.					
7.6, 8.2.5	Water Resources Protection					
	Goal 5: Comply with the Clean Water Act and other environmental laws and regulations by protecting water resources on 611 ASG sites.					
	<i>Objective 5.1: Maintain clean water as a critical part of ecosystem management.</i>					
	Provide support for IRP and related projects to minimize erosion and related water quality degradation.	X				
	Provide guidance to limit activities that may affect site watersheds.	X				
	Control ATV use to protect surface water resources.	X				
7.7, 8.2.6	Wetland and Flood Plain Protection					
	Goal 6: Protect and conserve wetland and riparian resources on 611 ASG sites.					
	<i>Objective 6.1: Ensure 611 ASG is in compliance with all applicable federal and state laws and regulations regarding wetlands.</i>					
	Ensure all projects that may affect wetlands are coordinated with the Natural Resources Manager .	X				
	Minimize impacts to wetlands through application of the Environmental Impact Analysis Process.	X				
	Ensure on-the-ground wetland verification occurs during the planning process to ensure protection of small wetlands is not overlooked.	X				
	Follow the permitting process of Section 404 of the Clean Water Act to allow the 611 ASG to mitigate unavoidable damage to wetlands during military or operations activities.	X				
	Comply with Alaska water quality standards and land use permit requirements regarding wetlands (as needed). Update wetland mapping and change analyses as new NWI data become available.	X				
	<i>Objective 6.2: Evaluate flood hazard potential for 611 ASG sites, and if such hazards exist, determine 100-year flood plains for such sites.</i>					
	Use flood plain maps and analyses (Legare 1998, U.S. Army Corps of Engineers 1998) in planning activities and construction in site flood plains.	X				
	Prepare FONPAs before actions within flood plains .	X				
7.8, 8.2.7	Grounds Maintenance, including Revegetation and Erosion Control					
	Goal 7: Conserve soil and vegetative resources on 611 ASG sites to comply with the Clean Water Act and the					

Chapters 7, 8, and 9 Sections	Sections/Goals/Objectives/Inhouse Actions, and Projects	Implementation Year				
		Indefinitely /Annually/ Ongoing/ As Needed	13	14	15	16
	Sikes Act.					
	Objective 7.1: Manage soil and vegetative resources on 611 ASG sites with a focus on soils conservation as the foundation of other natural resources.					
	Control or eliminate runoff and erosion through sound vegetative and land management practices (ongoing). Correct drainage problems that may lead to erosion along roads, particularly during routine maintenance activities.	X				
	Minimize impacts to vegetation resources on sites. Avoid vegetation clearing during times within the Recommended Time Periods for Avoiding Vegetation Clearing in Alaska in order to Protect Migratory Birds (USFWS 2005) to protect migratory birds (ongoing). Ensure vegetation management is consistent with and supports BASH Reduction goals.	X				
	Use updated guidance, professional advice from other agencies, and native species for revegetation of sites.	X				
	Whenever possible, do not disturb tundra vegetation.	X				
	Utilize site-specific reseeding recommendations, when available.	X				
	Implement the biosecurity plan (when completed) to minimize threats from exotic plant species.	X				
	Obtain USAF, USFWS, and ADFG approval prior to the introduction of exotic plants on installations.	X				
	Objective 7.2: Perform grounds maintenance and landscaping operations consistent with natural resource goals and objectives.					
	Ensure grounds maintenance activities protect soils from wind and water erosion.	X				
	Ensure grounds maintenance activities preserve and protect wetlands, flood plains, wildlife habitat, and minimize pollution.	X				
	Restrict mowing to areas where tall vegetation causes safety concerns or impacts the primary mission, such as along roadways, airport facilities, and buildings.	X				
	Maintain habitat as grassland at Indian Mountain, Tatalina, and Sparrevohn LRRSs to limit shrubs and trees that could obscure sighting moose, caribou or bear.	X				
7.9, 8.2.8	Integrated Pest Management					
	Goal 8: Provide a well-planned and executed pest management program to ensure that pests do not hinder completion of the 611 ASG mission.					
	Objective 8.1: Comply with the federal Insecticide, Fungicide, and Rodenticide Act and DoD and Air Force policies minimizing the use of pesticides.					
	Provide natural resource-based technical support for general pest management on 611 ASG sites.	X				
	Minimize damage to facilities from swallows, especially at Indian Mountain and Sparrevohn LRRSs.	X				

Chapters 7, 8, and 9 Sections	Sections/Goals/Objectives/Inhouse Actions, and Projects	Implementation Year					
		Indefinitely /Annually/ Ongoing/ As Needed	13	14	15	16	17
	Whenever possible, conduct nest-removing activities during non-nesting periods. If required during nesting periods, obtain necessary permits.	X					
7.10, 8.2.9	BASH						
	Goal 9: Manage natural resources in cooperation with the USFWS, ADFG, and the 611 ASG Bird Hazard Working Group to reduce the potential for bird and animal strikes during airfield operations on 611 ASG sites.						
	<i>Objective 9.1: Obtain and provide natural resources scientific information to reduce the potential for bird and animal strikes.</i>						
	Provide natural resources representation to the BASH Hazard Working Group to monitor and advise the group of environmental modification and conditions that affect BASH potential.	X					
	Provide support in obtaining federal and state permits required for the minimization of wildlife threats to aircraft safety.	X					
	Provide guidance and support for biological monitoring of wildlife populations, bird migration activity, and habitat management to improve technical advice for wildlife and vegetation management programs.	X					
	Identify aircraft strike hazards and evaluate deterrent/control techniques that may help reduce hazards.	X					
	Provide guidance and support for operations conducted regarding habitat modifications to make airfield habitats less attractive to birds and wildlife.	X					
	Use studies to provide provided data for the Bird Avoidance Model.	X					
	Manage arctic fox populations on Eareckson AS to provide population control of ground-burrowing nesting birds by preying on their eggs, young, and in some cases, adults.	X					
	Implement operations and grounds maintenance results of studies at King Salmon Airport involving bird migration peaks and grass cutting to minimize BASH risks.	X					
	Annually review the Alaska Department of Transportation wildlife hazard management plan for King Salmon Airport; implement plan recommendations; and recommend modifications to the plan, if needed.	X					
	Use airfield habitat modifications, garbage management, and large animal hazing, as needed, to minimize BASH risks at remote radar sites.	X					
7.11, 8.2.10	Outdoor Recreation and Related Land Use						
	Goal 10: Manage natural resources to provide subsistence and outdoor recreational opportunities, as appropriate.						
	<i>Objective 10.1: Provide a diversity of quality outdoor</i>						

Chapters 7, 8, and 9 Sections	Sections/Goals/Objectives/Inhouse Actions, and Projects	Implementation Year				
		Indefinitely /Annually/ Ongoing/ As Needed	13	14	15	16
	<i>recreation opportunities for military personnel and the public consistent with supporting the military mission while also maintaining ecosystem health and sustainability.</i>					
	Implement Executive Order 13443, <i>Facilitation of Hunting Heritage and Wildlife Conservation</i> and Executive Order 12962, <i>Recreational Fisheries</i> to facilitate the expansion and enhancement of hunting and fishing opportunities, consistent with military mission requirements.	X				
	Provide human-valued products of renewable natural resources when such products can be produced in a sustainable fashion without significant negative impacts on the military mission.	X				
	Implement 611 ASG polices for recreational access and weapons control to sites.	X				
	Conduct on-the-ground monitoring to assess impacts from recreational use on the environment and recreational facilities adequacy.	X				
	Implement off-road vehicle use restrictions on 611 ASG sites.	X				
	Provide appropriate wildlife safety information to recreational users, including provisions within the Polar Bear Interaction Management Plan (Appendix 7.4.5).	X				
	<i>Objective 10.2: Support subsistence activities on or in the vicinity of 611 ASG sites, consistent with supporting the military mission.</i>					
	Provide opportunities for subsistence activities to the best degree possible, considering military mission requirements.	X				
	Ensure that biodegradable wastes are buried and non-biodegradable wastes and equipment are removed along with personal gear upon breaking camp following herring fishing season activities at Cape Romanzof LRRS.	X				
7.12, 8.2.11	Cultural Resources Protection					
	Goal 11: Protect cultural resources on 611 ASG lands.					
	<i>Objective 11.1: Implement this INRMP in a manner consistent with the protection of cultural resources on 611 ASG sites.</i>					
	Ensure appropriate review of natural resource management projects by the Cultural Resources Manager to ensure that adverse effects to archeological sites are avoided.	X				
	Implement natural resources management aspects of 611 ASG Integrated Cultural Resources Management Plans.	X				
7.13, 8.2.12	Public Outreach and Natural Resources Education					
	Goal 12: Implement a public outreach and environmental education program appropriate for					

Chapters 7, 8, and 9 Sections	Sections/Goals/Objectives/Inhouse Actions, and Projects	Implementation Year				
		Indefinitely /Annually/ Ongoing/ As Needed	13	14	15	16
	remote 611 ASG sites.					
	Objective 12.1: Provide natural resources outreach, awareness, and education to 611 ASG inhouse and contract personnel and the general public.					
	Use Restoration Advisory Boards to provide information relative to natural resources in the area.	X				
	Provide educational materials to site personnel and site visitors, as appropriate for each site.	X				
	Ensure site personnel and visitors in polar bear regions are aware of polar bear dangers and means to minimize these risks.	X				
	If opportunities present, provide natural resources informal briefings to site personnel.	X				
	Project: Outreach. Provide educational materials to the general public and other interested parties external to the 611 ASG. This project also includes support for cultural resources public outreach.		X	X	X	X
	Project: Training, Others. Base personnel (non-environmental) requiring training to support environmental compliance program objectives. Support the Alaska Forum for the Environment, which includes invasive species, listed species, Coastal America issues, and similar programs.		X	X	X	X
	Objective 18.2: Provide for necessary supplemental training for natural resources personnel to ensure the proper and efficient management of 611 ASG natural resources per DoDI 4715.03, Enclosure 3, 1.I.					
	Project: Training, Environmental Function. Provide for the maintenance of staff knowledge of management strategies at the current state of the art through training and participation in workshops, research presentations, and other activities of regional and national professional natural resources research and conservation programs; and by sharing information with natural resources experts to ensure maximum benefits of adaptive management and research efforts.		X	X	X	X
7.14, 8.2.13	Installation Restoration Program, Demolition Program, and Related Concerns					
	Goal 13: Minimize effects of Installation Restoration Program and related projects on natural resources on 611 ASG sites.					
	Objective 13.1: Provide natural resources management support for Installation Restoration Program and related projects.					
	Review construction, demolition, and remediation plans and Air Force Certificates of Compliance for new facilities or relocation of facilities to understand potential impacts to natural resources and compatibility with this INRMP.	X				

Chapters 7, 8, and 9 Sections	Sections/Goals/Objectives/Inhouse Actions, and Projects	Implementation Year					
		Indefinitely /Annually/ Ongoing/ As Needed	13	14	15	16	17
	Provide natural resources support for IRP and related projects, to include wildlife-related permits, mitigation requirements, minimization of natural resources impacts, personnel safety minimization, and monitoring of effects of projects on natural resources.	X					
7.15, 8.2.14	Coastal Zone Management						
	Goal 14: Protect and restore coastal zone natural resources on or near 611 ASG sites.						
	<i>Objective 14.1: Ensure all 611 ASG activities, operations, projects, and programs that affect any lands, water use or natural resources of a state's coastal zone must be consistent, to the maximum extent practicable, with the state Coastal Zone Management Plan.</i>						
	Implement the Air Force Memorandum of Understanding with Coastal America on 611 ASG sites.	X					
	Use the Alaska Coastal Management Program Consistency Determination for Federal Activities questionnaire to evaluate effects of 611 ASG activities on coastal zone resources.	X					
	Protect coastal zone resources to the same degree as when the State of Alaska Coastal Zone Management Program was active.	X					
7.16, 8.2.15	Natural Resources Law Enforcement						
	Goal 15: Protect 611 ASG site natural resources.						
	<i>Objective 15.1: Ensure federal and state laws and 611 ASG natural resources protection policies are enforced on 611 ASG sites.</i>						
	Request enforcement assistance from the USFWS, if required.	X					
	Develop an agreement with Joint Base Elmendorf-Richardson to provide natural resources law enforcement on 611 ASG sites.			X			
7.17, 8.2.16	Wildland Fire Management						
	Goal 16: Protect 611 ASG site natural resources from wildfires.						
	<i>Objective 16.1: Use external agencies' wildland fire management resources to protect 611 ASG sites from wildfire damage.</i>						
	If wildfires threatened 611 ASG sites, use BLM, Alaska Fire Service and the Alaska Division of Forestry resources to manage these fires.	X					
	Mitigate and minimize risk from a wildland fire to 611 ASG property and structures using Firewise landscaping principles (http://firewise.org/).	X					
	Recommend the development of written agreements with the BLM, Alaska Fire Service and the Alaska Division of Forestry to provide fire suppression services for 611 ASG sites with significant fire risks.		X				

Chapters 7, 8, and 9 Sections	Sections/Goals/Objectives/Inhouse Actions, and Projects	Implementation Year					
		Indefinitely /Annually/ Ongoing/ As Needed	13	14	15	16	17
	Develop a project to prepare a Wildland Fire Management Plan for 611 ASG sites.		X				
	Provide support, as available, to manage wildfires, as stated in the Joint Task Force-Alaska Wildland Firefighting Concept of Operations.	X					
9.2, 8.3	General INRMP Implementation Projects						
	Goal 17: Implement this INRMP using professionally trained natural resources personnel, who are properly equipped and funded to work on remote 611 ASG sites.						
	<i>Objective 17.1: Ensure that sufficient numbers of professionally trained natural resources management personnel are available to implement this INRMP.</i>						
	Projects: Contractor Support, CN, Natural Resources; Contractor Support, Contracted/A76 CN, EAS/KSA /WIA; Contracted/A76 CN, Eareckson; and Contracted/ A76 CN, King Salmon. Provide Natural Resource Managers for geographically separated units of 611 Air Support Group to support installations' environmental programs. Contractor assistance provides normal day-to-day management functions and operations of King Salmon Airport, and Eareckson Air Station installation conservation programs while 611 CES provides oversight of these programs. Contract support will provide professional technical services for natural resources to support military readiness, training, and operations.		X	X	X	X	X
	<i>Objective 17.2: Ensure that 611 ASG natural resources personnel have funding to travel to remote sites to implement this INRMP.</i>						
	Projects: TDY, Environmental Function; and TDY, Environmental Function, FOL & Radar Sites. Costs associated with all site visits for a variety of reasons, including sampling, training, quality control evaluations, audits, meetings, etc. Mission-essential TDY for conservation personnel to participate in meetings, brief program initiatives, cross feed information with other environmental offices, meet with regulators, and participate in environmental seminars/symposiums in order to remain current on technology advances and changes in environmental regulatory requirements.		X	X	X	X	X
	<i>Objective 17.3: Provide necessary equipment and supplies to implement this INRMP.</i>						
	Projects: Supplies, CN and Supplies, CN Office. Provide all non-AFSF and AFSF supplies and equipment associated with conservation resources to support readiness of all installations. These funds will be used to support 611 ASG requirements for natural resources management on all sites.		X	X	X	X	X

Appendix 9.1. Work Plans for Natural Resources Projects

Annual requirements for funding through the Environmental Compliance Program listed below are for the planning period 2013 – 2017. However, annual requirements through the Environmental Compliance Program have been identified through FY 2023.

Work plan format is as follows:

Project: Title and Project number (if already in the budget system)

Description: A brief summary of the planned action.

Justification: This identifies a requirement or need to be satisfied in order for the mission to continue without disruption. Management justifications are installation unique and are defined by the mission, land uses to support the mission, and natural resources affected by the mission.

Implementation Timeframes: Calendar year the project is planned to be executed. Some projects are ongoing or as-needed.

Required Funding: Funds required by fiscal year, budget priority categories (levels) (see Section 9.5, *Implementation Funding Options*), and source of funding.

Regulatory Approvals Required: Used if projects are legally required to have some form of coordination, consultation, or permitting from an outside agency.

Project Implementation Vehicle: Generally either in-house or contract with the understanding that even contract projects require in-house support/monitoring.

Success Monitoring: Quantitative or qualitative means used to determine how well the project is meeting the purposes of the INRMP and the 611 ASG's military missions.

DoD Instruction 4715.03, Enclosure 4, *Program and Budgeting Priorities for Natural Resources Programs* (February 14, 2011) describes priorities for natural resources management funding on military installations. In the Automated Civil Engineer System, Level 0 projects generally relate to DoDI 4715.03 funding priority *Recurring Natural Resources Conservation Requirements*. Level 1 projects generally relate to DoDI 4715.03 *Non-recurring Natural Resources Conservation Requirements*, subsection a, *Current Compliance*. Level 2 projects generally relate to DoDI 4715.03 *Non-recurring Natural Resources Conservation Requirements*, subsection b, *Maintenance Requirements*. Level 3 projects generally relate to DoDI 4715.03 *Non-recurring Natural Resources Conservation Requirements*, subsection c, *Enhancement Actions Beyond Compliance*.

INRMP Section 9.5.1, *Funding Categories of Priority* describes these funding categories. Below projects are discussed in INRMP Chapter 7 and described in INRMP Chapter 8.

611 Air Support Group INRMP Implementation Projects

Section 7.2, Ecosystem Management

Objective 1.2: Use coordinated planning to fully integrate the 611 ASG sites natural resources program.

Must Fund Projects:

Project Title: Plan Update, INRMP, Alaska Remote Sites.

Project Numbers: VNMHOS140313 (2014), VNMHOS150313 (2015), VNMHOS160313 (2016), VNMHOS190313 (2019), VNMHOS200313 (2020), and VNMHOS210313 (2021).

Description: Review and update of this INRMP annually (except during time of major revision) using INRMP goals, objectives, inhouse actions, and projects to guide reviews; revise projects and budgets as required; coordinate significant changes with the USFWS, ADFG, and if necessary NMFS. Reviews will use metrics described in DoDI 4715-03, Enclosure 5.

Justification: Sikes Act and DoDI 4715.03. Without funding military training will be negatively impacted, federally-listed species management is jeopardized, critical habitat designation of military property is possible, and a negative feedback from the public and regulatory agencies is likely. It is important to note that this project significantly reduces the cost of the major review/INRMP updates in 2017 and 2022.

Implementation Timeframes: 2014-16 and 2019-2021.

Required Funding: 2014-2016 and 2019-2021 - \$50,000 annually, O&S funds.

Regulatory Approvals Required: USFWS and ADFG.

Project Implementation Vehicle: Contract support.

Success Monitoring: The 611 ASG INRMP is successfully reviewed for implementation success and updated annually.

Project Title: Plan Update, INRMP, Alaska Remote Sites.

Project Number: VNMHOS170313 (2017) VNMHOS220313 (2022).

Description: During 2017 and 2022 prepare five year revisions/updates of the 611 ASG INRMP with the goal of completion for implementation in 2018 and 2023; coordinate these updates with the USFWS, ADFG, NMFS, BLM, and other partners

Justification: Required by Sikes Act, DoDI 4715.03, AFI 32-7064, and 3WGI 32-7001.

Implementation Timeframes: 2017 and 2022.

Required Funding: 2017 - \$110,000 and 2022 - \$115,000, Level 0, O&S funds.

Regulatory Approvals Required: USFWS and ADFG.

Project Implementation Vehicle: Contract.

Success Monitoring: An updated 611 ASG INRMP is completed for the periods 2018-2022 and 2023-2027.

Section 7.4 Fish and Wildlife Management

Objective 3.1: Protect, conserve, and manage fish and wildlife and their habitats as vital elements of an integrated natural resources program and perform studies to enhance and maintain healthy sustainable populations.

Must Fund Projects:

Project Titles: Management, Habitat, Native Ecosystems (ARS); Management, Habitat, Native Ecosystems (EAS & KS); and Management, Habitat, Native Ecosystems.

Project Numbers: CEOSOS1167, VNMHOS141268, and VNMHOS211268, respectively.

Description: Conduct ecosystem monitoring to detect habitat changes on Eareckson AS, King Salmon Airport, and active LRRSs. Compare results with previous monitoring for 2000-2002 (Frost *et al.* 2005a and 2005b, Schick *et al.* 2004), for 2005-2008 (Roth and Macander 2009, Wells *et al.* 2010), that conducted for this INRMP, and those conducted by subsequent projects to monitor changes in the quality

of the ecosystem to determine the impact of site operations at these sites. Note: VNMHOS211268 is a combination of the previous two projects to reduce the number of budget requirements,

Justification: The Sikes Act requires that DoD lands be managed according to an INRMP. The 611 ASG, USFWS, and ADFG signed currently active INRMPs, which constitutes an interagency agreement under AFI 32-7001, Para 3.3.21. Updates are specifically required in currently active INRMPs (Eareckson INRMP [Nov 2007 Chapter 8.2 Goal 5, Objective 1, Project 10]; King Salmon INRMP [April 2008 Objective 2, Project 3]; Alaska Radar System INRMP [2008-2013, Chapter 8.2 Goal 5, Objective 2 and Project 2). Project being updated in 2013 Alaska Remote Sites INRMP.

Implementation Timeframes: 2013, 2014, and 2021, respectively .

Required Funding: 2013 - \$60,000, 2014 - \$70,000, and 2021 - \$110,000; O&S funds.

Regulatory Approvals Required: None.

Project Implementation Vehicle: Contract

Success Monitoring: Air Force and Defense requirements for periodic monitoring of 611 ASG site qualities are met.

Project Titles: Management, Species, Migratory Bird Protection Management, Species.

Project Numbers: VNMHOS130412 (2013), VNMHOS140412 (2014), VNMHOS150412 (2015), VNMHOS160412 (2016), VNMHOS170412 (2017), VNMHOS180412 (2018), VNMHOS190412 (2019), VNMHOS200412 (2020), VNMHOS210412 (2021), VNMHOS220412 (2022), and VNMHOS230412 (2023).

Description: Conduct surveys of wildlife at Shemya including Emperor Geese, threatened Steller's Eiders, and other winter waterfowl and seabirds, as well as threatened sea otters and endangered Steller sea lions and Arctic foxes to compare populations with historic counts funded by the Legacy Program and more recent surveys. Species-specific management activities required to achieve goals and objectives of the Eareckson Air Station INRMP, approved in accordance with the Sikes Act. Includes requirements to inventory, survey, monitor, and/or otherwise manage species.

Justification: Implements multiple objectives of the approved Eareckson Air Station INRMP, including goal 5, objective 1, Conduct surveys to reduce the potential for bird and animal strikes and goal 1, objective 9, to monitor wildlife with a consideration for all biological communities and human values associated with these resources. Also implements current Alaska Radar System INRMP Project 13 and Eareckson AS INRMP Project 21.

Implementation Timeframes: 2013-2023, annually; and 2014, respectively.

Required Funding: 2012-2015 - \$55,000, annually; 2016-2023 - \$60,000 annually; O&S funds.

Regulatory Approvals Required: None.

Project Implementation Vehicle: Contract

Success Monitoring: Information regarding the status of wildlife species is available to properly implement this INRMP.

Project Title: Management, Invasive Species.

Project Numbers: VNMHOS1370 (2013), VNMHOS147000 (2014), VNMHOS157000 (2015), VNMHOS167000 (2016), VNMHOS177000 (2017), VNMHOS187000 (2018), VNMHOS197000 (2019), VNMHOS207000 (2020), VNMHOS217000 (2021), VNMHOS227000 (2022), and VNMHOS237000 (2023).

Description: Requirements to control the presence and spread of invasive species as required by the goals and objectives of the INRMP, approved in accordance with the Sikes Act. Project will eradicate rats at Eareckson Air Station and ensure measures to prevent rat re-introduction are implemented. Funds are consistent with at 10K yearly. Also used to remove other invasive species as needed at 611 sites.

Justification: Required by a file memo 11 Sep 00, para 4b, states INRMPs should be submitted as a level OS requirement. Memorandum from Alex A. Beehler, Assistant Deputy Under Secretary of Defense (Environment, Safety and Occupational Health), November 1, 2004, Implementation of Sikes Act

Improvement Amendments: Supplemental Guidance concerning INRMP Reviews. The 611 ASG, USFWS and ADFG have all signed the INRMP which constitutes an interagency agreement under AFI 32-7001, Para 3.3.21 Eareckson Air Station INRMP (2007-2012, Chapter 8.2, Goal 6, Objective 2, identifies requirement.

Implementation Timeframes: 2013-2023, annually.

Required Funding: 2013-2020 - \$10,000, annually; 2021-2023 - \$15,000, annually; O&S funds.

Regulatory Approvals Required: None.

Project Implementation Vehicle: Contract.

Success Monitoring: Rats are eradicated from Eareckson AS, and the island remains rat-free following eradication.

Project Title: Update Wildlife Hazard Management Plan, Eareckson.

Project Numbers: VNMHOS208845 (2020).

Description: Update the EAS Wildlife Hazard Management Plan and present it to the Bird Hazard Working Group for review and approval.

Justification: Required by Sikes Act (16 USC 670a), 50 CFR 21.41, and 14 CFR 139.337.

Implementation Timeframes: 2013-2023, annually.

Required Funding: 2020 - \$50,000; O&S funds.

Regulatory Approvals Required: None.

Project Implementation Vehicle: Contract.

Success Monitoring: Actions taken at EAS to minimize BASH risks fully comply with USAF regulations and policies.

Level 1 Project:

Project Title: Management, Species, Arctic Fox.

Project Number: VNMH169000

Description: Continue a study from 2008 on the condition of foxes on Shemya Island and investigate their generally poor health. The work will include additional analysis of samples already obtained, histology of teeth and jaw tissues, assessment of genetic diversity, and screening of tissues for possible environmental contaminants that were identified in 2008 project. Additional field study is also necessary to determine causes of these pathologic conditions and to identify measures that will improve fox health.

Justification: This is a requirement of the Sikes Act, which requires that DoD lands be managed according to an INRMP. The 611 ASG, USFWS and ADFG have all signed the INRMP, which constitutes an interagency agreement under AFI 32-7001, Para 3.3.21. The Eareckson AS INRMP, (2007-2012, Chapter 8.2, Goal 6, Objective 1, identifies requirement, which is currently being updated in 2013 611 Alaska Remote Sites INRMP.

Implementation Timeframes: 2015

Required Funding: 2015 - \$50,000; Level 1 funds.

Regulatory Approvals Required: None.

Project Implementation Vehicle: Contract.

Success Monitoring: Information will be provided to implement management to improve arctic fox health.

Section 7.5 Management of Threatened and Endangered Species and Habitats

Objective 4.1: Maintain mission flexibility through the conservation and management of federal and state-listed species and species of special concern.

Level 1 Projects:

Project Title: Management, Species, Threatened Eider.

Project Number: VNMH130595 (2013), VNMH180595 (2018), and VNMH230595 (2023).

Description: Conduct threatened Eider inventory and monitoring at 611 ASG sites that have Threatened Eider nesting habitat (Bullen Point, Point Lonely and Wainwright former SRRSs; Point Lay former LRRS; Point Barrow and Oliktok LRRSs) and other sites where these birds potentially occur. This project surveys for the presence, habitats, seasonal use, and nesting locations of these birds.

Justification: Sikes Act. The 2007 Alaska Radar System INRMP, Project 1 identifies this requirement.

Implementation Timeframes: 2013, 2018, and 2023.

Required Funding: 2013 - \$60,000, 2018 - \$70,000, and ; 2023 - \$75,000; Level 1 funds.

Regulatory Approvals Required: USFWS.

Project Implementation Vehicle: Contract.

Success Monitoring: The 611 ASG meets all statutory and regulatory requirements for the protection and management of federally-listed Eiders.

Project Title: Management, Species, Threatened Eider.

Project Number: VNMH130595 (2013), VNMH180595 (2018), VNMH230595 (2023).

Description: Conduct threatened Eider inventory and monitoring at Bullen Point, Point Lonely and Wainwright former SRRSs; Point Lay former LRRS; Point Barrow and Oliktok LRRSs, and other sites where these birds potentially occur. This project surveys for the presence, habitats, seasonal use, and nesting locations of these birds.

Justification: Endangered Species Act, Sikes Act, and 2007 Alaska Radar Sites INRMP Project 1

Implementation Timeframes: 2013, 2018, and 2023.

Required Funding: 2013 - \$60,000, 2018 - \$70,000, 2023 - \$75,000, Level 1 funds.

Regulatory Approvals Required: USFWS.

Project Implementation Vehicle: Contract.

Success Monitoring: Threatened Eiders are inventoried and monitored to meet all compliance requirements associated with federally-listed species.

Project Titles: Management, Species; Steller Sea Lion.

Project Numbers: VNMH140777 (2014) and VNMH199001 (2019).

Description: Conduct survey of 611 ASG sites that have Endangered Steller sea lions as well as identify Proposed ringed and bearded seals, sea otter, and Pacific walrus. These species need to be surveyed for ongoing operations and cleanup of coastal 611 sites. Project will also determine haulout sites for walruses and seals on 611 ASG sites and sites used by sea otters and sea lions. Besides determining potential sensitive sites that need to be managed for candidate and proposed for listing species, changes in haulout sites may be used as a baseline for monitoring effects of loss of sea ice.

Justification: Sikes Act / 2007 ARS INRMP Project 13, 2007 Eareckson AS INRMP Project 21. Being updated in 2013 611 Remote Sites INRMP.

Implementation Timeframes: 2013-2023, annually; and 2014, respectively.

Required Funding: 2014 and 2019 - \$90,000, annually; Level 1 funds.

Regulatory Approvals Required: None.

Project Implementation Vehicle: Contract

Success Monitoring: Information regarding the status of wildlife species is available to properly implement this INRMP.

Section 7.13 Public Outreach and Natural Resource Education

Objective 12.1: Provide natural resources outreach, awareness, and education to 611 ASG inhouse and contract personnel and the general public.

Must Fund Projects

Project Title: Outreach.

Project Numbers: VNMHOS131368 (2013), VNMHOS141368 (2014), VNMHOS151368 (2015), VNMHOS161368 (2016), VNMHOS171368 (2017), VNMHOS181368 (2018), VNMHOS191368 (2019), VNMHOS201368 (2020), VNMHOS211368 (2021), VNMHOS221368 (2022), and VNMHOS231368 (2023).

Description: Provide educational materials to the general public and other interested parties external to the 611 ASG. This project also includes support for cultural resources public outreach.

Justification: AFI32-7065, NHPA and ARPA, NEPA. Personnel safety, primarily the dissemination of the Polar Bear Interaction Plan.

Implementation Timeframes: 2013-2023.

Required Funding: 2013-2023 - \$2,000, annually; O&S funds.

Regulatory Approvals Required: None.

Project Implementation Vehicle: Inhouse and Contract.

Success Monitoring: Public relations and printing services are adequately provided to meet annual requirements.

Project Title: Training, Others.

Project Numbers: VNMHOS555313 (2013), VNMHOS555314 (2014), VNMHOS555315 (2015), VNMHOS165553 (2016), VNMHOS175553 (2017), VNMHOS185553 (2018), VNMHOS195553 (2019), VNMHOS205553 (2020), VNMHOS215553 (2021), VNMHOS225553 (2022), VNMHOS235553 (2023).

Description: Base personnel (non-environmental) requiring training to support environmental compliance program objectives. Support the Alaska Forum for the Environment, which includes invasive species, listed species, Coastal America issues, and similar programs. Funds required to arrange annual P2 roundtable for all installations in Alaska. Community awareness is also accomplished with these funds by including crossfeed with other federal agencies. Funds provide info brochures and miscellaneous materials to support the annual event. The roundtable is a forum for information exchange between federal facilities inside and outside Alaska. Note: Project was born out of federal statement of Cooperation with Alaska Department of Environmental Conservation and other federal agencies.

Justification: Statement of Cooperation agreement with Alaska Department of Environmental Conservation as signed by 11 AF/CC.

Implementation Timeframes: 2013-2023.

Required Funding: 2013-15 - \$15,000; 2014-2023 - \$5,000, annually; O&S funds.

Regulatory Approvals Required: None.

Project Implementation Vehicle: Inhouse.

Success Monitoring: Base personnel (non-environmental) have adequate training to support environmental compliance program objectives.

Objective 18.2: Provide for necessary supplemental training for natural resources personnel to ensure the proper and efficient management of 611 ASG natural resources per DoDI 4715.03, Enclosure 3, 1.1.

Must Fund Project

Project Title: Training, Environmental Function.

Project Numbers: VNMHOS555213 (2013), VNMHOS555214 (2014), VNMHOS555215 (2015), VNMHOS555216 (2016), VNMHOS555217 (2017), VNMHOS555218 (2018), VNMHOS555219 (2019), VNMHOS555220 (2020), VNMHOS555221 (2021), VNMHOS555222 (2022), and VNMHOS555223 (2023).

Description: Provide for the maintenance of staff knowledge of management strategies at the current state of the art through training and participation in workshops, research presentations, and other activities of regional and national professional natural resources research and conservation programs; and by sharing information with natural resources experts to ensure maximum benefits of adaptive management and research efforts. Includes training for Environmental Function EQ (all pillars) personnel to support Environmental Compliance program objectives, regulatory requirements and AF/DoD Instructions. Includes courses mandated by specific law, rule, executive order, AF/DoD Instructions, and mission-essential items due to local permits, state laws, or agreements.

Justification: Mission-essential training, required by law, EO, regulation, or AF/DoD instruction to support environmental program objectives.

Implementation Timeframes: 2013-2023.

Required Funding: 2013-2020 - \$30,000, annually, 2021-2023 - \$35,000, annually; O&S funds.

Regulatory Approvals Required: None.

Project Implementation Vehicle: Inhouse.

Success Monitoring: 611 ASG staff demonstrates professional knowledge that is up-to-date and needed to implement this INRMP.

8.3 General INRMP Implementation Projects

Objective 17.1: Ensure that sufficient numbers of professionally trained natural resources management personnel are available to implement this INRMP.

Must Fund Project

Project Titles: Contractor Support, CN, Natural Resources; Contractor Support, Contracted/A76 CN, EAS /KSA/WIA; Contractor Support, Contracted/A76 CN, Eareckson; and Contractor Support, Contracted/A76 CN, King Salmon.

Project Numbers: YGFZOS138012 (2013); VNMHOS141914 (2014), VNMHOS151914 (2015), VNMHOS161914 (2016), VNMHOS171914 (2017), VNMHOS181914 (2018), VNMHOS191914 (2019), VNMHOS201914 (2020), VNMHOS211914 (2021), VNMHOS221914 (2022), VNMHOS231914 (2023); VNMHOS501213 (2013); and VNMHOS513012 (2013).

Description: Provide Natural Resource Managers for geographically separated units of 611 Air Support Group to support installations' environmental programs. Contractor assistance provides normal day-to-day management functions and operations of the King Salmon Airport and Eareckson Air Station installation conservation programs while 611 CES provides oversight of these programs. Contract support will provide professional technical services for natural resources to support military readiness, training, and operations.

Justification: Required support for environmental programs in accordance with the Sikes Act, AFI 32-7064, 32 CFR 190, DoDI 4715.3, 3WGI 32-7001, and 3WGI 91-212.

Implementation Timeframes: 2013-2023, annually.

Required Funding: 2013- \$215,000; 2014-2023 - \$220,000 annually; 2013 - \$270,000; 2013 - \$670,000; O&S funds.

Regulatory Approvals Required: None.

Project Implementation Vehicle: Contract.

Success Monitoring: An adequate number of professional technical personnel are available on an annual basis and performing tasks needed to implement this INRMP.

Objective 17.2: Ensure that 611 ASG natural resources personnel have funding to travel to remote sites to implement this INRMP.

Must Fund Project

Project Titles: TDY, Environmental Function and TDY, Environmental Function, FOL & Radar Sites.

Project Numbers: VNMHOS541114 (2014), VNMHOS541115 (2015), VNMHOS541116 (2016), VNMHOS541117 (2017), VNMHOS541118 (2018), VNMHOS541119 (2019), VNMHOS541120 (2020), VNMHOS541121 (2021), VNMHOS541122 (2022), VNMHOS541123 (2023); and VNMHOS541113 (2013).

Description: Costs associated with all site visits for a variety of reasons, including sampling, training, quality control evaluations, audits, meetings, etc. Mission-essential TDY for conservation personnel to participate in meetings, brief program initiatives, cross feed information with other environmental offices, meet with regulators, and participate in environmental seminars/symposiums in order to remain current on technology advances and changes in environmental regulatory requirements

Justification: There are 16 LRRS and aircraft sites scattered in remote Alaska. UMD 7. \$8,300 per UMD= \$58K. 611th is composed of very remote sites and planes must be chartered for our purpose. In order to effectively manage the sites, several flights must be taken per year, not including any TDYs to HQ PACAF in Hawaii.

Implementation Timeframes: 2013-2023, annually.

Required Funding: 2013-2019 - \$58,000, annually; 2020-2023 - \$60,000, annually; O&S funds.

Regulatory Approvals Required: None.

Project Implementation Vehicle: Inhouse.

Success Monitoring: Natural resources personnel are able to travel to 611 ASG sites, as needed to implement this INRMP.

Objective 17.3: Provide necessary equipment and supplies to implement this INRMP.

Must Fund Project

Project Title: Supplies, CN; Supplies, CN Office and Supplies, Office, Environmental Function.

Project Numbers: VNMHOS510913 (2013), VNMHOS510914 (2014), VNMHOS510915 (2015), VNMHOS510916 (2016), VNMHOS510917 (2017), VNMHOS510918 (2018), VNMHOS510919 (2019), VNMHOS510920 (2020), VNMHOS510921 (2021), VNMHOS510922 (2022), VNMHOS510923 (2023); and VNMHOS562213 (2013), VNMHOS562214 (2014), VNMHOS562215 (2015), VNMHOS562216 (2016), VNMHOS562217 (2017), VNMHOS562218 (2018), VNMHOS562219 (2019), VNMHOS562220 (2020).

Description: Provide all non-AFSF and AFSF supplies and equipment associated with conservation resources to support readiness of all installations. These funds will be used to support 611 ASG requirements for natural resources management on all sites.

Justification: Sikes Act and AFI 32-7064 to support installation environmental programs.

Implementation Timeframes: 2013-2023, annually.

Required Funding: 2013 - \$4,000, 2014-2016, \$3,500, annually, 2017-2020, \$4,000, annually, 2021-2023, \$5,000, annually; 2013 - \$38,500, 2014 - \$24,500, 2015-2020 - \$7,000, annually; O&S funds.

Regulatory Approvals Required: None.

Project Implementation Vehicle: Contract.

Success Monitoring: Conservation program supplies and equipment not available in the 611 ASG supply system are purchased and are readily available.