Integrated Natural Resources Management Plan

Naval Air Station Whidbey Island

December 2013

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN NAVAL AIR STATION WHIDBEY ISLAND

December 2013

This Integrated Natural Resources Management Plan requires an annual review and update at natural resources metrics meetings, which includes all implementing parties and enables future major update rewrites as needed. Reviews and updates are a necessary part of maintaining a proactive management plan. The section below should be used to document reviews and changes to the plan for improving natural resources management. Annual reviews provide information for incorporating into the next major update and are used as backup for revalidating and resigning the current and subsequent plan updates every 5 years as required by the Sikes Act.

DATE	SECTION/PAGE	COMMENT	REVIEWER

Acknowledgements

This Integrated Natural Resources Management Plan meets the requirements of the Sikes Act (16 U.S.C. 670a *et. seq*., as amended); Department of Defense Instruction 4715.03 *Natural Resources Conservation Program*; and OPNAVINST 5090.1C *Environmental and Natural Resources Program Manual.*

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US Navy Signature Page

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Endorsed by:

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Date

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US Fish and Wildlife Service Signature Page

This Integrated Natural Resources Management Plan meets the requirements of the Sikes Act (16 U.S.C. 670a *et. seq*., as amended) and supports US Fish and Wildlife Service policies, management goals and objectives.

Approved by:

Ken S. Berg — 8/30/12

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Washington Fish and Wildlife Office
U.S. Fish and Wildlife Service

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Washington Department of Fish and Wildlife Signature Page

This Integrated Natural Resources Management Plan meets the requirements of the Sikes Act (16 U.S.C. 670a *et. seq*., as amended) and supports Washington Department of Fish and Wildlife policies, management goal and objectives.

Approved by:

for ______________________________ 8/9/2012 ____________

Phil Anderson, Director
Washington Department of Fish and Wildlife

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National Marine Fisheries Service Signature Page

This Integrated Natural Resources Management Plan meets the requirements of the Sikes Act (16 U.S.C. 670a *et. seq*., as amended) and supports National Marine Fisheries Service policies, management goal and objectives.

Approved by:

William W. Stelle, Jr, Regional Administrator
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6/8/2012
Date

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List of Acronyms

ADC	Animal Damage Control
BASH	Bird Aircraft Strike Hazard
BBS	Breeding Bird Survey
BD	Bankfull Discharge
BEAP	Base Exterior Architecture Plan
BEMP	Bald Eagle Management Plan
BMP	Best Management Practice
BOQ	Bachelor Officer's Quarters
BOS	Base Operating Services
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CNIC	Commander, Navy Installations Command
CNO	Chief of Naval Operations
CO	Commanding Officer
COMNAVBASE	Commander Naval Base
CSR	Contract Support Representative
CWA	Clean Water Act
DBH	Diameter at Breast Height
DEIS	Draft Environmental Impact Statement
DoD	Department of Defense
DODDIR	Department of Defense Directive
DON	Department of the Navy
EAD	Environmental Affairs Division
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
EPR	Environmental Program Requirements
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
HARP	Historic and Archeological Resources Protection
HPA	Hydraulic Project Approval
ICO	Installation Commanding Officer
IEPD	Installation Environmental Program Director
INRMP	Integrated Natural Resource Management Plan
IPM	Integrated Pest Management
JAG	Judge Advocate General
MILCON	Military Construction
MOA	Memorandum of Agreement
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service

NRDA	Natural Resources Damage Assessment
NWI	National Wetlands Inventory
OGC	Office of General Counsel
OLF	Outlying Field
OMB	Office of Management and Budget
OPNAVINST	Instruction by the Chief of Naval Operations
ORV	Off-Road Vehicle
PAO	Public Affairs Office
PGA	Professional Golf Association
PIF	Partners in Flight
PL	Public Law
QRP	Qualified Recycling Program
RCW	Regulatory Code of Washington
RV	Recreational Vehicle
SAIA	Sikes Act Improvement Act
SCS	Soil Conservation Service
SCWP	State Comprehensive Wildlife Plan
SECNAVINST	Instruction by the Secretary of the Navy
SHPO	State Historic Preservation Officer
SMA	Shoreline Management Act
SMMP	Shoreline Management Master Program
SMZ	Streamside Management Zone
SPCC	Spill Prevention Control and Countermeasures
SR	State Route
T&E	Threatened and Endangered
TES	Threatened, Endangered, and Sensitive
TIWET	The Institute of Wildlife and Environmental Toxicology
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USDAWS	United States Department of Agriculture Wildlife Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WARIS	Washington Rivers Information System
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WDOE	Washington Department of Ecology

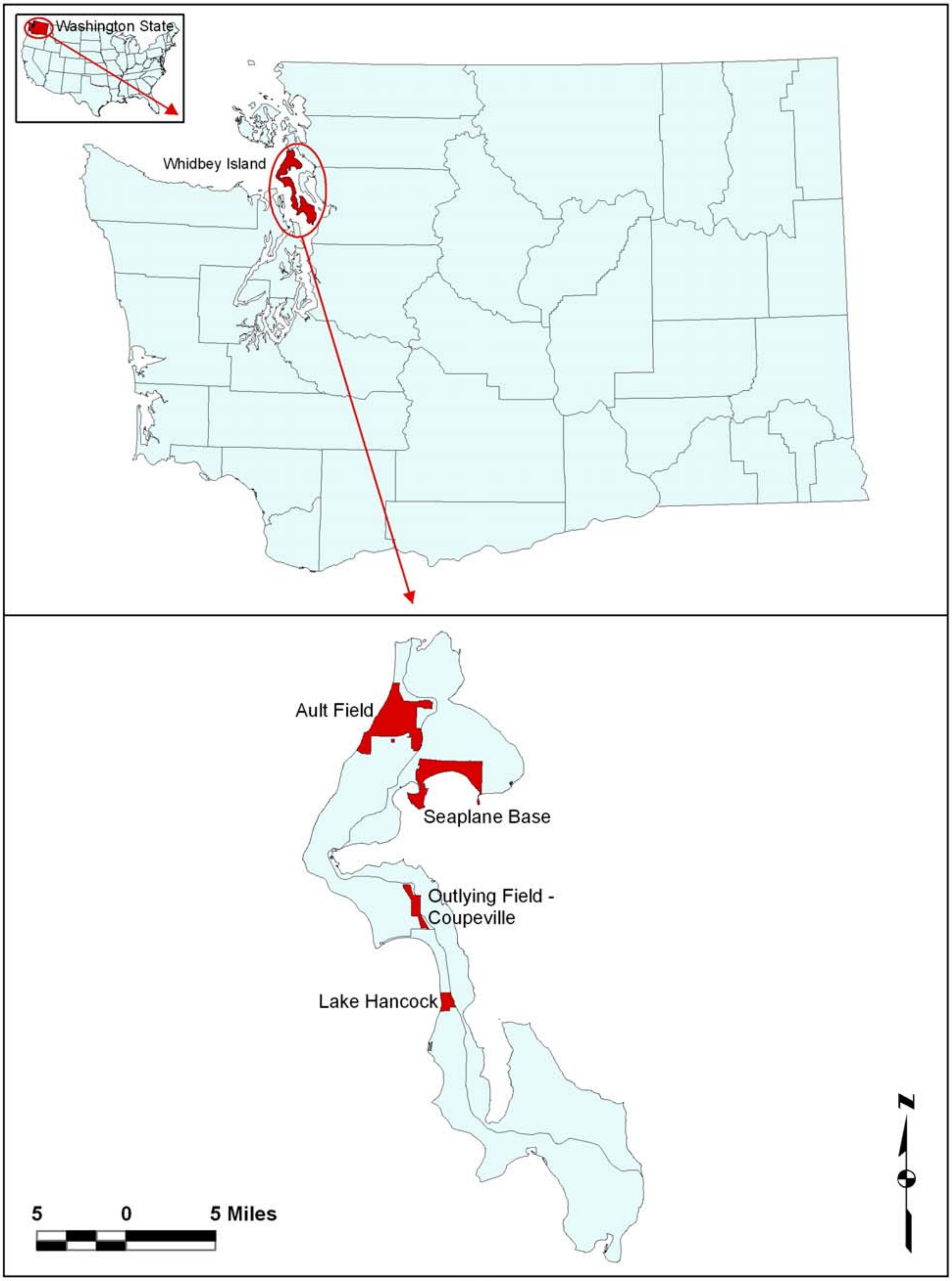

Figure 1. Location of Naval Air Station Whidbey Island.

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1.0 OVERVIEW OF INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

1.1 Purpose

This Integrated Natural Resources Management Plan is a planning document to guide the Naval Air Station (NAS) Whidbey Island management of natural resources in support of the Navy's military mission, while protecting and enhancing natural resources for multiple uses, sustainable yield, and biological integrity. This INRMP was developed for NAS Whidbey Island to provide a management tool for station personnel to use when making decisions about natural resources management and future activities or development at the station. The primary purpose of the plan is to ensure that natural resources conservation measures and military operations on the installation are integrated and compliant with stewardship and legal requirements.

This plan emphasizes ecosystem management, a process that considers the environment as a complex system functioning as a whole, not as a collection of parts. It recognizes the needs of people and the military mission as parts of the whole. Ecosystem management encourages partnerships among private, tribal, and local, state, and federal government interests.

This new plan updates and replaces the *Integrated Natural Resources Management Plan – Naval Air Station Whidbey Island* (EA Engineering, Science, and Technology 1996) *and the Naval Air Station Whidbey Island Bald Eagle Management Plan* (EDAW 1996). In this INRMP, a site specific and integrated approach to the conservation and management of natural resources at NAS Whidbey Island has been developed. This plan satisfies current Department of Defense (DoD) requirements for INRMPs by involving the appropriate state and federal agencies in the cooperative management of natural and outdoor recreation resources at NAS Whidbey Island. This document provides guidance for natural resource management at NAS Whidbey Island.

With the publication of "Implementation of Ecosystem Management in the DoD" (DoD 1994), the Department of Defense established ecosystem management as the basis by which all DoD natural resources will be managed. This approach emphasizes a cooperative management style that crosses political boundaries, establishing interagency management partnerships and incorporating public needs. The directive states that ecosystem management facilitates "a greater understanding and recognition of interrelationships among components of the environment (including people) across the landscape and over time" (DoD 1994). With this understanding, managers can guide installation programs in a manner that protects and restores the composition, structure, and function of the natural communities that comprise ecosystems.

1.2 Scope

This plan covers all the federally owned or leased lands, tidal lands, and waters of NAS Whidbey Island, located in Island County, Washington (see Figure 1). This INRMP addresses tidelands and waters from the mean high water level to offshore security boundaries. No tidelands or waters past the above identified tidal elevations are being managed or covered under this INRMP. Because of vastly different habitat types and species and also because of different stakeholders, NWSTF Boardman is covered under a separate INRMP.

1.3 Goals and Objectives

The installation's successfully implemented natural resources program will meet two basic goals, which are closely related and not mutually exclusive:

a) Ensure the sustainability of all ecosystems encompassed by an installation; and
b) Ensure no net loss of the capability of installation lands to support the DoD mission.

NAS Whidbey Island's natural resources program objectives are to accomplish the following:

a) Assign professionally trained personnel to this program and provide natural resource personnel the opportunity to participate in job-training activities and professional meetings.
b) Protect, conserve and manage the watersheds, wetlands, soils, forests, fish and wildlife, and other natural resources as vital elements of a natural resources program.
c) Protect threatened, endangered, and sensitive (TES) species and critical habitats regulated by the Endangered Species Act (ESA).
d) Manage natural resources to provide outdoor recreation opportunities.
e) Use and care for natural resources in the combination best serving the present and future needs.
f) Provide for the optimum use of land and water areas and access thereto while maintaining safety, security, and ecological integrity.

For NAS Whidbey Island, the goal of ecosystem management can be achieved by implementing recommendations of this plan in a prioritized manner (see Appendix A). Proposed actions are prioritized based on the nature and importance of specific natural resource values, the potential level of degradation and impact that has or is potentially going to occur to that specific set of natural resources, the potential for success in undertaking and management action and the availability of financial and labor resources.

1.4 Responsibilities

Responsibility for implementation of this INRMP flows through the following chain of command:

1.4.1 Chief of Naval Operations, Environmental Readiness Division

Chief of Naval Operations (CNO) shall serve as the principal leader and overall Navy program manager for the development, revision, and implementation of INRMPs and shall:

a) Provide policy, guidance, and resources for the development, revision, and implementation of INRMPs and associated NEPA documents.
b) Represent the Navy on issues regarding development and implementation of INRMPs and delegate responsibility in writing.
c) Resolve high-level conflicts associated with development and implementation of INRMPs.
d) Approve all INRMP projects before INRMPs are submitted to regulatory agencies for signature.

1.4.2 Commander, Navy Installations Command

Commander, Navy Installations Command (CNIC) shall ensure that installations under their command develop, revise, and implement INRMPs if required, and shall:

a) Ensure that this guidance is utilized by installations to develop, revise, and implement INRMPs.

1) Within 12 months of the release of this Guidance, evaluate the need for an INRMP at all installations that currently do not have an INRMP.
2) Following the initial evaluation, reevaluate all remaining installations that do not have an INRMP every five years.

b) Ensure that installations comply with DoD, DON, and CNO policy on INRMPs and associated NEPA document preparation, revision, and implementation.
c) Ensure the programming of resources necessary to maintain and implement INRMPs, which involves:

1) The review of and endorsement of projects recommended for INRMP implementation prior to submittal for signature.
2) The evaluation and validation of EPR-web project proposals.

d) Participate in the development and revision of INRMPs, which involves the maintenance of a close liaison with NAVFAC and other budget submitting offices.
e) Provide overall program management oversight for all natural resources program elements.

1.4.3 Regional Commanders

Regional Commanders shall:

a) Ensure that installations comply with DoD, DON, and CNO policy on INRMP and associated NEPA document preparation, revision, and implementation.
b) Ensure that installations under their control undergo annual informal reviews as well as formal five-year evaluations.
c) Ensure the programming of resources necessary to maintain and implement INRMPs, which involves:

1) The evaluation and validation of EPR-web project proposals.
2) The funding of installation natural resources management staff.

d) Participate in the development and revision of INRMPs, which involves:

1) Maintenance of a close liaison with the local/regional USFWS and appropriate state fish and wildlife Agency and other INRMP stakeholders.
2) Signature endorsement of the INRMP by Regional Commander.

NAS Whidbey Island is under Commander, Navy Region Northwest, whose office is located at Naval Base Kitsap, Silverdale, Washington.

1.4.4 Commanding Officer

The Installation Commanding Officer shall ensure the preparation, completion, and implementation of INRMPs and associated NEPA documentation for their installations and should systematically apply the conservation practices set forth in this INRMP. Their role is to:

a) Act as stewards of natural resources under their jurisdiction and integrate natural resources requirements into the day-to-day decision-making process.

b) Ensure natural resources management and INRMPs comply with all natural resources-related legislation; EOs and Executive Memorandums; and DoD, SECNAV, DON, and CNO directives, instructions, and policies.
c) Involve appropriate tenant, operational, training, or R&D commands in the INRMP review process to ensure no net loss of military mission.
d) Designate, in writing, a Natural Resources Manager (NRM) responsible for the management efforts related to the preparation, revision, implementation, and funding for INRMPs, as well as coordination with subordinate commands and installations (see Appendix D for a copy of this designation letter).
e) Involve appropriate Navy Judge Advocate General (JAG) or Office of the General Counsel (OGC) Legal Counsel to provide advice and counsel with respect to legal matters related to natural resources management and INRMPs.
f) Approve INRMPs via Commanding Officer signature.

The NAS Whidbey Island's Commanding Officer holds the highest-ranking position at the installation and ultimately is responsible for all aspects of the installation and its many functions. This includes the management of natural resources on the installation and ensuring that the INRMP is developed, implemented, and fully supported. The Commanding Officer can facilitate the implementation of the INRMP by encouraging support down the chain of command. The Commanding Officer has to ensure that a process is established for early coordination between the NRM and key installation staff. The Commanding Officer must also ensure that natural resources management is integrated with other installation management activities, as well as with military training and testing activities.

1.4.5 Natural Resources Manager

The NAS Whidbey Island NRM is primarily responsible for implementing this INRMP and coordinating with other personnel on the installation. Some of the implementation responsibilities include identifying personnel, internal or external to the installation, with expertise to perform the work identified; identifying the appropriate funding source to accomplish the projects; and ensuring installation personnel are familiar with the contents of this INRMP. The NRM is also responsible for ensuring this plan is reviewed in coordination with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Washington Department of Fish and Wildlife (WDFW), and federally recognized Tribes with affiliation to NAS Whidbey Island properties or "usual and accustomed" fishing areas in waters adjacent to the installation.

1.4.6 Public Affairs Office

The Public Affairs Office (PAO) provides a significant link between the INRMP and the on- and off-installation communities. The PAO can facilitate communication between offices across the installation and nearby communities regarding environmental management initiatives. Any proposed communications outside the installation should be discussed in advance with the PAO.

1.4.7 Naval Facilities Engineering Command

Naval Facilities Engineering Command (NAVFAC) provides oversight and support for the development, maintenance, and implementation of Navy Region Northwest's installation INRMPs and the natural resource program. NAVFAC NW's role in natural resources management is to:

a) Provide technical and contractual support to NRMs for the preparation, development, and implementation of INRMPs and associated NEPA documents.
b) Facilitate and coordinate the issuance of INRMP related NEPA documentation.
c) Evaluate and disseminate information concerning new technology, methods, policies, and procedures for use in the development and implementation of INRMPs.

d) Assist with the development of the INRMP Project Implementation Table (Appendix A), EPR, and Legacy project proposals.
e) Provide technical and administrative guidance for the development and execution of contracts and cooperative agreements to develop and implement INRMPs.
f) Facilitate the acquisition of INRMP "mutual agreement" between the Navy, USFWS, NMFS, and state fish and wildlife agencies.
g) Facilitate resolution of conflicts between the Navy, USFWS, and state fish and wildlife agencies and other stakeholders, if necessary.
h) Provide technical oversight and resources for forest management and agricultural outlease projects.
i) Provide technical oversight and budget approval of installation fish and wildlife/hunting and fishing fee and permit projects.
j) Compile, track and maintain INRMP metrics on the Navy Natural Resources Conservation Website.
k) Review INRMPs via NAVFAC field components Natural Resources Managers to ensure technical sufficiency.

In addition to the installation NRMs, NAVFAC NW has professionally qualified Senior Natural Resources Specialists in Forestry and Fish and Wildlife Management to support and assist the installation's Natural Resources Manager.

1.4.8 Other Federal Agencies

The Sikes Act directs DoD to coordinate with the U.S. Fish and Wildlife Service (USFWS) in the management of natural resources on DoD installations. Even though the Sikes Act does not require the National Marine Fisheries Service (NMFS) participation in installation natural resources management, they provide a valuable role in assisting with fisheries management under other federal statutes. NMFS is included in the review and signature approval of this INRMP because of their legal jurisdiction over marine resources and their expertise to provide assistance in fisheries management. The USFWS and NMFS have been included in the development, review and approval of this INRMP. Staff biologists of these Federal agencies may be called upon to provide assistance and support to the NRM.

1.4.9 State Agencies

The Sikes Act also directs DoD to coordinate with the appropriate state fish and game office in the management of natural resources on DoD installations. The Washington Department of Fish and Wildlife has been included in the development, review and approval of this INRMP. WDFW biologists may be called upon to provide assistance and support to the NRM.

1.5 Authority

This INRMP is authorized under the Conservation Programs on Military Installations (Sikes Act), as amended; Public Law 86-797, 16 United States Code (USC) § 670(a) et seq., which requires military installations to prepare and implement INRMPs to provide for:

a) Fish and wildlife management, land management, forest management, and fish and wildlife-oriented recreation.
b) Fish and wildlife habitat enhancement or modifications.
c) Wetlands protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants.
d) Integration of and consistency among the various activities conducted under the plan.

e) Establishment of specific natural resources management goals and objectives and timeframes for proposed actions.
f) Sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of the fish and wildlife resources.
g) Public access to the military installation that is necessary and appropriate, subject to requirements necessary to ensure safety and military security.
h) Enforcement of applicable natural resources laws and regulations.
i) No net loss in the capability of military installation lands to support the military mission of the installation.
j) Such other activities as the Secretary of the Navy determines appropriate.

The Sikes Act also sets guidelines for the collection of fees for the use of natural resources such as hunting and fishing.

Over the last several years, various guidance documents have been prepared on the interpretation of the Sikes Act Improvement Amendment (SAIA) and on INRMP preparation. Below are listed key Department of Defense (DoD) and Department of Navy (Navy) documents relevant to natural resource management.

- *Memorandum on Implementation of Ecosystem Management in DoD.* This Memorandum issued by the Deputy Under Secretary of Defense on 8 August 1994, was the first formal statement of an ecosystem management approach to land management in the DoD. Ecosystem management is to be achieved through developing and implementing INRMPs. This Memorandum contains DoD's 10 principles of ecosystem management as an attachment, which were later included as an enclosure in DODINST 4715.03 (see below).
- *DoDINST 4715.03, Natural Resources Conservation Program (18 March 2011).* This Department of Defense Instruction (DODINST) develops new policy and updates policy for the integrated management of natural resources on property and lands managed or controlled by DoD.
- *Memorandum on Implementation of Sikes Act Improvement Amendment: Updated Guidance*. This Memorandum of the Under Secretary of Defense, issued on 10 October 2002, provides guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD and replaces the 21 September 1998 guidance Implementation of the Sikes Act Improvement Amendments. The October 2002 memorandum and its supplement issued in November 2004 emphasize implementing and improving the overall INRMP coordination process and focus on coordinating with stakeholders, reporting requirements and metrics, budgeting for INRMP projects, using the INRMP as a substitute for critical habitat designation, supporting military training and testing needs, and the INRMP review process.
- *The Implementation of Sikes Act Improvement Amendment: Supplemental Guidance Concerning Leased Lands*, 17 May 2005. This document provides supplemental guidance for implementing SAIA requirements consistently throughout the Department of Defense. The guidance covers lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission. INRMPs must address the resource management of all lands for which the subject installation has real property accountability, including leased lands. Installation Commanding Officers may require tenants to accept responsibility for performing appropriate natural resource management actions as a condition of their occupancy or

use, but this does not preclude the requirement to address the natural resource management needs of these lands in the installation INRMP.

- *OPNAVINST 5090.1C, Environmental and Natural Resources Management Manual – (SAIA 1997)* - Establishes broad policy and assigns responsibilities for the Naval Natural Resources Program. Naval Facilities Engineering Command is assigned overall program management responsibility with authority to establish, coordinate, and promulgate the program; to issue appropriate instructions to the Navy installations for implementation of the various natural resources programs; and to provide professional natural resources services and technical assistance to Navy and Marine Corps Installations. It also directs major claimants and intermediate commands to ensure that subordinate commands support natural resources programs on installations under their control. Installation Commanding Officers are tasked with:

  - Requesting and using technical assistance from the appropriate NAVFAC office in developing and maintaining an effective natural resources program.
  - Providing funding to ensure adequate support of the natural resources program.
  - Applying practices set forth in approved natural resources management plans.
  - Assigning specific responsibilities, centralized supervision, and qualified personnel to the natural resources program.

- *NAVFAC Real Estate Operations and Natural Resources Management Procedure Manual, P-73, Volume I, May 1987* - Establishes the governing format under which the INRMP is structured. This document addresses all CNO natural resources program requirements, guidelines and standards.
- *Integrated Natural Resources Management Plan Guidance for Navy Installations*, 2006. This guidance provides natural resources managers at Navy installations with an interpretation of what processes are needed to prepare INRMPs. This document is divided into three sections. The first section suggests a process to develop an INRMP. The second section addresses traditional technical areas to be included in the INRMP. The third section includes a discussion on implementing the INRMP.

1.6 Sustainability and Compliance

As a steward of military lands, the Navy recognizes that at NAS Whidbey Island diverse and functioning ecosystems are critical not only to maintenance of the few species that might be harvested, but also to perpetuation of the many species that inhabit the installation, as well maintaining its military mission. Conservation biology fully recognizes and embraces the many contributions that need to be made by non-biologists to the conservation of biodiversity. In many cases, social values, economics, and political factors have more of an impact on natural resources management than do biological sciences. The Commanding Officer, operations personnel, and other installation personnel have an influence on environmental conditions. At NAS Whidbey Island, they become part of the solution by working with the NRM and integrating their perspectives within the management process of the installation and implementation of this INRMP.

As NAS Whidbey Island faces pressures of increasing demands and fewer resources to meet them, stewardship of the environment becomes a very practical issue. Biodiversity, which refers to the variety of life and the ecological processes that sustain it, is critical to the integrity and sustainability of

the NAS Whidbey Island ecosystems. This concept of biodiversity is central to ecosystem management, which is the basis for NAS Whidbey Island's natural resources management.
Sustainability is a systemic concept to preserve biodiversity and ensure the integrity of natural ecosystems over time while meeting the needs of the military mission. This concept of conservation and sustainability goes beyond the definition of compliance, which is simply meeting the minimum requirements of laws and regulations that pertain to the environment. NAS Whidbey Island personnel will take an active approach to managing the natural resources of the installation and will integrate all plans and operations into the concepts of conservation, biodiversity, and sustainability of these resources. This INRMP, as a whole, outlines a strategy for sustaining biodiversity and the ecosystem as well as plans for complying with applicable regulations while meeting the needs of the military mission.

1.7 Review and Revision Process

NAS Whidbey Island will evaluate the effectiveness of its INRMP annually. The evaluation will utilize the seven areas in the Navy's web-based Metrics tool on the NNavy's Conservation Website in EMS WEB. The evaluation will include the following seven areas:

- *INRMP Implementation;*
- *Partnerships/Cooperation and Effectiveness;*
- *Team Adequacy;*
- *INRMP Impact on the Installation Mission;*
- *Status of Federally Listed Species and Critical Habitat (CH);*
- *Ecosystem Integrity;*
- *Fish and Wildlife Management and Public Use.*

Use of the Metrics Builder to accomplish the INRMP Annual Reviews will also generate Navy conservation program metrics to measure effects of the conservation program on the installation mission and the status of our relationship with USFWS, NMFS, and WDFW.

The annual evaluation must be completed in cooperation with the appropriate field-level offices of USFWS, NMFS and WDFW. The cooperating partners will work together to measure both the successes and issues resulting from INRMP implementation. During these reviews, it may be determined that an installation's current INRMP is effective and is not in need of revision. With agreement from USFWS, NMFS, and WDFW, resigning the existing INRMP with thorough written documentation of the annual informal evaluations may be used to substitute for the five-year formal rewrite. In addition, minor changes can be made to the INRMP following annual reviews that will prevent the need for a more costly and time-consuming revision following the five-year review. Therefore, it is NAS Whidbey Island's intent to document annual reviews and work with USFWS, NMFS, and WDFW to utilize the annual review process to meet the five-year formal review requirement whenever possible. Prior to conducting the annual reviews with the INRMP signatories, NASWI will consult with and solicit input from local tribal entities concerning these reviews and the following years proposed natural resources management actions and projects.

1.8 Commitment of the USFWS, NMFS and WDFW

No element of the SAIA is intended to either enlarge or diminish the existing responsibility and authority of the USFWS, NMFS, or WDFW concerning fish and wildlife responsibilities on military lands. The Sikes Act requires the INRMP be prepared in cooperation with the USFWS and appropriate state fish and wildlife agency (in Washington State it is WDFW). An INRMP reflects mutual agreement of the parties concerning the conservation, protection, and management of fish and wildlife resources. In addition, USFWS, NMFS and WDFW will review the INRMP as to its effectiveness and revalidate it (by signatures) at least once every five years.

1.9 Sikes Act Cooperative Agreement

A cooperative agreement under the Sikes Act was developed between NAS Whidbey Island, the US Fish and Wildlife Service, and Washington Department of Fish and Wildlife and signed in 1996 (see Appendix B for the complete text of this agreement). The purpose of this agreement is foster a continued cooperation in natural resources management on NAS Whidbey Island by the parties.

1.10 Management Strategy

Ecosystem management is a goal-driven approach to environmental management that is at a scale compatible with natural processes; is cognizant of nature's time frames; recognizes social and economic viability within functioning ecosystems; 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. The ecosystem management approach has the overarching goal of protecting the properties and functions of natural ecosystems. Over the long term, this approach will maintain and improve the sustainability and biological diversity of terrestrial and aquatic ecosystems while supporting sustainable economies and communities. Maintenance of healthy ecosystems supports realistic military training and testing, which in turn promotes mission readiness.

The Commander, Navy Region Northwest considers this approach to be responsible stewardship. The Natural Resources Management Program is based on the premise that responsible stewardship and ecosystem management are synonymous and are compatible with integrated natural resources management.

1.10.1 Natural Resources Management Strategy

The natural resources management strategy for NAS Whidbey Island begins with three words: "What, Where, When":

- **What:** what natural resources, habitats, vegetation, wildlife and water resources are on the installation?
- **Where:** where are these resources located?
- **When:** when are they present on the installation?

NRM will use the best available data that helps answer the "What, Where, When" questions for management decisions for the installation.

a) Early Review and Risk Assessment: Early review of proposed actions and the assessment of environmental risk is achieved at NAS Whidbey Island by the NAS Whidbey Island review process, which requires that all new projects, programs, and operations, or changes to existing projects, programs, and operations, be reviewed by the Environmental Division staff for potential impacts to the environment, including potential impacts to natural resources. The NRM is a member of the Environmental Division and is able to review planned actions, assess the risks to natural resources, and provide comments and/or alternatives to the action proponents that will minimize or eliminate the risks, if possible. The early review process also allows the Environmental Planner an opportunity to identify the appropriate NEPA documents that will be generated based on the proposed action and the alternatives.

The NRM is not exempt from the review process, or from the requirements of NEPA. Agricultural or shellfish harvesting leases, research projects, and restoration projects, just to name a few possible natural resource actions, must all be reviewed for environmental risks and impacts, the same as if the proposed action is a building project or a new training operation.

b) Restoration and Enhancement of Resources: The NRM will keep abreast of installation military requirements and identify areas heavily impacted by the operations and thus not appropriate for restoration activities. A ranking system must be developed in order to make efficient use of diminishing budgets and to focus restoration and monitoring activities. Mission, biological, seasonal, or budgetary constraints may dictate when restoration projects can be implemented. Restoration planning must be detailed enough to allow for successful completion of the project. Monitoring for success or failure should also be a key component of any restoration or enhancement planning.

1.11 Anti-Deficiency Act

All actions contemplated in this INRMP are subject to the availability of funds properly authorized and appropriated under Federal law. Nothing in this INRMP is intended to be nor must be construed to be a violation of the Anti-Deficiency Act, 31 U.S.C. §1341.

2.0 CURRENT CONDITIONS AND USE

2.1 Station Location

Whidbey Island is located in western Washington; the southern end lies approximately 20 miles north of Seattle. The Island is 65 miles long and has a land area of 172 square miles. NAS Whidbey Island is comprised of four separate primary land units located in central and northern Whidbey Island, which total approximately 8,200 acres in size (see Figure 1). Ault Field (which includes Racon Hill) is located 5 miles north of the town of Oak Harbor and is bounded on the west by the Strait of Juan de Fuca and on the east by State Route (SR) 20. Seaplane Base lies within the town of Oak Harbor and is bounded on the south by Crescent Harbor and on the north by Crescent Harbor Road. Outlying Field (OLF) Coupeville lies approximately 20 miles south of Ault Field and is approximately 2 miles south of the town of Coupeville. It is bounded on the east by SR 20 and on the west by Keystone Road. Lake Hancock is located approximately 9 miles south of the town of Coupeville and is bounded on the west by Admiralty Inlet and on the east by SR 525. Figure 2-1 shows the current configuration of buildings, roads, and runways for NAS Whidbey Island properties.

NAS Whidbey Island also leases approximately 400 square feet (20 feet by 20 feet) of beachfront property at Admiralty Bay from Fort Casey State Park for placement of a navigational marker. A one-story cinderblock building and remnants of a small boat pier sit on and adjacent to the property that was used by spotters during practice bombing runs in Admiralty Inlet during and after World War II.

2.2 History and Mission of the Station

Ault Field was constructed in 1942 as a land plane-operating base and was expanded in 1950 with the construction of two 8,000-foot (2,438-meter) runways, two hangars, a Bachelor Officer's Quarters (BOQ), barracks, a mess hall, and a chapel. Ault Field serves as the command center for NAS Whidbey Island. It includes the main airfield, most of the administrative and industrial buildings, the station hospital, temporary housing, apartments for single enlisted personnel, and several recreational areas. Ault Field is the most highly developed of the four installations that comprise NAS Whidbey Island, yet the area includes a wide variety of natural resources. Ault Field totals approximately 4,253 acres in size. Figure 2-2 shows Ault Field on a 2009 aerial photograph.

Seaplane Base was originally commissioned in 1942 as "Rearming Base, NAS Seattle." It served as a base for patrol plane operations, rocket-firing training, recruit training, petty officer training, and torpedo overhaul. At the end of World War II, the base was placed on a reduced operating status. It was then shifted back to full operating status in 1949, and an all-weather station was constructed to support fleet and Alaskan operations. Family housing was built on the base in 1950. Seaplane Base is currently used as a services and support area for NAS Whidbey Island personnel and their families. Figure 2-3 shows the Seaplane Base on a 2009 aerial photograph.

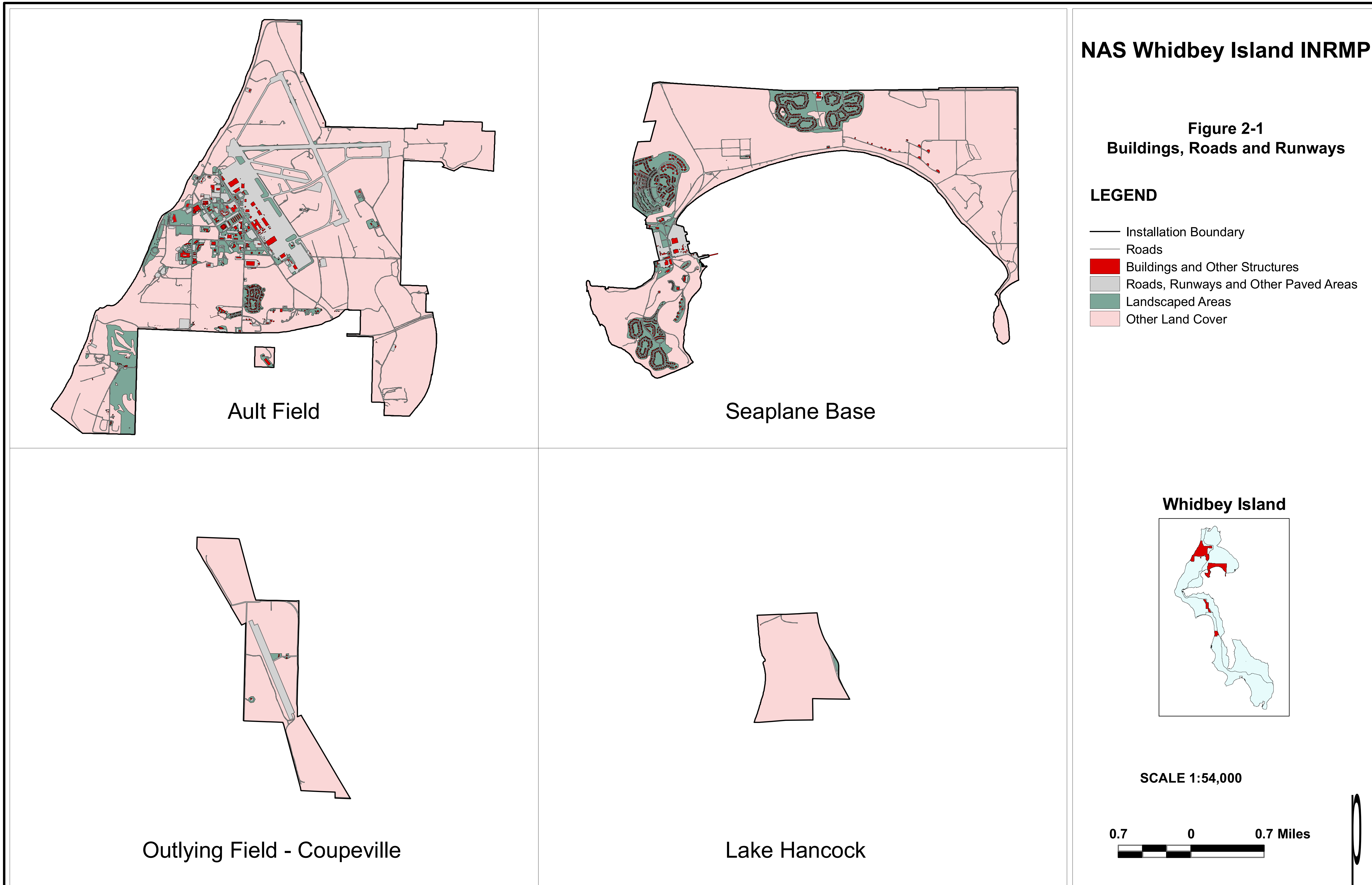
OLF Coupeville was constructed in 1943 to serve primarily as a practice landing strip. Following World War II, OLF Coupeville was placed on reduced operating status and in 1956 was placed on inactive status, where it remained until it was reactivated in 1967. It is currently used as a training runway for simulated carrier landings. Approximately 15,000 fleet carrier-landing practices are flown annually at OLF Coupeville. Most scheduled operations occur during evening and nighttime hours (1800-0100), since the primary use of the site is for simulated nighttime carrier landings. The lack of development and associated lighting in the vicinity of OLF Coupeville facilitates realistic simulations for conducting carrier landings in darkness. Figure 2-4 shows OLF Coupeville on a 2009 aerial photograph.

Lake Hancock, previously known as "Target Range Lake Hancock," was established in 1943 as a practice bombing range for aircraft stationed at NAS Whidbey Island. Practice bombs, practice rockets, and sand bombs were dropped on the site. This use of the site for munitions practice was discontinued in the early 1970s. Lake Hancock (estuary) is considered closed for impact operations under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). It was swept and cleared of range expendable materials by Explosive Ordnance Disposal (EOD) in the early 1970s. In 1972 and 1973, approximately 15.5 tons of ordnance was cleared from the range. Due to the marshy conditions of the target area, any remaining ordnance is likely at depths of 5 to10 feet. Figure 2-5 shows Lake Hancock on a 2009 aerial photograph. Lake Hancock is still used for non-intrusive training exercises such as Unmanned Aerial Vehicle (UAV) operations and helicopter training exercises. The area is primarily managed for wildlife and wetland conservation. Lake Hancock was placed on the Washington Register of Natural Areas in 1992 because of its value as an ecologically important salt marsh. With the exception of a small roadside interpretive area, the site is off-limits to the public due to the potential hazard from unexploded spotting charges.

The current mission of NAS Whidbey Island is to provide land-based support and training for tenant units of EA-6B "Prowler" and EA-18G "Growler" aircraft based on both coasts and for P-3 and EP-3 aircraft in the Pacific Northwest. NAS Whidbey Island has supported the Expeditionary Electronic Attack (VAQ) community for over 30 years. It is currently home to:

- Three Expeditionary VAQ EA-6B squadrons, which forward deploy to land-based sites.
- Nine carrier air wing (CVW) VAQ Fleet squadrons (currently transitioning from EA-6B aircraft to EA-18G aircraft, to be completed by 2013), which deploy with aircraft carriers.
- The VAQ Fleet Replacement Squadron (FRS), which supports EA-6B aircraft and EA-18G aircraft.
- Three P-3 maritime patrol squadrons (with phased transition to P-8A aircraft beginning in 2016).
- Two EP-3 fleet air reconnaissance squadrons.
- One C-9 fleet logistics squadron.
- MH-60S search-and-rescue helicopters.

P3 Orion and EA6B Prowler over Deception Pass.


NAS Whidbey Island INRMP
Figure 2-1
Buildings, Roads and Runways
LEGEND
Installation Boundary
Roads
Buildings and Other Structures
Roads, Runways and Other Paved Areas
Landscaped Areas
Other Land Cover
Ault Field
Seaplane Base
Outlying Field - Coupeville
Lake Hancock
Whidbey Island
SCALE 1:54,000
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0.7 Miles

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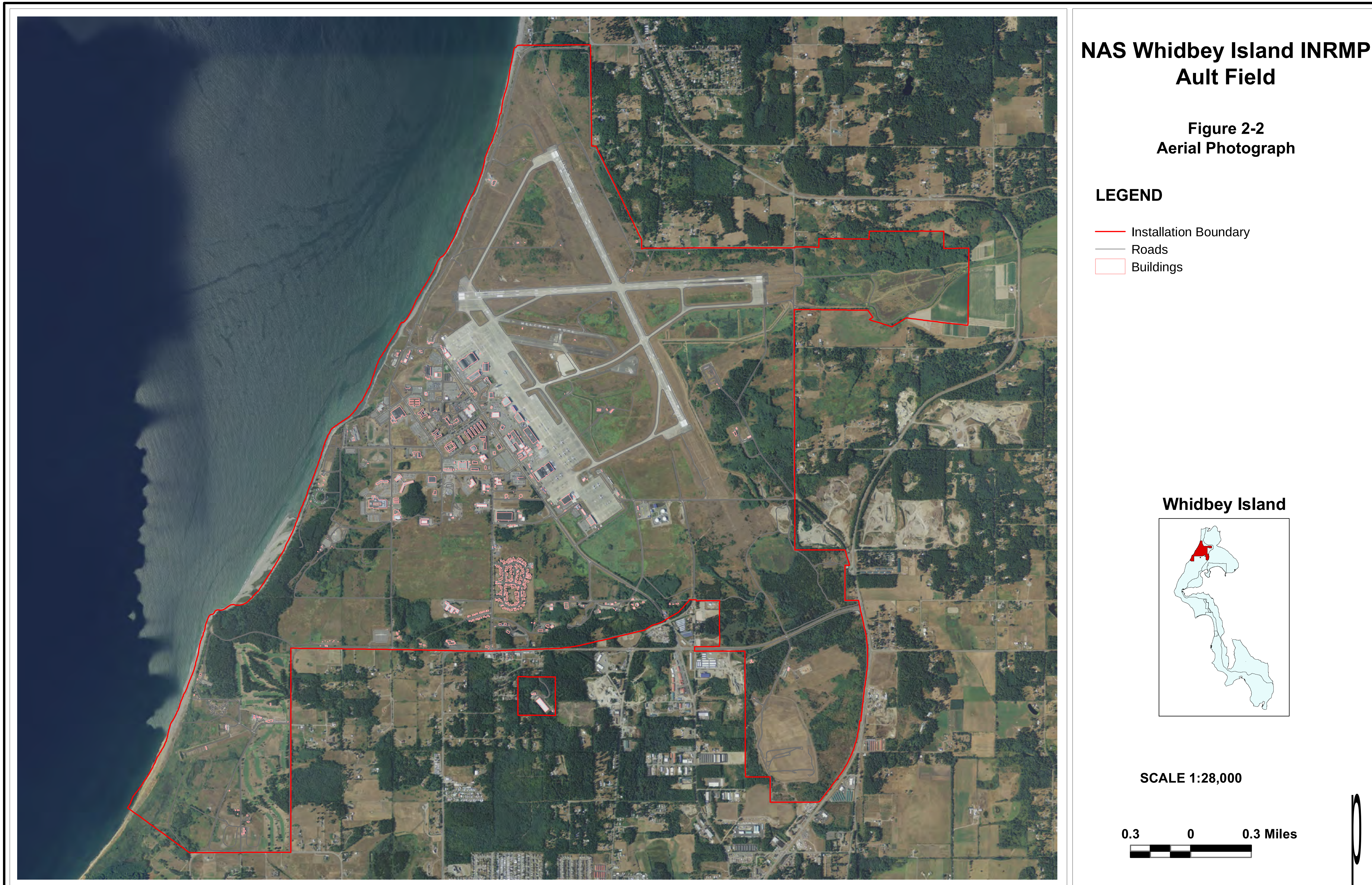
NAS Whidbey Island INRMP
Ault Field
Figure 2-2
Aerial Photograph
LEGEND
Installation Boundary
Roads
Buildings
Whidbey Island
SCALE 1:28,000
0.3
0
0.3 Miles

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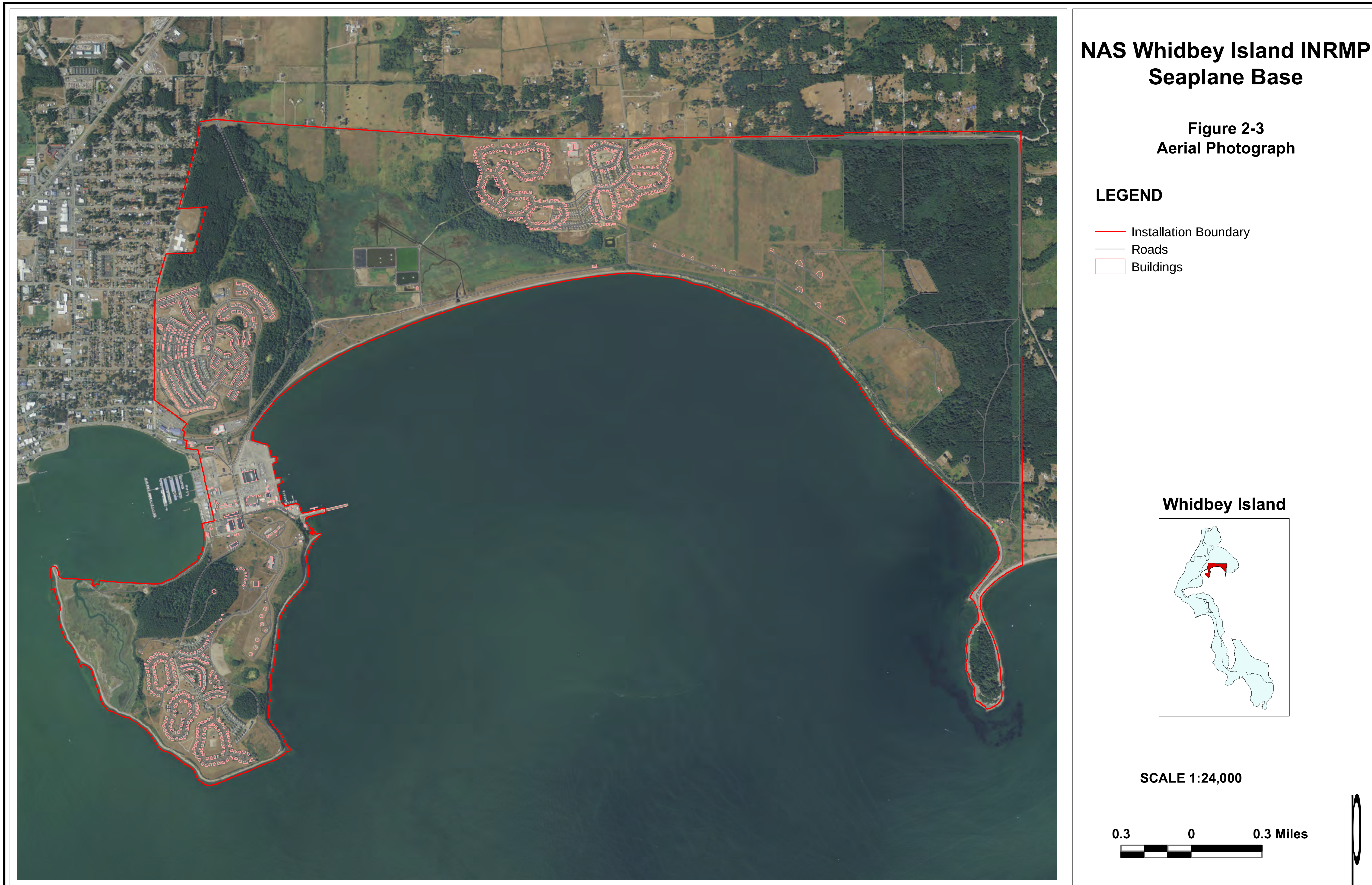
NAS Whidbey Island INRMP
Seaplane Base
Figure 2-3
Aerial Photograph
LEGEND
Installation Boundary
Roads
Buildings
Whidbey Island
SCALE 1:24,000
0.3
0
0.3 Miles

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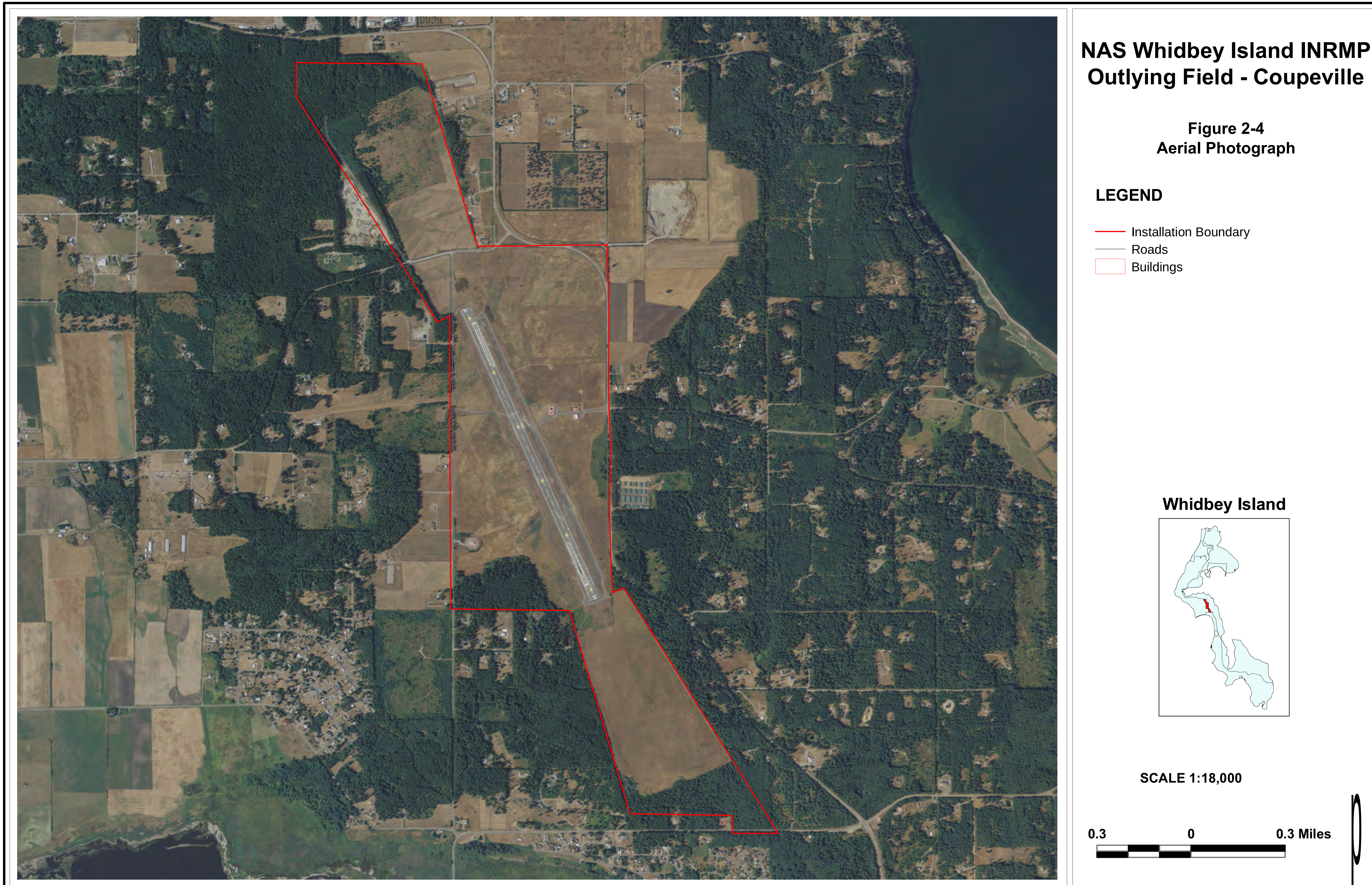
NAS Whidbey Island INRMP
Outlying Field - Coupeville
Figure 2-4
Aerial Photograph
LEGEND
Installation Boundary
Roads
Buildings
Whidbey Island
SCALE 1:18,000
0.3
0
0.3 Miles

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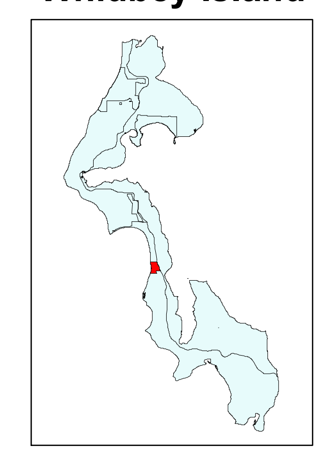
NAS Whidbey Island INRMP
Lake Hancock

Figure 2-5
Aerial Photograph

LEGEND

- Installation Boundary
- Roads
- Buildings



SCALE 1:8,000

0.1 0 0.1 Miles

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Those units conduct aircraft flight training in and around NAS Whidbey Island properties and also train in nearby Navy range complex assets. The station is also a center for the Navy and Marine Corps reserve training activities in the Pacific Northwest. Twenty-six other tenant commands are located on the installation including a Navy explosive ordnance detachment the conducts underwater explosive ordnance training in Crescent Harbor and a marine security and patrol boat unit that also conducts small boat training in Crescent Harbor. Both of those units can provide support to civilian law enforcement agencies around Puget Sound.

2.3 General Physical Environment

The landform of NAS Whidbey Island has been directly shaped by several glaciation events and extensive seismic activity. Erosion and deposition after these geological events has created an uneven topography that generally slopes towards the ocean and relatively shallow soils underlain with unconsolidated glacial till.

2.3.1 Climate

Whidbey Island has a mid-latitude west coast marine climate that is characterized by moist, mild winters and by cool, dry summers. Cool, moist, maritime polar air moving east by northeast into the area from the Pacific Ocean moderates temperature extremes in western Washington. Whidbey Island receives less annual precipitation than nearby regions because it lies in the rain shadow of the Olympic Mountain Range, which is located southwest of the island on the Olympic Peninsula. Average annual precipitation recorded at Ault Field is approximately 19 inches (48 centimeters), compared to annual averages of 38 inches (96 cm) in Seattle and 36 inches (91 cm) in both Everett and Bellingham (Owenby and Ezell 1992; NPMOF Whidbey 2002).

Approximately 80 percent of the annual precipitation on Whidbey Island is recorded during the cooler months of October through May. Late fall and winter days are typically cloudy and drizzly with occasional fog. Spring is a continuation of winter weather with less precipitation and more frequent breaks in the cloud cover, while summer and early fall days are often sunny and clear. Throughout the entire year, humidity is generally high, primarily due to low evaporation rates that result from the high degree of cloud cover and low annual incoming solar radiation. Snowfall is rare. The average date of the last killing frost is March 30th, and the average first killing frost occurs on November 10th (SCS 1991). Precipitation and temperatures at NAS Whidbey Island are indicated in Table 2-1.

The prevailing direction of the winds in the vicinity of Whidbey Island is from the south or southwest in the fall and winter and from the west or northwest in spring and summer. The strongest winds typically blow from the south as intense Pacific winter storms move inland. Extreme winds at 30 feet (9 meters) above ground level can be expected to exceed 55 miles per hour (mph, 88 kph) once in two years, 80 mph (129 kph) once in 50 years, and 90 mph (145 kph) once in 100 years (SCS 1991).

2.3.1.1 Climate Change

Global mean temperatures have increased significantly over the last century, causing changes in local temperature and precipitation, and resulting in widespread effects on the 29 million acres of land that DoD stewards. Rising levels of carbon dioxide and other heat-trapping gases have warmed the earth and are already causing wide-ranging impacts, from rising sea levels, to melting snow and ice, to more drought and extreme rainfall. Scientists project that these trends will continue and in some cases accelerate, posing significant risks to human health, our forests, agriculture, freshwater supplies, coastlines, and other natural resources.

Global mean temperatures have increased significantly over the last century, causing changes in local temperature and precipitation, and resulting in widespread effects on the 29 million acres of

Table 2-1. Precipitation and Temperatures at NAS Whidbey Island (Ault Field)

Month	Precipitation (in.) 2001	Average Precipitation (in.) 1945-90	2001 Average Max Temp (^{0}F)	Average Max Temp (^{0}F) 1945-90	2001 Average Min Temp (^{0}F)	Average Min Temp (^{0}F) 1945-90
January	1.77	2.4	48	45	35	35
February	.77	1.7	47	48	31	36
March	1.81	1.6	52	51	37	38
April	2.20	1.4	54	55	40	41
May	.85	1.2	57	59	44	46
June	1.96	1.2	60	63	48	50
July	.42	.7	63	66	52	52
August	.72	.8	66	66	51	52
September	.41	1.2	60	64	46	49
October	3.04	1.9	55	57	43	44
November	1.89	2.5	51	50	40	39
December	1.82	2.6	42	46	38	36
Total	18.32	19.2				

land that DoD stewards. Rising levels of carbon dioxide and other heat-trapping gases have warmed the earth and are already causing wide-ranging impacts, from rising sea levels, to melting snow and ice, to more drought and extreme rainfall. Scientists project that these trends will continue and in some cases accelerate, posing significant risks to human health, our forests, agriculture, freshwater supplies, coastlines, and other natural resources.

Climate change is pushing temperature and many climate-influenced conditions and events beyond their historical ranges. Washington State is already experiencing trends that are consistent with a warming climate, from warmer temperatures to rising sea levels to melting snow and ice to more drought and extreme rainfall. Many models have been developed to estimate the future effects of climate change and their conclusions vary. But in the Puget Sound based on the averages of those models, it is reasonable to expect general temperatures to increase 3.2^{o}F by the 2040s, winter precipitation to increase by 8% but a summer precipitation to decrease by 14% by the 2080s, sea level to rise 6 inches by the 2050s, ocean pH to decline by 0.3 units by the 2100s, and ocean surface temperatures to increase by 2.2^{o}F by the 2040s (WDOE 2012).

2.3.2 Geologic History

The major geologic surface features of the Puget Lowland were formed by the Puget Lobe of the Cordilleran Ice Sheet. This continental ice sheet formed during the Pleistocene Epoch, which spanned a period from about 2.2 million to 10,000 years ago. Six periods of glaciation or six major advances and retreats of continental glaciers from Canada occurred during this Epoch, known as the "Ice Age". Each glacial advance and retreat (stade) was followed by a warmer interglacial period. Whidbey Island consists of deposits left during three of these glaciations and interglaciations.

The most recent period of advance of the Cordilleran Ice Sheet is known as the Vashon Stade of the Fraser glaciation. This stade extended from the Fraser River Valley in British Columbia south to

Olympia, Washington, reaching its maximum some 18,000 to 14,000 years ago (Burns 1985). It is estimated that the ice of the Vashon Stade covered the area near Whidbey Island to a maximum depth of 4,100 feet (1,250 m) during this period (Burns 1985). The deposit left by this glaciation is an unsorted, boulder-clay layer referred to as Vashon till. This glacial till covers most of the upland areas of Whidbey Island, having buried older Pleistocene deposits from the two previous glaciations. The layer varies in thickness from several feet (1 m) to approximately 175 feet (53 m) (Easterbrook 1968). Pre-Vashon layers are exposed in high cliffs at Double Bluff and Possession Point at the southern end of Whidbey Island. These are studied extensively as the stratigraphy exposed here is the most complete available record of Ice Age deposits in northern Puget Sound (Kruckeberg 1991).

2.3.3 Seismicity

The Puget Sound Basin is historically the most seismically active region in the state. However, most of these earthquakes are so small in magnitude that they are not typically felt. Destructive earthquakes are infrequent, the most recent being the Nisqually earthquake of February 28, 2001. No significant damage was incurred at NAS Whidbey Island from the magnitude 6.8 earthquake; the epicenter of this earthquake was located approximately 81 miles to the south of Ault Field. Seven additional earthquakes of a magnitude greater than 5.0 on the Richter scale have occurred in western Washington and along Vancouver Island in British Columbia in the past 50 years (McCrumb *et al.* 1989, Seattle Times 1996). These are associated with the subduction zone of the Juan de Fuca Plate. Large magnitude shocks (magnitude > 7.0 on the Richter scale) are estimated to occur in the Puget Sound area at intervals of approximately 150 years (Reid, Middleton & Assoc. 1988).

A fault discovered in the 1970s, known as the Northern Whidbey Island Fault, crosses the island in an east-west direction approximately 3 miles north of Oak Harbor. This is considered to be an inactive fault. The most recent apparent significant activity was approximately 18,000 years ago (Cheney 1987). Since earthquakes are a reflection of active tectonic processes, this fault does not appear to present any significant seismic hazard.

The land area of Island County, having been compacted by thick glacial ice, generally provides good foundation material during an earthquake. Potential for damage from ground shaking is highest in such local areas as artificial fill, areas underlain by peat, existing landslides, and on valley floors underlain by unconsolidated alluvial sediments. Much of the runway and airfield areas at Ault Field were constructed on artificial fill.

2.3.4 Topography

Current landforms are predominantly the result of erosion and deposition that occurred as the Vashon ice retreated northward. The topography of Whidbey Island is characterized by gentle to moderate slopes at low elevations. Gentle ridges run the length of the island. Above 200 feet (61 m), the terrain undulates through upland hills and plains. Much of the island is traversed by lowland valleys at elevations below 100 feet (30 m). Steep slopes occur primarily in erosional areas, forming cliffs along the shoreline. The lands that comprise NAS Whidbey Island are generally flat to gently sloped with the exception of steep bluffs in some shoreline areas.

2.3.5 Soils

The soil series occurring on NAS Whidbey Islands lands were grouped into seven categories according to the formation processes and geologic features with which they are associated. These are characterized as follows:

2.3.5.1 Soils of Glacial Uplands

Soils that occur on glacial uplands occupy approximately 75 percent of Island County. On NAS Whidbey Island, they include Bozarth, Casey, Hoypus, Keystone, Swantown, Townsend and Whidbey soil series. These soils are derived from coarse to fine textured glacial drift and all developed under forest except for the Townsend soils. Their internal drainage is moderately good to somewhat excessive.

Most of these soils have only fair suitability for agricultural use. The Hoypus and Keystone soils are generally too droughty for growing crops and are typically used for pasture or left in forest. Casey soils retain moisture to a greater extent than many of the other soils occurring on glacial uplands and so are typically used for agriculture, primarily for pasture and hay in conjunction with dairying. Townsend soils have a higher organic content and retain adequate moisture for growing a number of crops.

2.3.5.2 Soils of Terraces

Terraces are raised, level areas with vertical or sloping sides, often occurring in series, one above the other. On Whidbey Island, they were probably formed by isostatic rebound and the resultant varying sea level. Isostatic rebound occurs as landforms are freed from the weight of ice sheets and glaciers during periods of glacial retreat. Land masses rise up and relative sea level drops during interglacial periods.

Terrace soils do not cover extensive areas at NAS Whidbey Island. They include Coupeville, Ebeys, San Juan, and Snakelum soil series. These soils formed from marine or lake sediments and from glacial outwash; their internal drainage is moderately good to excessive.

The San Juan and Snakelum series are prairie soils derived from gravelly or sandy outwash and are considered relatively good agricultural soils. The Coupeville and Ebeys soils are considered the most highly productive in Island County, producing high yields of wheat, oats, squash, and cabbage for seed, alfalfa, and other crops.

2.3.5.3 Soils of Depressions in Uplands and Terraces

These soils occur in small depressions, basins, or sloping concave areas that receive considerable seepage and runoff from surrounding uplands. The soils are often saturated during the rainy months and are poorly drained. They include Bellingham, Coveland loam, and Norma soils. Norma and Bellingham soils developed under forest, while Coveland soils developed under grasses, sedges and brush. These are typically poorly drained soils that are associated with wetlands unless drained. When drained, Norma and Bellingham soils are used for pasture grasses; Coveland soils are used to grow cereal grains and vegetables.

2.3.5.4 Soils of Deltas, Tidal Flats, Tidal Marshes and Coastal Beaches

Soils of deltas and tidal flats at NAS Whidbey Island include Hovde, Lummi, and Tidal Marsh. Hovde sand is found in nearly level beach areas adjacent to coastal beach soils. Lummi silt loam occurs on deltas and tide flats in tidal salt marsh areas that have been artificially drained using dikes and ditches. Soils mapped as Tidal Marsh are bordered by salty or brackish water and are generally submerged at high tide. These soils have developed from marine sediments and are generally alkaline unless diked and drained.

Coastal beaches are long, narrow, nearly level strips of sandy and gravelly materials. They are above the level of the mean tide, but are swept by storm waves. They occur at the base of coastal bluffs or lowlands bordering the Strait of Juan de Fuca. Tacoma peat occurs in depressional areas adjacent to coastal beach. These soils are not typically considered for agricultural purposes unless diked or drained.

2.3.5.5 Organic Soils

Organic soils are formed from the decomposition of plant material that has accumulated in shallow lakes, on slow-moving stream banks, or in permanently wet depressions. Organic soils are characterized by poor drainage, surface-water ponding, and a slight erosion hazard. By definition, they are hydric soils and wetlands are typically associated with them. Most of these soils receive runoff and seepage from higher elevations; surface runoff from organic soils is typically slow. Soil series of this type occurring at NAS Whidbey Island include Carbondale, Rifle, Tacoma, and Tanwax.

2.3.5.6 Disturbed Soils

The surface layers of disturbed soils have usually been modified by the placement of fill for construction purposes or the removal of surface soil for landfill material. The subsurface characteristics of the original soil have usually not been altered, and control the movement of water on and through the soils. Areas where significant amounts of fill have been placed are mapped on soils maps as “Made Land.”

2.3.6 Shorelines

The west side of Whidbey Island is exposed to wind and wave action from the Strait of Juan de Fuca and is characterized by high eroding bluffs that feed cobble and sand beaches. The shore along the protected east side of the island is comprised of mostly stable gravel and mud beaches.

The lands of NAS Whidbey Island include 15.5 miles (25 km) of shoreline bordering the inland marine waters of Puget Sound. These waters include the Strait of Juan de Fuca, Admiralty Inlet, Oak Harbor, Crescent Harbor, and Saratoga Passage. Shoreline features found at NAS Whidbey Island include depositional beaches, steep bluffs composed of unconsolidated glacial deposits, tidal flats, salt marshes, and modified shorelines composed of artificial fill and seawalls.

No major rivers occur on Whidbey Island. The primary source of sediment to the shorelines of NAS Whidbey Island is the erosion of the bluffs adjacent to the beaches. Of the total length of shoreline, approximately 6.6 miles (10.6 km) are backed by high bluffs. The bluffs are composed of highly erodible unconsolidated material of glacial origin, ranging in size from sand to boulders. Direct wave action accounts for the greatest amount of erosion from the bluffs. Waves undercut the toe of the bluffs, primarily during storm events, and cause slumping. This serves to over-steepen the bluffs and leads to additional slumping and soil falls that occur between major storms. Rain and freeze-thaw activities also contribute to bluff erosion. Although different bluff areas erode at varying rates depending on soil type, wave, and weather conditions, the Natural Resources Conservation Service (NRCS, formerly the Soil Conservation Service) has estimated an overall long-term erosion rate of six to eight inches per year of bluff retreat at NAS Whidbey Island (SCS 1991). Stormwater outfalls that extend over steep bluffs exacerbate erosion problems in some areas.

Varying levels of wave action have resulted in beaches of varying composition. In areas of high wave action, such as headland areas, actively eroding bluffs contribute material of all sizes, but what remains on the beaches is too heavy for the strong waves to remove. Therefore, cobble beaches typically form at headland areas. Lighter weight materials eroded from the bluffs are carried by longshore drift and deposited on beaches where wave action is reduced or a barrier occurs. Sandy beaches typically occur in these accretional areas. Beaches with neutral erosion rates, or areas where material is not actively eroding or accreting, are composed primarily of gravel or coarse sand. These are known as transport beaches.

Areas with neutral erosion rates are typically backed by bluffs with a dense cover of mature vegetation. These bluffs may have a wave-cut scarp at the toe of the slope, but it will usually be small and relatively inactive. Bluffs with high erosion rates are generally quite steep and have minimal vegetative protection. These bluffs have large wave-cut scarps at the toe that are actively eroding.

Navy ownership includes tidelands down to the extreme low tide level which is defined as minus 4.5 feet (-1.4 m) (Taylor 1995). The actual property boundary therefore changes as currents and tidal action move benthic sediments and change underwater elevations. For mapping purposes, the seaward boundary will arbitrarily be designated as the beach boundary assigned in the hydrology layer of the station's AutoCad files. This line is not the legal station boundary and does not correlate to any specific tidal elevation. While the extent of Navy-owned intertidal lands is not depicted in the map figures in this document, these lands will be addressed in the text. All acreage noted in the document for shoreline areas were derived using this AutoCad beach boundary.

2.3.6.1 Shoreline Management

Under the Coastal Zone Management Act (CZMA) federal agencies are required to comply with the enforceable policies of Washington's Shoreline Management Act to the maximum extent practicable. The State of Washington's Shoreline Management Act (SMA) of 1971 (RCW 90.58) is designed to manage the land 200 feet inland from shorelines and associated wetlands. The SMA designates most of the responsibility of the administration of shoreline areas to local governments. The SMA gives preference to shoreline uses in the following order:

- *Recognize and protect the statewide interest over local interest;*
- *Preserve the natural character of the shoreline;*
- *Result in long-term over short-term benefit;*
- *Protect the resources and ecology of the shoreline;*
- *Increase public access to publicly owned areas of the shoreline;*
- *Increase recreational opportunities for the public in the shoreline;*
- *Provide for any other element deemed appropriate or necessary.*

The local jurisdiction that enforces the SMA in the area of NAS Whidbey Island is Island County. Island County adopted its current Shoreline Master Program (SMP) in June 2001 to comply with the SMA that is codified in Island County Code (ICC) at Chapter 17.05. The Seaplane Base is within the Oak Harbor city limits and would also be within the scope of the City of Oak Harbor Shoreline Master Program. The City of Oak Harbor adopted its current Shoreline Master Program (SMP) in December 1998 to comply with the SMA that is codified in Oak Harbor Municipal Code (OHMC) at Chapter 18.10.025. Both SMPs state that they do not directly apply to federal agencies and lands within their areas of coverage, but do refer federal agencies back to the State of Washington SMA program. Both Island County and the City of Oak Harbor are currently reviewing and updating their respective SMPs.

The purpose of the SMPs is to protect shoreline resources and to control development in shoreline areas while enhancing public access to publicly owned shorelines and tidelands. The program acts to concentrate commercial development on shorelines in areas where current commercial uses exist and to prioritize water-dependent uses in shoreline areas. Proposed shoreline developments will be reviewed for consistency with the SMPs during the assessment and analysis phase of the Navy's NEPA review of specific projects. The SMPs contains specific policies concerning marinas, bulkheads, dredging, shoreline protection, and other aspects related to shoreline management.

2.3.7 Soil Erosion

The soils of NAS Whidbey Island are not particularly prone to erosion in their undisturbed conditions. This is due to the following factors: low annual precipitation, gentle topography, lack of major river drainages, abundant native vegetative cover, and lack of strong winds during the dry season (SCS 1991). However, the soils can become erodible under conditions associated with development. Areas of significant, long-term erosion at NAS Whidbey Island include some coastal bluffs and the main drainage ditches at Ault Field.

2.3.7.1 Soil Erosion Management

Minimizing soil erosion is a primary goal of resource managers at NAS Whidbey Island. While bluff erosion is the main form of soil erosion occurring at the station, there are few cost-effective actions that can be taken to reduce this loss of soil. Traditional methods such as bulkheads and rock riprap are costly and reduce the quality of shoreline and nearshore aquatic habitats. If the situation is suitable, future shoreline stabilization should focus on more environmental friendly bioengineering techniques, rather than bulkheads or rock riprap. Bioengineering techniques and guidance can be found at http://www.pugetsoundnearshore.org/technical_papers/management_measures.pdf and http://www.ser.org/sernw/pdf/WDOE_alt_shoreline_protection.pdf. To limit impacts to nearshore habitats, structural modifications such as bulkheads or rock riprap could be used on a limited basis to reduce the shoreline erosion rate at a specific site by moderating wave action at the toe of bluffs. Impacts on surrounding areas and on long-term sediment transport patterns must be taken into account when planning slope stabilization construction projects, since the coastal bluffs provide material for nearby beaches. As new projects are developed on or adjacent to obsolete and unneeded hard shoreline armoring, they structures should be removed and replaced with bioengineering techniques, if suitable for the specific site, instead of attempting to repairing with similar hard armoring.

The general management approach to bluff erosion is preventing structural damage by sighting structures in suitable locations. Severe development constraints are imposed on bluff slopes in excess of 15 percent due to the high risk of slope failure and erosion problems. An estimated long-term rate of bluff retreat of 6-8 inches (15-20 cm) per year is accounted for when planning the locations of structures adjacent to high bluffs.

The focus of soil erosion management at the station is generally on controlling erosion at construction sites. Erosion control practices are typically implemented at construction sites and areas where the ground or vegetation cover is disturbed. Erosion and sediment control involves minimizing and stabilizing disturbed areas for the primary purpose of keeping sediment from entering water bodies. It often includes the temporary installation of control structures such as silt fences and sediment traps. Erosion and sediment control measures are typically designed in accordance with applicable “best management practices” (BMPs). Sediment discharge at all construction sites that will disturb over one acre of land is regulated by the EPA, and the use of BMPs is required in all such circumstances. The construction contractor is usually liable for complying with EPA discharge permit conditions.

Practical combinations of the following BMPs are typically utilized, as a minimum, in planning for any land-disturbing activity.

- ***Fit the activity to the topography and soils*** - Roadways, buildings and other permanent features should conform to the natural characteristics of the site. Areas of steep slopes, erodible soils, and soils with severe limitations for the intended uses should not be utilized without overcoming the limitations through sound engineering practices.

- ***Minimize the disturbed area and the duration of exposure to erosive elements -*** Clearing of natural vegetation should be limited only to those areas of the site to be developed at a given time. Vegetation native to the Pacific Northwest, and Whidbey Island in particular, should be retained, protected, and supplemented whenever practicable and consistent with operational needs.
- ***Schedule construction during appropriate months -*** Major land clearing and grading operations should be scheduled during seasons of low potential runoff.
- ***Stabilize disturbed areas immediately -*** Erosion control matting, temporary or permanent vegetation, and mulch or a combination of these measures should be employed as quickly as possible after the land is disturbed. These temporary measures should be employed immediately after rough grading is completed if a delay is anticipated in obtaining finished grade. The finished slope of a cut or fill should be stable and ease of maintenance considered in the design. All roadways, parking areas, and paved areas should be stabilized with a gravel subbase, temporary vegetation, or mulch.
- ***Retain sediment -*** Sediment basins, sediment barriers and related structures should be installed to filter or trap sediment on the site to be disturbed. The most effective method of controlling sediment, however, is to control erosion at its source. Sediment retention structures should be planned to retain sediment when erosion control methods are not practical, are insufficient, are in the process of being installed, or have failed due to some unforeseen factor. Plans for maintenance of sediment control structures and removal of collected sediment following construction shall be developed prior to starting construction.
- ***Avoid encroaching on watercourses -*** Permanent buildings should not be constructed in flood-prone or high erosion hazard areas. Earth fills that would adversely obstruct water flows or increase downstream velocity of water flows should not be constructed in flood-prone areas. When necessary to span a flood prone area or watercourse, bridge or culvert openings should be sized to permit passage of peak discharges without causing undue restrictions in water flows or creating excessive downstream velocities. Uses of flood prone areas should be limited to activities that are not adversely impacted by flooding, scour, and sediment deposition. Temporary bridges or culverts should be employed when construction equipment is required to cross natural or constructed channels. If possible, construction should be avoided within at least 50 feet (15 m) of wetlands.

Standard vegetation planting practices have been proposed by the Natural Resources Conservation Service (NRCS) to reduce erosion on exposed soil surfaces (SCS 1991). These practices can be applied to all watershed surfaces where exposed soil is present. Following are some of the practices that can be incorporated in revegetation plans:

- Plant native vegetation, such as trees, shrubs, vines, grasses, or legumes, on highly erodible or critically eroding areas. Examples of applicable areas are eroded fields, disturbed levees, excavation sites, road construction areas, or gullied areas where vegetation is difficult to establish by usual planting methods.
- Use companion crops that aid in the establishment of permanent cover, especially when mixed plantings are done during marginal planting periods.
- Use block sod or matting in controlling erosion adjacent to structures.

- Seed in annual, native grasses for use in temporary erosion control.
- Use irrigation when planting occurs in late spring or summer, or during unseasonably hot, dry weather.
- Use low maintenance native plants to increase plant survival rates and ensure long-lasting erosion control.

2.3.8 Ault Field Resources

2.3.8.1 Topography

Ault Field ranges in elevation from sea level to approximately 220 feet (67 m). The topography is gently to moderately sloping with the exception of steep bluffs near Rocky Point. The central portion of Ault Field, containing the runways, taxiways, and operations buildings, is in a low-lying area approximately 20 to 50 feet (6-15 m) above sea level. Approximately 515 acres (1.9 km^2) in this area, known as Clover Valley, were filled and leveled for the construction of runways and taxiways. The topography of Ault Field is represented in Figure 2-6.

2.3.8.2 Shorelines

Ault Field has a total of 4.4 miles (7.1 km) of shoreline bordering the Strait of Juan de Fuca. Small rock headlands occur at Rocky Point, dividing pockets of sand and gravel beaches. West Beach is an accretional beach composed primarily of sand with patches of gravel and a well-established back-shore berm. Wave action at West Beach is moderate. Concrete rubble and riprap have been used to modify approximately 1.6 miles (2.6 km) of shoreline near the north end of Ault Field. The practice of randomly dumping concrete rubble along this portion of shoreline has been discontinued and is prohibited.

Longshore drift moves sediment in a northerly direction along the west side of Whidbey Island. Bluff erosion is evident near Rocky Point, along approximately one mile of shoreline, and along a stretch extending from the Recreational Vehicle (RV) Park northward for 0.4 miles (640 m) (SCS 1991). Long-term bluff erosion has been measured near the west-end of Eighth Street at about 5.5 in (14 cm) per year (SCS 1991).

The storm sewer outfall, located on the beach approximately 1.1 miles (1.8 km) south of the north boundary of the field, acts as a groin to restrict the transport of beach sediments (SCS 1991). Since the long-term sediment transport in this portion of the Strait of Juan de Fuca is in a northerly direction, sediments are being deposited on the beach to the south of this storm sewer outfall. The beach north of the outfall is eroding at a slow rate with sand being washed out from between the pieces of rubble, and the rubble being moved on the beach. Depositional beaches occur south of the filled land around the airfield, south of the RV Park, and along the south boundary of Ault Field (SCS 1991). Overall, the shorelines at Ault Field are relatively stable.

2.3.8.3 Soils

Most of the lands (51 percent) at Ault Field are comprised of soils of glacial uplands, primarily Hoypus gravelly loamy sand and Whidbey gravelly sandy loam. These are well-drained soils that are suited for construction of roads and buildings. Another 20 percent of the land area is comprised of more poorly draining soils of depressions in uplands and terraces. Close to 400 acres of poorly drained land was filled to facilitate construction of portions of the airfield and administrative areas. Organic soils and soils of tidal marshes and coastal beaches predominate in the most poorly drained, largely wetland areas of Ault Field. Acreage of soil series is presented in Table 2-2, and the distribution of soils at Ault Field is shown in Figure 2-7.

Table 2-2. Soil Series Occurring at Ault Field

Map Symbol	Soil Name	Slope (%)	Total Acres	Percent of Ault Field
Soils of Glacial Uplands				
Bd	Bozarth fine sandy loam	0-5	75	1.8
Cb	Casey fine sandy loam	0-5	37	0.9
Cc	Casey fine sandy loam	5-15	11	0.2
Hb	Hoypus coarse sandy loam	0-5	72	1.7
He	Hoypus gravelly loamy sand	0-5	347	8.1
Hf	Hoypus gravelly loamy sand	5-15	1,079	25.4
Hg	Hoypus gravelly loamy sand	15-30	45	1.0
Kb	Keystone loamy sand	0-5	45	1.0
Sg	Swantown gravelly sandy loam	0-5	12	0.3
Sh	Swantown gravelly sandy loam	5-15	41	1.0
Wa	Whidbey gravelly sandy loam	0-5	19	0.4
Wb	Whidbey gravelly sandy loam	5-15	371	8.7
Wc	Whidbey gravelly sandy loam	15-30	12	0.3
Soils of Terraces				
Cm	Coupeville silt loam	0-2	61	1.4
Ea	Ebeys sandy loam	0-5	131	3.1
Sa	San Juan coarse sandy loam	0-5	39	0.9
Soils of Depressions in Uplands and Terraces				
Ba	Bellingham silt loam	0-3	289	6.8
Cn	Coveland loam	0-5	453	10.6
Na	Norma loam	0-3	64	1.5
Nc	Norma silt loam	0-2	36	0.8
Soils of Deltas, Tidal Flats, Tidal Marshes, and Coastal Beaches				
Ch	Coastal beach	0-2	59	1.4
Ha	Hovde sand	0-2	7	0.2

Map Symbol	Soil Name	Slope (%)	Total Acres	Percent of Ault Field
Lb	Lummi silt loam	0-2	97	2.3
Td	Tidal Marsh	0-2	13	0.3
Organic Soils				
Ca	Carbondale muck	0-2	377	8.9
Rb	Rifle peat, shallow	0-2	26	0.6
Tb	Tanwax peat	0-2	19	0.4
Disturbed Soils				
Ma	Made land	0-2	396	9.3

2.3.8.4 Soil Erosion

Ongoing shoreline erosion does not threaten any large bluff-top structures, but walkways could be impacted in the future.

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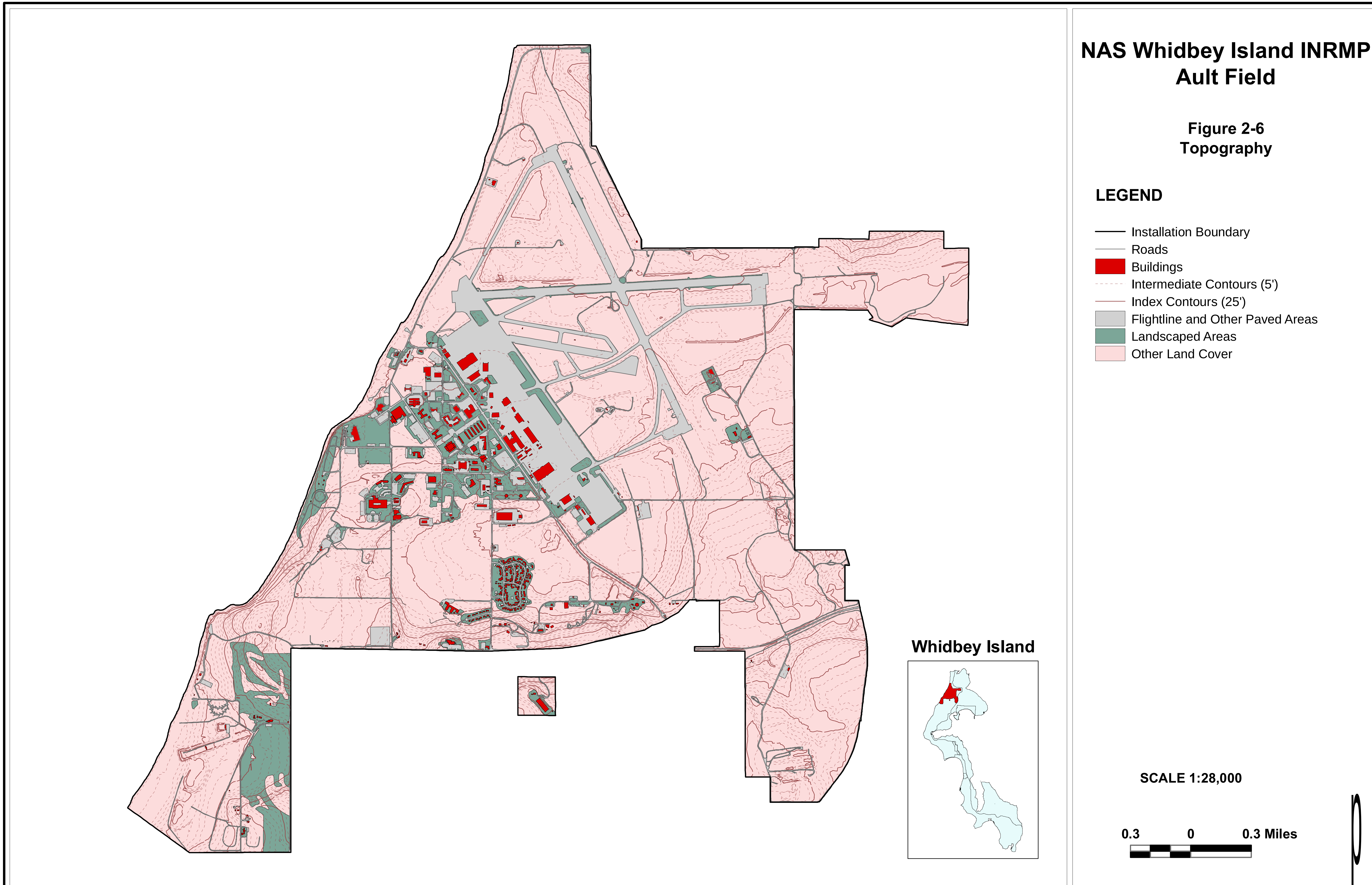
NAS Whidbey Island INRMP
Ault Field
Figure 2-6
Topography
LEGEND
Installation Boundary
Roads
Buildings
Intermediate Contours (5')
Index Contours (25')
Flightline and Other Paved Areas
Landscaped Areas
Other Land Cover
Whidbey Island
SCALE 1:28,000
0.3
0
0.3 Miles

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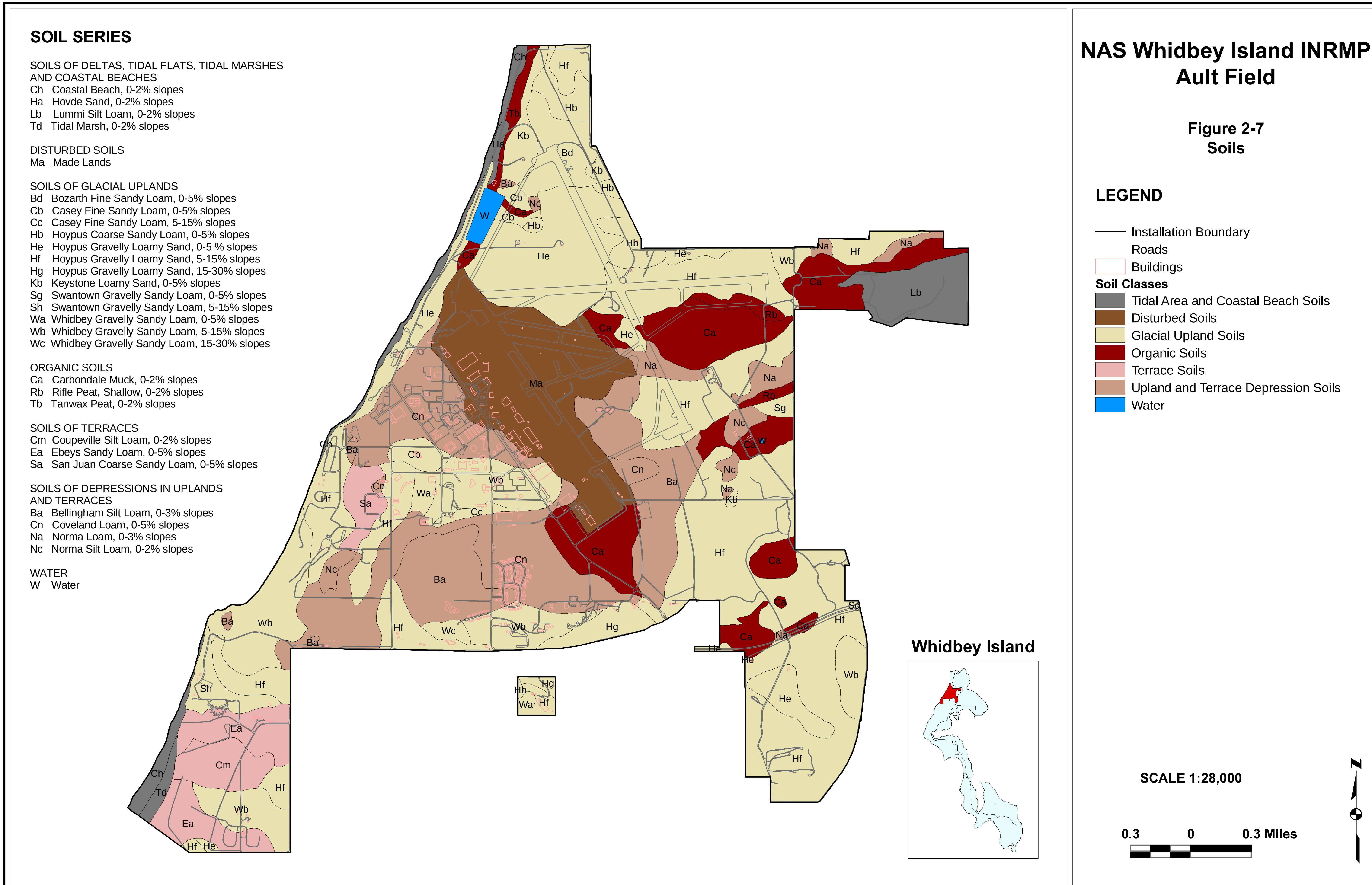
SOIL SERIES
SOILS OF DELTAS, TIDAL FLATS, TIDAL MARSHES AND COASTAL BEACHES
Ch Coastal Beach, 0-2% slopes
Ha Hovde Sand, 0-2% slopes
Lb Lummi Silt Loam, 0-2% slopes
Td Tidal Marsh, 0-2% slopes
DISTURBED SOILS
Ma Made Lands
SOILS OF GLACIAL UPLANDS
Bd Bozarth Fine Sandy Loam, 0-5% slopes
Cb Casey Fine Sandy Loam, 0-5% slopes
Cc Casey Fine Sandy Loam, 5-15% slopes
Hb Hoypus Coarse Sandy Loam, 0-5% slopes
He Hoypus Gravelly Loamy Sand, 0-5 % slopes
Hf Hoypus Gravelly Loamy Sand, 5-15% slopes
Hg Hoypus Gravelly Loamy Sand, 15-30% slopes
Kb Keystone Loamy Sand, 0-5% slopes
Sg Swantown Gravelly Sandy Loam, 0-5% slopes
Sh Swantown Gravelly Sandy Loam, 5-15% slopes
Wa Whidbey Gravelly Sandy Loam, 0-5% slopes
Wb Whidbey Gravelly Sandy Loam, 5-15% slopes
Wc Whidbey Gravelly Sandy Loam, 15-30% slopes
ORGANIC SOILS
Ca Carbondale Muck, 0-2% slopes
Rb Rifle Peat, Shallow, 0-2% slopes
Tb Tanwax Peat, 0-2% slopes
SOILS OF TERRACES
Cm Coupeville Silt Loam, 0-2% slopes
Ea Ebeys Sandy Loam, 0-5% slopes
Sa San Juan Coarse Sandy Loam, 0-5% slopes
SOILS OF DEPRESSIONS IN UPLANDS AND TERRACES
Ba Bellingham Silt Loam, 0-3% slopes
Cn Coveland Loam, 0-5% slopes
Na Norma Loam, 0-3% slopes
Nc Norma Silt Loam, 0-2% slopes
WATER
W Water
NAS Whidbey Island INRMP
Ault Field
Figure 2-7
Soils
LEGEND
Installation Boundary
Roads
Buildings
Soil Classes
Tidal Area and Coastal Beach Soils
Disturbed Soils
Glacial Upland Soils
Organic Soils
Terrace Soils
Upland and Terrace Depression Soils
Water
Whidbey Island
SCALE 1:28,000
0.3
0
0.3 Miles
N

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2.3.9 Seaplane Base Resources

2.3.9.1 Topography

Seaplane Base ranges in elevation from sea level to approximately 420 feet (128 m). The east half of the base has gentle to moderate, west- to southwest-facing slopes. The central portions of the Base are relatively flat but rise to 100 feet (30 m) above sea level near the housing area adjacent to Crescent Harbor Road. The west end shows gentle to moderate slopes occurring on several small hills, with steep bluffs on the Maylor's Point and Forbes Point peninsula. Topography at Seaplane Base is represented in Figure 2-8.

2.3.9.2 Shorelines

Seaplane Base has approximately 10.1 miles (16.2 km) of shoreline, including modified shoreline, depositional beach, and high bank bluffs. Locations of shoreline features are summarized in Table 2-3. The modified shoreline consists of man-made seawalls, beach with dumped rock riprap and concrete rubble, and beach with pilings and plank bulkhead. Seawalls are located on both sides of the isthmus between Oak Harbor and Crescent Harbor, presumably constructed to protect the structures that have been built on the isthmus. The piling and plank bulkhead located on the south side of Oak Harbor is old and has deteriorated to a point where it is no longer effective. Beach erosion occurs behind this structure. The beaches with rock and concrete rubble are located in two reaches. One reach extends eastward from the seawall along Crescent Harbor. The other reach extends westward from the seawall on Oak Harbor to the piling and plank bulkhead described above.

High bank bluffs occur on the Maylor's Point and Forbes Point peninsula, on the east end of Crescent Harbor, and on Polnell Point peninsula. Bluff erosion occurs in all these areas. It is of a sporadic nature, with significant losses occurring during heavy winter storms. Over a period of 37 years of documented coastal erosion at Maylor's Point, the long-term erosion rate was found to be 6 inches (15 cm) per year (SCS 1991). The erosion rate at Polnell Point is somewhat slower than this. Bank sloughing and erosion is particularly severe on unprotected bluffs at drainage ditch overfalls along the Maylor's Point Peninsula and at the east-end of Crescent Harbor (SCS 1991).

Long-term sediment transport is from Maylor's Point to the beaches of Oak Harbor and Crescent Harbor and from Polnell Point to the beaches of Crescent Harbor. Depositional beaches at Seaplane Base occur in Oak Harbor, Crescent Harbor, and on the northeast end of the Polnell Point peninsula.

Table 2-3. Shoreline Features at Seaplane Base.

Location	Modified Shoreline			Eroding Bluffs	Depositional Beach
	Seawalls	Riprap/ Rubble	Plank Bulkhead		
Both sides of isthmus	0.3				
East side of Crescent Harbor		0.8		2.1	
Crescent Harbor					1.4
South side of Oak Harbor		0.3	0.3		1.1
Maylor's and Forbes Point Peninsula				1.8	

Location	Modified Shoreline			Eroding Bluffs	Depositional Beach
	Seawalls	Riprap/ Rubble	Plank Bulkhead		
Polnell Point Peninsula				1.1	
Northeast side of Polnell Point					0.4

2.3.9.3 Soils

There are 23 soil mapping units that occur on Seaplane Base, comprising 14 soil series. Similar to Ault Field, soils formed on glacial uplands are the dominant soil type at Seaplane Base, covering approximately 61 percent of the installation area. About 18 percent of the area is comprised of more poorly draining soils that formed in depressions on uplands and terraces. These depressional soils (Bellingham silt loam and Coveland loam), combined with the Coastal beach, Hovde sand, and Tacoma peat, comprise a full 33 percent of Seaplane Base that is covered in hydric soils or soils that are typically found in wetlands. Not surprisingly, wetlands are a major landscape feature at the installation. In contrast to Ault Field, made land or fill comprises only 3 percent of Seaplane Base, primarily in the commercial area on the isthmus between Crescent Harbor and Oak Harbor. Soil acreage is listed in Table 2-4 and the distribution of soils shown in Figure 2-9.

Table 2-4. Soil Series Occurring at Seaplane Base

Map Symbol	Soil Name	Slope (%)	Total Acres	Percent of Seaplane Base
Soils of Glacial Uplands				
Ce	Casey loam	0-5	64	2.3
Cf	Casey loam	5-15	159	5.6
Cg	Casey loam	15-30	12	0.4
He	Hoypus gravelly loamy sand	0-5	13	0.5
Hf	Hoypus gravelly loamy sand	5-15	242	8.5
Hg	Hoypus gravelly loamy sand	15-30	55	1.9
Kc	Keystone loamy sand	5-15	189	6.7
Kd	Keystone loamy sand	15-30	8	0.3
Sg	Swantown gravelly sandy loam	0-5	16	0.6
Sh	Swantown gravelly sandy loam	5-15	81	2.9
Te	Townsend sandy loam	0-5	25	0.9
Tf	Townsend sandy loam	5-15	6	0.2
Wb	Whidbey gravelly sandy loam	5-15	813	28.8

Map Symbol	Soil Name	Slope (%)	Total Acres	Percent of Seaplane Base
Wc	Whidbey gravelly sandy loam	15-30	35	1.2
Soils of Terraces				
Ck	Coupeville loam	0-3	37	1.3
Sb	San Juan coarse sandy loam	5-15	44	1.6
Soils of Depressions in Uplands and Terraces				
Ba	Bellingham silt loam	0-3	28	1.0
Cn	Coveland loam	0-5	384	13.6
Co	Coveland loam	5-8	86	3.0
Soils of Deltas, Tidal Flats, Tidal Marshes, and Coastal Beaches				
Ch	Coastal beach	0-2	207	7.3
Ha	Hovde sand	0-2	54	1.9
Organic Soils				
Ta	Tacoma peat	0-2	161	5.7
Disturbed Soils				
Ma	Made land	0-2	74	2.6

2.3.9.4 Soil Erosion

Soil erosion is not a major concern at Seaplane Base. Ongoing shoreline erosion does not threaten any bluff-top structures.

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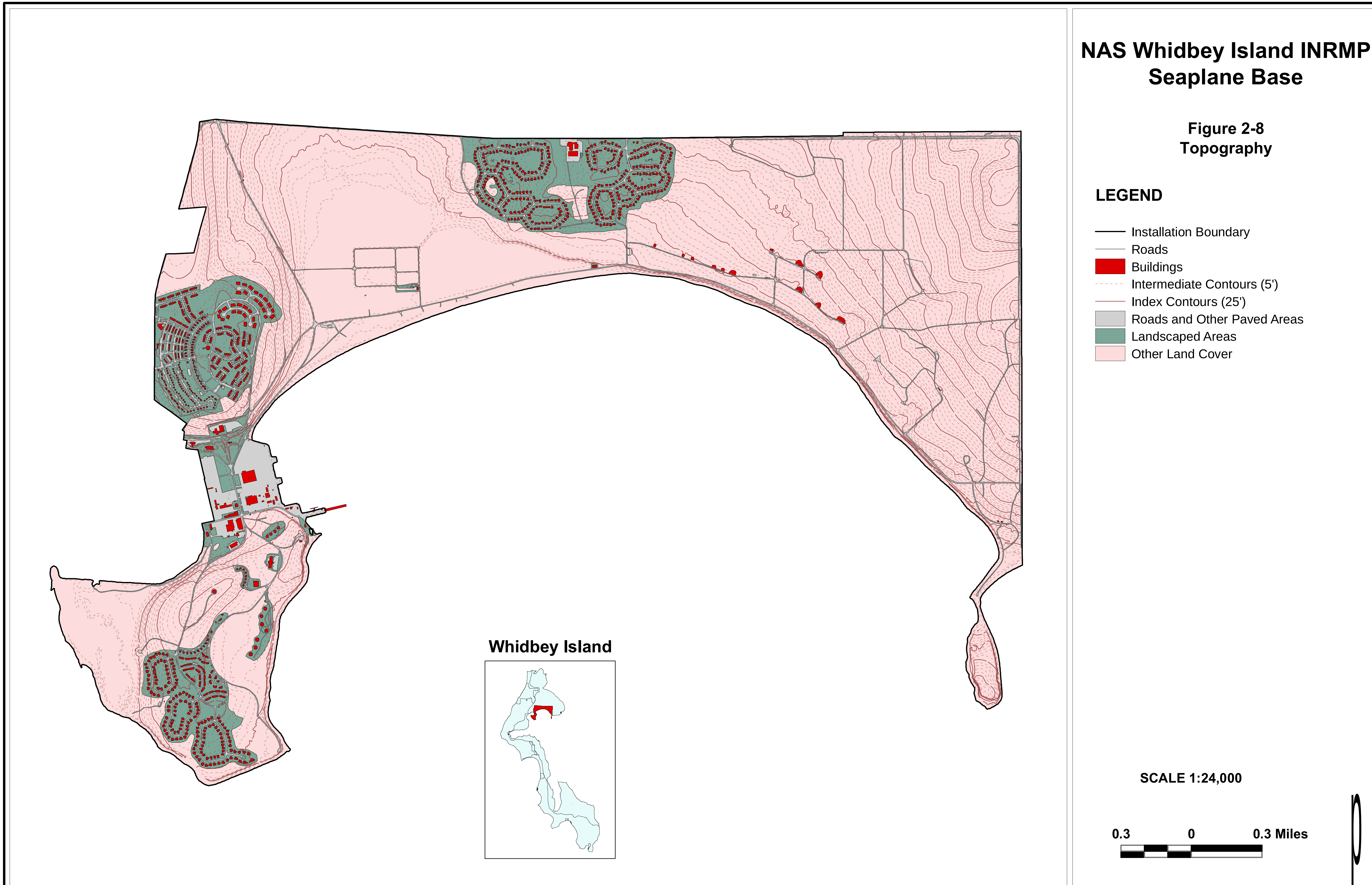
NAS Whidbey Island INRMP
Seaplane Base
Figure 2-8
Topography
LEGEND
Installation Boundary
Roads
Buildings
Intermediate Contours (5')
Index Contours (25')
Roads and Other Paved Areas
Landscaped Areas
Other Land Cover
SCALE 1:24,000
0.3
0
0.3 Miles
Whidbey Island

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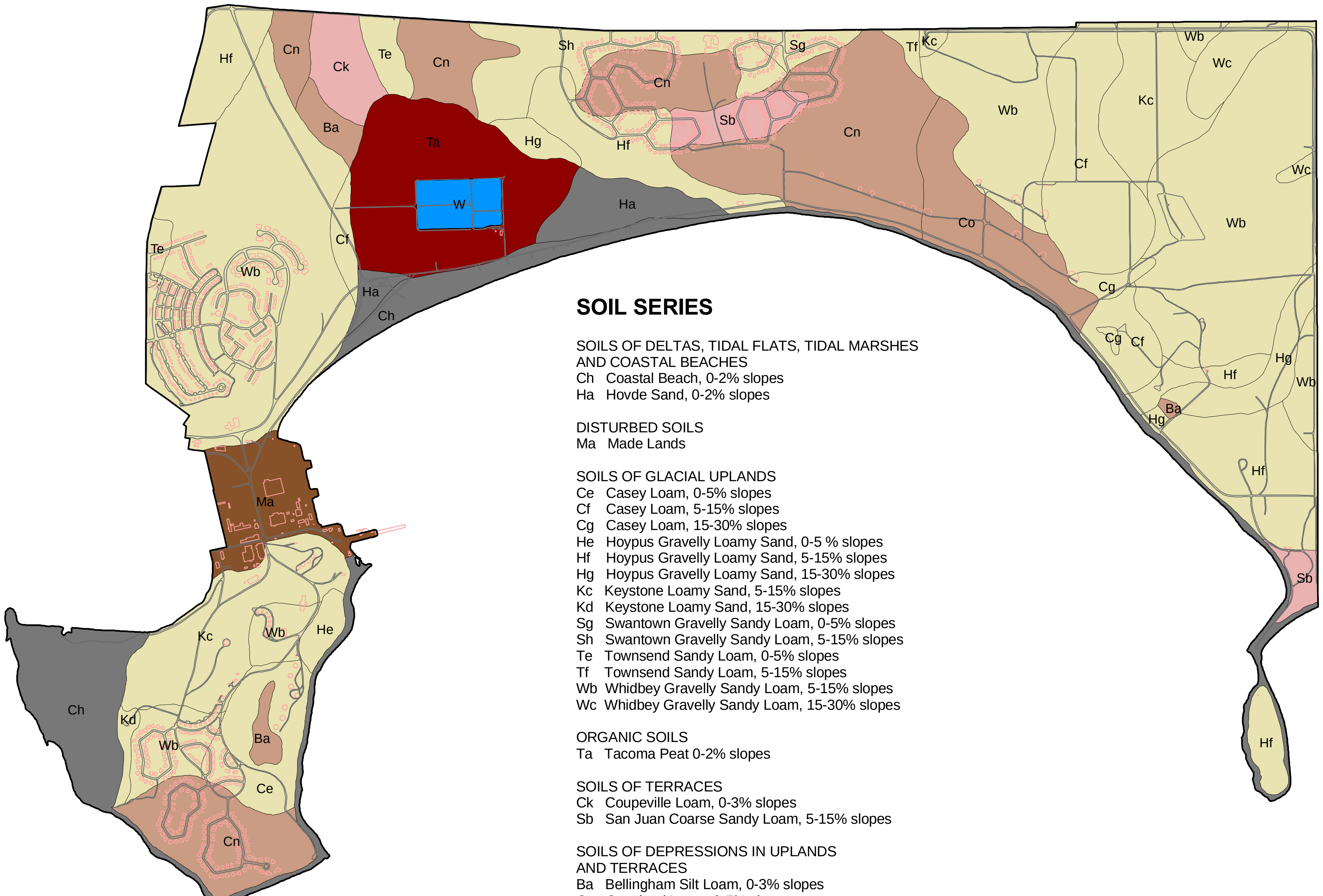


SOIL SERIES

SOILS OF DELTAS, TIDAL FLATS, TIDAL MARSHES AND COASTAL BEACHES
Ch Coastal Beach, 0-2% slopes
Ha Hovde Sand, 0-2% slopes

DISTURBED SOILS
Ma Made Lands

SOILS OF GLACIAL UPLANDS
Ce Casey Loam, 0-5% slopes
Cf Casey Loam, 5-15% slopes
Cg Casey Loam, 15-30% slopes
He Hoypus Gravelly Loamy Sand, 0-5 % slopes
Hf Hoypus Gravelly Loamy Sand, 5-15% slopes
Hg Hoypus Gravelly Loamy Sand, 15-30% slopes
Kc Keystone Loamy Sand, 5-15% slopes
Kd Keystone Loamy Sand, 15-30% slopes
Sg Swantown Gravelly Sandy Loam, 0-5% slopes
Sh Swantown Gravelly Sandy Loam, 5-15% slopes
Te Townsend Sandy Loam, 0-5% slopes
Tf Townsend Sandy Loam, 5-15% slopes
Wb Whidbey Gravelly Sandy Loam, 5-15% slopes
Wc Whidbey Gravelly Sandy Loam, 15-30% slopes

ORGANIC SOILS
Ta Tacoma Peat 0-2% slopes

SOILS OF TERRACES
Ck Coupeville Loam, 0-3% slopes
Sb San Juan Coarse Sandy Loam, 5-15% slopes

SOILS OF DEPRESSIONS IN UPLANDS AND TERRACES
Ba Bellingham Silt Loam, 0-3% slopes
Cn Coveland Loam, 0-5% slopes
Co Coveland Loam, 5-8% slopes

WATER
W Water

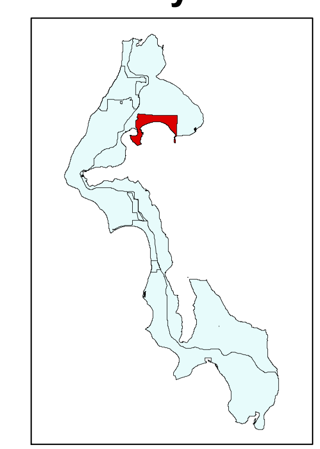
NAS Whidbey Island INRMP
Seaplane Base

Figure 2-9
Soils

LEGEND

Installation Boundary
Roads
Buildings
Soil Classes
Tidal Area and Coastal Beach Soils
Disturbed Soils
Glacial Upland Soils
Organic Soils
Terrace Soils
Upland and Terrace Depression Soils
Water

Whidbey Island



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2.3.10 OLF Coupeville Resources

2.3.10.1 Topography

OLF Coupeville is a flat inland site containing no major topographic features, no surface water bodies, and no shorelines. The topography of the majority of the site ranges from 0 to 5 percent in slope, with a small area of steeper slope in the southwest corner. The elevation of the site ranges from approximately 120 to 200 feet (30 to 61 m) above sea level. Topography at OLF Coupeville is represented in Figure 2-10.

2.3.10.2 Soils

A total of six mapping units and five soil series occur at OLF Coupeville. They are primarily loamy sands or sandy loams that developed from glacial till, drift, and lake-laid or marine sediments. The soils formed on glacial terraces, glacial uplands, moraines, and outwash plains, and are moderately to well-drained. There are no hydric soils on this site.

The soils at OLF Coupeville are not of prime agricultural use due to their low water holding capacity. They can be expected to produce lower yields than soils with higher water holding capacities. The soils are best suited for tree production. Seasonal soil wetness is a limitation on the Casey soils where soil compaction will occur if heavy wheeled machinery is used during wetter months. The acreage of soil series occurring at OLF Coupeville is presented in Table 2-5. The distribution of these soils is shown in Figure 2-11.

Table 2-5. Soil Series Occurring at OLF Coupeville

Map Symbol	Soil Name	Slope (%)	Total Acres	Percent of OLF
Soils of Glacial Uplands				
Ce	Casey loam	0-5	62	9.2
Hb	Hoypus coarse sandy loam	0-5	149	22.0
Kb	Keystone loamy sand	0-5	253	37.4
Kd	Keystone loamy sand	15-30	20	2.9
Wb	Whidbey gravelly sandy loam	5-15	813	28.8
Wc	Whidbey gravelly sandy loam	15-30	35	1.2
Soils of Terraces				
Sa	San Juan coarse loam	0-5	166	24.6
Sc	Snakelum coarse sandy loam	0-5	26	3.8

Source: SCS 1958

2.3.10.3 Soil Erosion

Soil erosion is not a significant management concern at OLF Coupeville.

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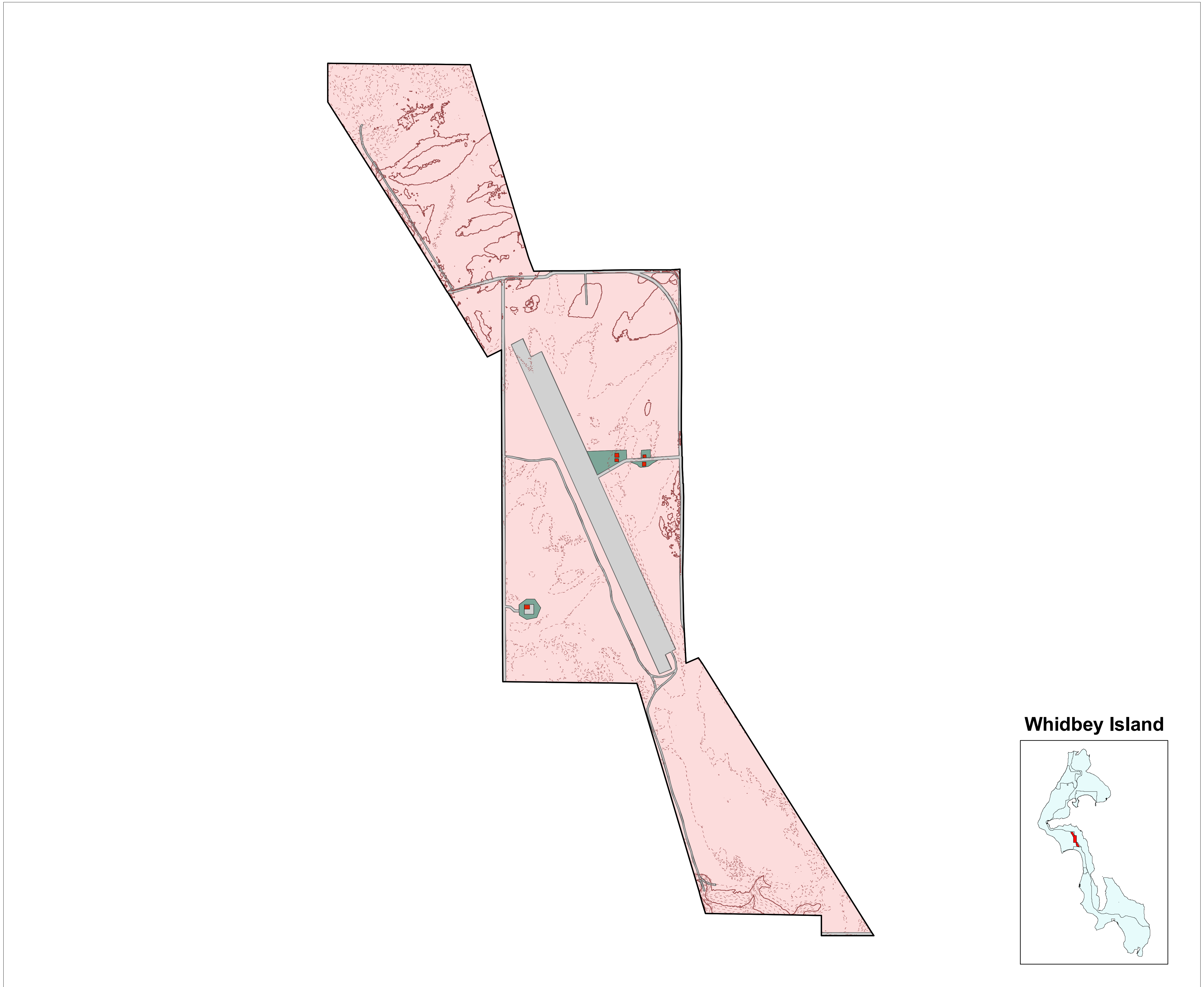

NAS Whidbey Island INRMP
Outlying Field - Coupeville

Figure 2-10
Topography

LEGEND

- Installation Boundary
- Roads
- Buildings
- Intermediate Contours (5')
- Index Contours (25')
- Runway and Other Paved Areas
- Landscaped Areas
- Other Land Cover

SCALE 1:18,000

0.3 0 0.3 Miles

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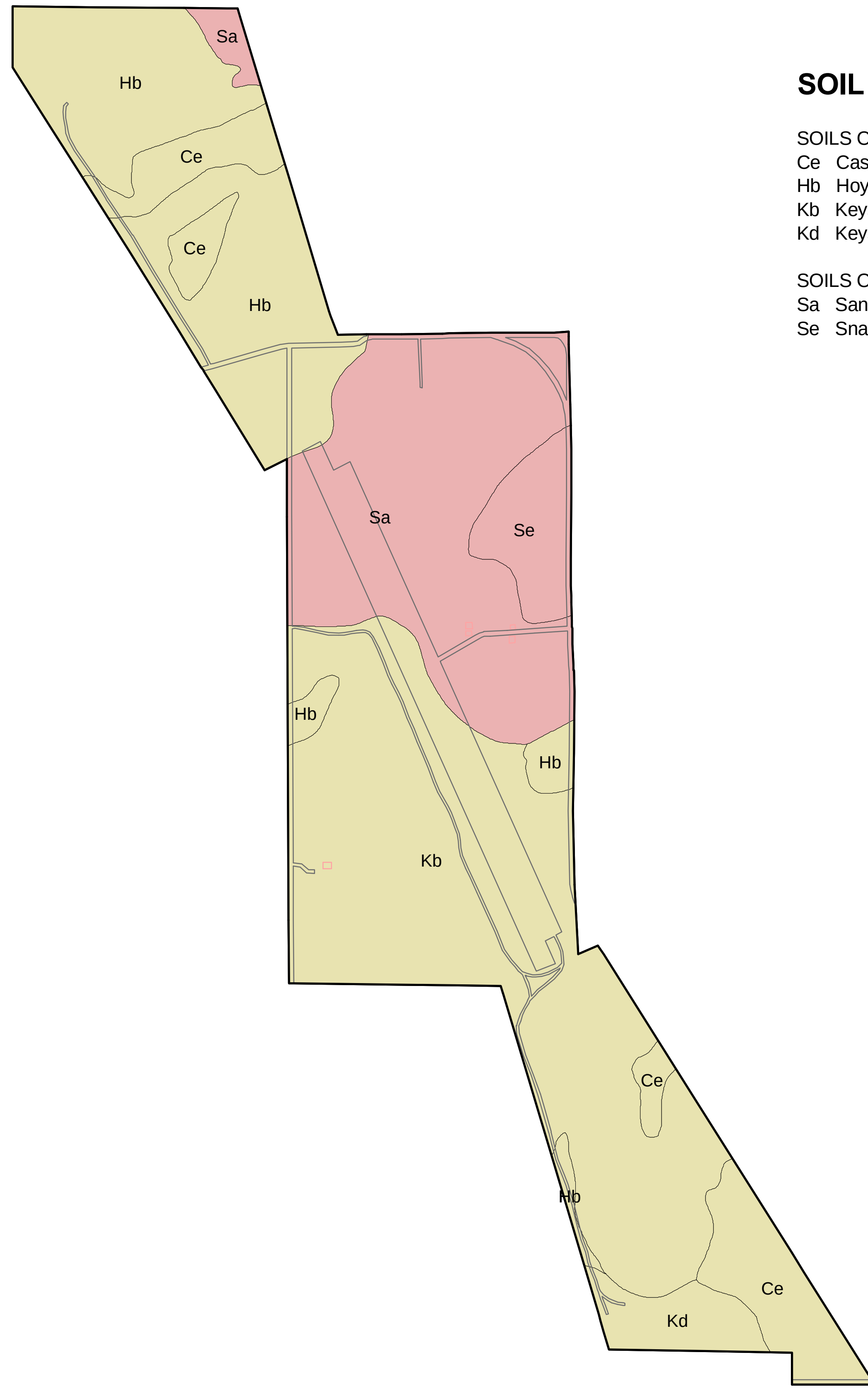
NAS Whidbey Island INRMP
Outlying Field - Coupeville

Figure 2-11
Soils

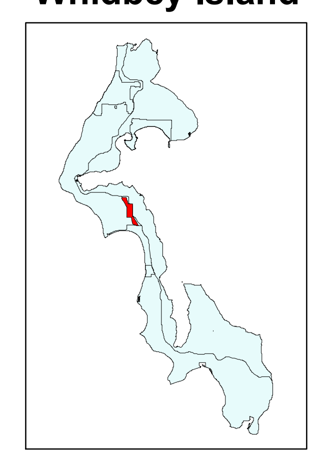


SOIL SERIES

SOILS OF GLACIAL UPLANDS
Ce Casey Loam, 0-5% slopes
Hb Hoypus Coarse Sandy Loam, 0-5% slopes
Kb Keystone Loamy Sand, 0-5% slopes
Kd Keystone Loamy Sand, 15-30% slopes

SOILS OF TERRACES
Sa San Juan Coarse Sandy Loam, 0-5% slopes
Se Snakelum Coarse Sandy Loam, 0-5% slopes

Whidbey Island



LEGEND

Installation Boundary
Roads
Buildings
Soil Classes
Glacial Upland Soils
Terrace Soils

SCALE 1:18,000

0.3 0 0.3 Miles

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2.3.11 Lake Hancock Resources

2.3.11.1 Topography

The Lake Hancock property ranges in elevation from sea level to approximately 140 feet (43 m) above sea level. In the northeast corner and along the eastern boundary of the site, the land slopes gently to the west and southwest. The rest of the site is virtually flat and much of it receives regular tidal flooding. Figure 2-12 depicts the topography of Lake Hancock.

2.3.11.2 Shorelines

The Lake Hancock site contains roughly one mile (1.6 km) of shoreline on Admiralty Inlet. Two sections of high bank bluff, totaling 0.3 mile (0.5 km) in length, occur along this shoreline near the north and south ends of the site. These areas are experiencing substantial erosion and are separated by a section of depositional beach. The beach toward the north end of the Lake Hancock shoreline is composed primarily of cobbles while sand dominates the beach substrate at the south end, indicating a local sediment transport pattern of north to south (SCS 1991). Long-term bluff erosion rates have not been documented at Lake Hancock but rates of 1.5-8 inches (4-21cm) per year have been documented for bluffs occurring within one mile (1.6 km) of the site (SCS 1991). Erosion rates appear to be greater on bluffs further to the north of Lake Hancock.

2.3.11.3 Soils

Six mapping units and four soil series comprise the lands of Lake Hancock. Upland areas are generally covered with gravelly loamy sand that formed on glacial uplands. These are droughty soils that are rated excessively drained (SCS 1958). Soils of glacial uplands cover 50 percent of the exposed land area at Lake Hancock. Low-lying areas have tidal marsh and coastal beach soils that were formed by deposition of marine sediments and bluff erosion. Acreages of soil units are presented in Table 2-6, and the distribution of soils at Lake Hancock is shown in Figure 2-13.

Table 2-6. Soil Series Occurring at Lake Hancock

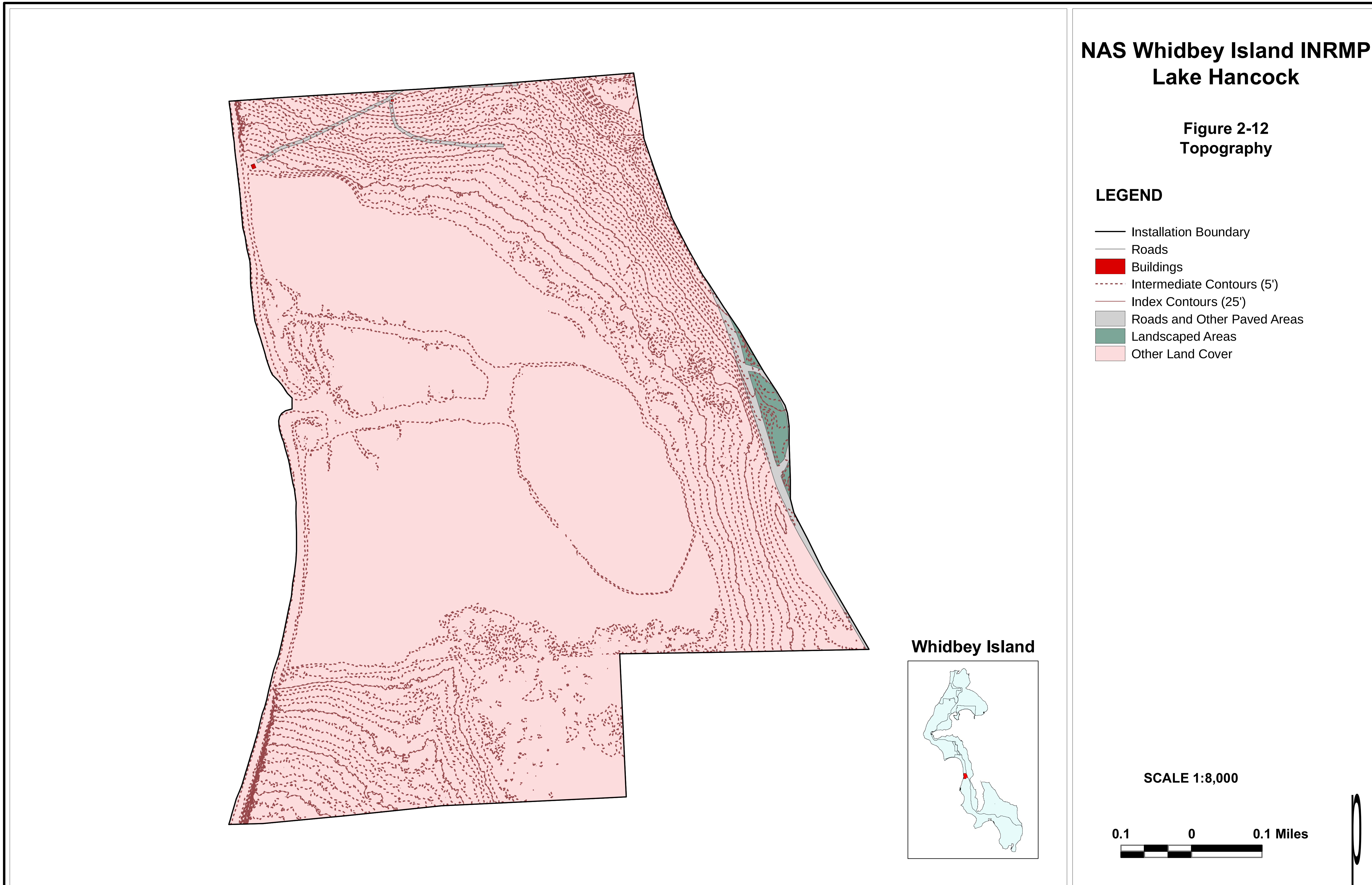
Map Symbol	Soil Name	Slope (%)	Total Acres	Percent of Lake Hancock
Soils of Glacial Uplands				
He	Hoypus gravelly loamy sand	0-5	3	0.1
Hf	Hoypus gravelly loamy sand	5-15	156	36.9
Hg	Hoypus gravelly loamy sand	15-30	13	3.1
Wb	Whidbey gravelly sandy loam	5-15	42	9.9
Soils of Deltas, Tidal Flats, Tidal Marshes, and Coastal Beaches				
Ch	Coastal beach	0-2	14	3.3
Td	Tidal marsh	0-2	155	36.7

2.3.11.4 Soil Erosion

Soil erosion is not a major concern at Lake Hancock. Ongoing bluff erosion does not threaten any bluff-top structures. Slopes are not steep enough in other areas to cause any significant erosion, and the only channelized water flow is in tidal sloughs that occur in flat areas.

2.3.12 Project Recommendations – Land and Physical Environment Resources

See Appendix A for a detailed list of projects for NAS Whidbey Island land and physical environment resources management.


NAS Whidbey Island INRMP
Lake Hancock
Figure 2-12
Topography
LEGEND
Installation Boundary
Roads
Buildings
Intermediate Contours (5')
Index Contours (25')
Roads and Other Paved Areas
Landscaped Areas
Other Land Cover
Whidbey Island
SCALE 1:8,000
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0.1 Miles

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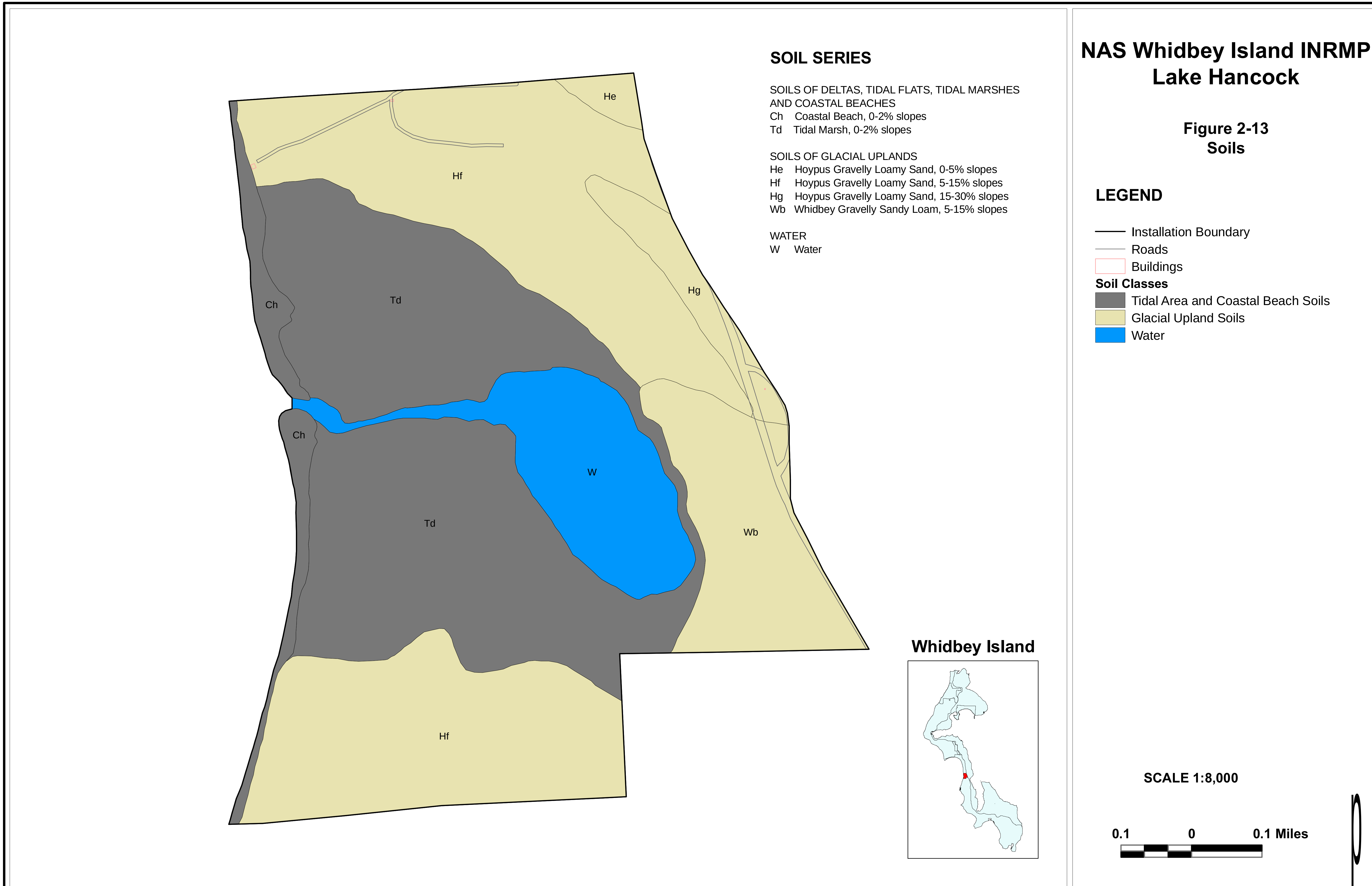
NAS Whidbey Island INRMP
Lake Hancock
Figure 2-13
Soils
SOIL SERIES
SOILS OF DELTAS, TIDAL FLATS, TIDAL MARSHES AND COASTAL BEACHES
Ch Coastal Beach, 0-2% slopes
Td Tidal Marsh, 0-2% slopes
SOILS OF GLACIAL UPLANDS
He Hoypus Gravelly Loamy Sand, 0-5% slopes
Hf Hoypus Gravelly Loamy Sand, 5-15% slopes
Hg Hoypus Gravelly Loamy Sand, 15-30% slopes
Wb Whidbey Gravelly Sandy Loam, 5-15% slopes
WATER
W Water
LEGEND
Installation Boundary
Roads
Buildings
Soil Classes
Tidal Area and Coastal Beach Soils
Glacial Upland Soils
Water
He
Hf
Hg
Ch
Td
W
Wb
Hf
Whidbey Island
SCALE 1:8,000
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2.4 Water Resources

2.4.1 Surface Water

Surface water on Whidbey Island generally occurs on soils with low infiltration rates or in streams or constructed ditches due to runoff from precipitation or flowing springs. Low infiltration rates usually occur on clay soils, soils with a high water table, or on shallow soils over impervious materials. A minor amount of surface water results from discharge from shallow aquifers.

No significant rivers or streams occur on Whidbey Island. The island streams tend to be short coastal tributaries draining into cleared lands or, in some instances, lands with residual forest stands. Most of the streams on the island have densely vegetated riparian zones dominated by deciduous trees and shrubs. The streams tend to be shallow, and most of them carry a reduced water volume during the summer months, the flow becoming subsurface in some stream reaches.

The intermittent flow of many of the island streams results in reduced available fish rearing habitat and limits the production capacity of the streams. In addition, many of the streams maintaining a permanent flow have shallow gradients and low velocity. These conditions lead to adverse effects of sediment loading on the streambeds and increased temperature potential. In streams that have been channeled for agricultural drainage, the residual streamside cover tends to be low in height, which reduces thermal shading on the wider ditches. These natural and man-caused physical characteristics lead to water quality issues associated with low flows such as high temperatures and resulting low dissolved oxygen levels along with loss of suitable fish spawning and rearing substrate.

The freshwater streams occurring on NAS Whidbey Island fall within two categories: (1) coastal streams draining small watersheds or waterbodies, and (2) complexes of drainage channels manipulated for specific land management purposes. The latter were originally shallow, meandering watercourses that were channelized and straightened and the attendant riparian vegetation removed.

Several created ponds occur at Ault Field on the golf course, and at Seaplane Base (Penfold Pond). Extensive marsh areas are found at Seaplane Base. The Lake Hancock site includes a coastal lagoon and a saltwater slough draining the lagoon. Stormwater on Ault Field and Seaplane Base is collected via storm drains, underground pipes, and open ditches and is discharged into the Strait of Juan de Fuca, Dugualla Bay, Crescent Harbor, and Oak Harbor.

2.4.2 Wetlands

Wetlands on NAS Whidbey Island were classified and mapped by Geonex Inc. in 1994 and 1995. The inventory was based on review of aerial photographs and National Wetlands Inventory (NWI) maps, and was supplemented by limited ground truthing and by information provided by station personnel. GIS-generated maps were then field checked and corrected. This mapping includes jurisdictional and non-jurisdictional wetlands known and identified at a coarse planning level scale for the installation. Wetland boundaries are approximate and are subject to change. This effort is not intended to be a complete mapping of all wetlands found on the installation. Accurate field delineations must be performed before ground disturbing activities occur.

2.4.2.1 Wetland Classification

Jurisdictional wetlands, as defined by the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." The jurisdictional definition and criteria are used by the EPA and the USACE for administering Sections 401 and 404 of the Clean Water Act.

Wetlands on NAS Whidbey Island that are not confined to stream channels and ditches comprise a total of 1,147 acres or 14 percent of station lands. Wetlands in streams and ditches are not defined by area but by linear mile. Linear wetlands total 24.5 miles. Wetland vegetation is described in Chapter 5. Freshwater wetlands occur on all four sites and saltwater wetlands can be found on Ault Field, Seaplane Base, and Lake Hancock.

Freshwater wetlands on station lands generally occur in low-lying areas that are underlain by poorly draining clay or organic soils known as hydric soils. Water is supplied to the freshwater wetlands by surface runoff or, in some areas, by a locally shallow groundwater table. Some of the constructed drainage ditches on Ault Field and Seaplane Base drain directly into wetland areas. Freshwater wetlands occurring on station lands include naturally-occurring and constructed ponds, streams, constructed drainage ditches, marshes, and wet meadows. These are typically classified as palustrine or riverine wetlands. Palustrine designates a shallow, standing water pond, bog, swamp, or marsh environment. Riverine wetlands are characterized by channels that convey moving water.

Saltwater wetlands are those that are either tidally inundated or tidally influenced. Tidally inundated wetlands at NAS Whidbey Island occur in the intertidal zone and include nearshore areas, beaches, tidal sloughs, and some of the lower elevation areas in salt marshes. Tidally influenced wetlands generally have brackish water due to seawater intrusion into the groundwater table, but are not located in the intertidal zone and are not inundated during regular tidal cycles. At NAS Whidbey Island, this wetland type occurs in high salt marsh areas at Seaplane Base and Lake Hancock and behind the foredune on sandy beaches such as those located south of Rocky Point at Ault Field.

2.4.2.2 Wetland Functions

The primary functions of the wetlands on NAS Whidbey Island are associated with providing fish and wildlife habitat, recreational opportunities, flood attenuation, and water quality enhancement.

- ***Fish and Wildlife Habitat -*** The main wildlife groups that could potentially use the freshwater wetlands at NAS Whidbey Island are waterfowl (ducks, geese, and swans), herons, rails, coots, raptors, shorebirds, passerine birds, shrews, voles, muskrat, mice, raccoon, weasels, mink, river otter, frogs, newts, salamanders, and a variety of freshwater fishes and invertebrates. In the saltwater wetlands, wildlife groups likely to occur include loons, waterfowl, herons, rails, coots, raptors, shorebirds, gulls, alcids, owls, muskrat, raccoon, river otter, California sea lion, harbor seal, and a variety of marine fishes and invertebrates. Wetlands provide critical nesting and feeding habitat for many species, as well as being a source of fresh water.

- ***Recreation -*** Recreational activities associated with wetlands at NAS Whidbey Island include duck hunting, fishing, beachcombing, boating, hiking, picnicking, and interpretive uses such as birdwatching.

- ***Flood Attenuation -*** Large volumes of runoff collect in low-lying wetland areas from rainstorms occurring in the winter and spring. The stored water either evaporates or is slowly released into drainage channels. This serves to slow the arrival of water to the channels following storms, thus minimizing the risk of downstream flooding.

- ***Water Quality Enhancement -*** Since wetlands receive much of the non-industrial surface runoff from the station, they play a significant role in maintaining the quality of water that flows to nearby receiving waters. The ponds and freshwater marshes in particular tend to retain water for long periods of time, thus allowing for the settling of sediments and associated pollutants.

2.4.3 Flooding

NAS Whidbey Island does not have a history of serious flooding problems. The western coast at Ault Field is undeveloped recreation land. The mile-long lowland marsh across the southern portion of the lowland area near the flight line is subject to tidal flooding but no facilities have been constructed in this area. Flooding has occurred at Lake Hancock, but there have been no serious adverse effects since this is an uninhabited area. It is the policy of the station to avoid siting new construction in low lying wetland areas subject to tidal flooding.

Areas within the 100-year coastal flooding zone were mapped by the Federal Emergency Management Agency (FEMA) for Seaplane Base. A total of 368 acres of coastal area at Seaplane Base lie within the floodplain. The FEMA study area excluded Ault Field so no flooding information was available for the low-lying areas at this facility. No areas at Lake Hancock were included within the 100-year flooding zone.

2.4.4 Groundwater

Five major aquifers of varying extent and depth have been identified on Whidbey Island (Jones 1985). These occur in layers of unconsolidated sand and gravel deposits that formed during glacial and interglacial periods. Groundwater recharge is primarily through infiltration of the precipitation, therefore recharge is greatest during the rainy winter and spring months. An average of six percent of the precipitation percolates through the soils to recharge aquifers (Reid, Middleton and Associates, Inc 1988). Groundwater discharge occurs primarily through outflow into marine waters and by pumping of wells on the island. Seawater intrusion has been found in a number of wells near the coastline of the island (Jones 1985).

Groundwater yields from wells on the island range between 50 to 350 gallons (189-1,324 L) per minute, with most wells yielding less than 100 gallons per minute (378 L) (Jones 1985). The water tables generally follow the topography although perched water exists in some locations. Water quality varies considerably with regard to mineral content, color, and seawater infiltration. Groundwater supply and potential contamination is a major concern within the county. The Washington Department of Ecology has designated the island's groundwater supply as a "sole source aquifer" and has also designated Island County as a high-priority groundwater management area.

NAS Whidbey Island does not withdraw significant amounts of groundwater. The primary source of water for the station is the Skagit Pipeline which pumps water from the Skagit River. The installation has several developed emergency potable water wells on Ault Field, but they would be used only for emergencies. The only groundwater well that is permitted for regular use is at the golf course in the southwest corner of Ault Field. This well can be used to irrigate the golf course primarily during the dry summer months. The permit for the well, reviewed and approved by the Washington Department of Ecology, allows the pumping of up to 120 acre feet during the dry season (Apr. 15 – Oct. 15).

2.4.5 Water Quality

Spills of industrial wastes generated by aircraft and public works maintenance operations have caused some water quality problems at the station. This problem is thoroughly addressed in the station's Spill Prevention Control and Countermeasures (SPCC) Plan (Appendix E).

The main concern regarding pond and stream protection is prevention of non-point source pollution. Water quality in the ditched channels at Ault Field is considered poor. These ditches accumulate significant amounts of sediments that are contaminated with aromatic hydrocarbons and heavy metals, primarily from discharge from the flight line and hangar complex (TIWET 1995). The ditches are regularly dredged to maintain stormwater conveyance. Silt fences are erected during dredging operations to minimize downstream impacts.

To control non-point source pollution, the exposure of contaminants to stormwater runoff must be controlled. Developing stormwater and erosion control measures, implementing standard stormwater best management practices (BMPs), and educating station personnel are proactive measures to limit the exposure of stormwater to contaminants. Landscape and golf course management practices can be modified to reduce sedimentation and non-point source pollution.

Best management practices for controlling non-point source pollution include:

- Activities in uncovered areas such as vehicle maintenance, chemical or waste oil storage, transferring potential contaminants, will be conducted in covered areas so stormwater will not wash contaminants into storm drains or surface waters.

- Areas that cannot be covered should have their stormwater runoff retained and diverted to the sanitary sewer system.

- The storm drain system should not to be used to dump or discharge any materials or chemicals. All departments should notify the Environmental Division before conducting any operations that may discharge materials or washes into the system. This includes water from vehicle washing. All storm drains should be labeled with no dumping signs.

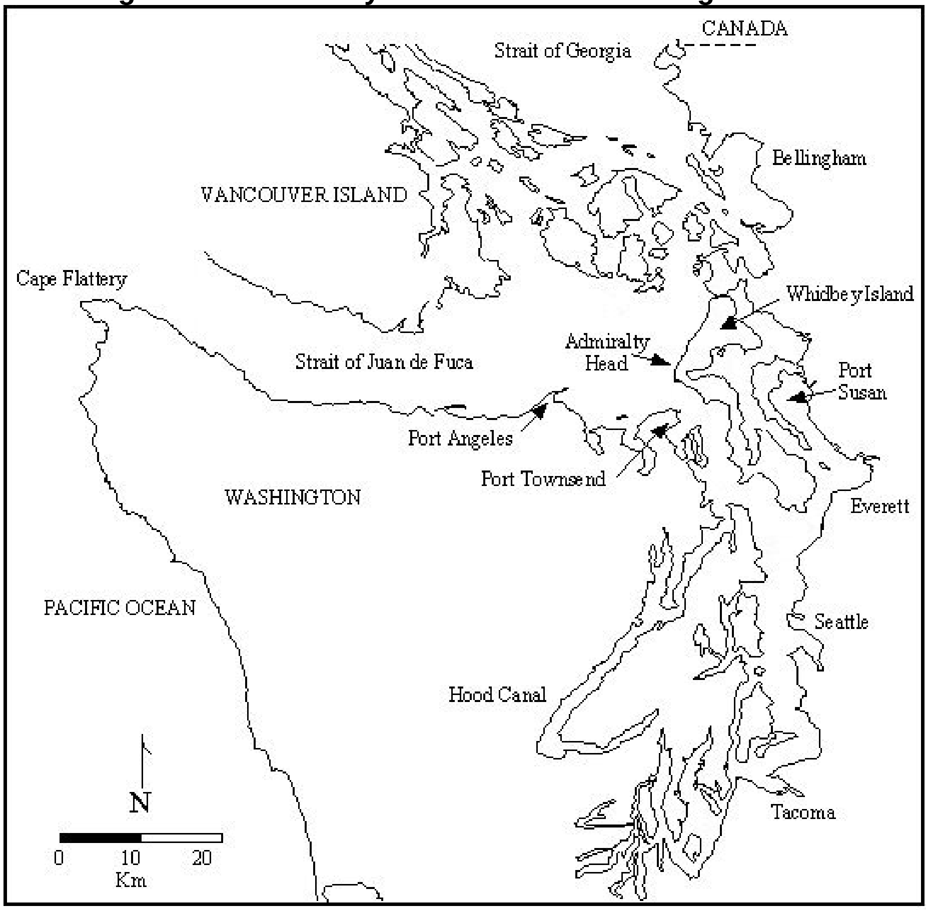
2.4.6 Marine Waters

During the Pleistocene Age, a massive glacial tongue covered the area now known as Puget Sound. As the ice retreated, it left behind deeply-carved channels that filled with seawater as ocean levels rose, forming the islands and other topographic features present today. Puget Sound covers an area of about 2,330 km^2 and has about 3,700 km of coastline (Figure 2-14). The freshwater inflow into Puget Sound is about 900 million gallons/day (3.4 trillion liters /day). Major sources of freshwater are the Skagit and Snohomish Rivers located in the Whidbey Basin; however, the annual amount of freshwater entering Puget Sound is only 10 to 20% of the amount entering from the Strait of Georgia, primarily through the Fraser River (Gustavson et al. 2000).

Sediment characteristics around Whidbey Island include mixed fines in bays and estuaries, sands and gravels in deeper waters, grading out to finer sands towards the western end of the Strait of Juan de Fuca (Gustavson et al. 2000).

Water circulation, temperatures, and quality are complicated by the geography of the Puget Sound region. The Strait of Juan de Fuca is a weakly stratified, positive estuary with strong tidal currents. The western end of the Strait is strongly influenced by ocean processes, whereas the eastern end is influenced by intense tidal action occurring through and near the entrances to numerous narrow passages. Seasonal variability in temperature and salinity is small because the waters are vertically well mixed. Temperatures west of Whidbey Island generally range between 7^{o} and 11^{o}C, although occasionally surface temperatures reach as high as 14^{o}C. In the eastern portion of northern Puget Sound, temperature and salinity vary from north to south, with the waters in the Strait of Georgia being slightly warmer than the waters near Admiralty Inlet. Waters near Admiralty Inlet also tended to

Figure 2-14. Whidbey Island's Location in Puget Sound



(Adapted from Gustafson et al. 2000)

have higher salinities than waters to the north. Dissolved oxygen levels vary seasonally, with lowest levels of about 4 mg/L at depth during the summer months, and highest levels of about 8 mg/L near the surface (Gustavson et al. 2000).

On the eastern side of Whidbey Island, the Skagit River (the largest single source of freshwater in Puget Sound) enters the northeastern corner, forming a delta and the shallow waters (< 20 m) of Skagit Bay. Saratoga Passage, just south of Skagit Bay, separates Whidbey Island from Camano Island. This passage is 100 to 200 m deep, with the deepest section (200 m) located near Camano Head. Port Susan is located east of Camano Island and receives freshwater from the Stillaguamish River at the northern end and from the Snohomish River (the second largest of Puget Sound's rivers) at southeastern corner. Port Susan also contains a deep area (120 m) near Camano Head. The deepest section of the basin is located near its southern boundary in Possession Sound (220 m). The waters in this basin are generally stratified, with surface waters being warmer in summer (generally 10-13°C) and cooler in winter (generally 7-10°C). In Port Susan and Saratoga Passage, salinities of surface waters are generally 27.0-29.5‰ (parts per thousand), due to runoff from the two major rivers; after heavy rain these salinities range from 10-15‰. Concentrations of dissolved oxygen in these waters were highest in surface waters (up to 15 mg/L) and tended to be inversely proportional to salinity. Samples collected during spring run-off had the highest concentrations of dissolved oxygen.

The lowest values (3.5 to 4.0 mg/L) were generally found at the greatest depths in the fall (Gustavson et al. 2000).

2.4.7 Ault Field Resources

2.4.7.1 Surface Water

Most of the natural drainage ways at Ault Field have been modified by a stormwater system consisting of surface ditches and subsurface storm drains. These were originally shallow, meandering watercourses that were channelized and straightened, with attendant riparian vegetation removed. This series of ditches totals approximately 20 miles in length. The main surface ditches drain to Dugualla Bay through a pumping plant and gravity outlets with tide gates. Runoff is collected from concrete runways and apron areas by this drainage system and passed through oil-water separators before being discharged into marine waters. These ditches also receive discharge from many of the station's storm sewers. In addition, agricultural fields adjacent to the primary ditches discharge flow via smaller ditches spanning the fields.

The primary drainage ditches are linear, generally intersect at right angles, vary in width from 2 to 10 feet (0.6-3 m), and have steep (30 to 45 degree), 10 foot (3 m) high banks. The amount of water in the ditches varies seasonally. The vegetation on the ditch banks is dominated by reed canarygrass, Canada thistle, spirea, and Himalayan blackberry.

Most of the surface ditches that flow from the runway areas to the Strait of Juan de Fuca are plugged at the shoreline by beach sediment and concrete rubble. Water in the ditches appears to percolate into the beach sediment near these constrictions rather than flowing out on the surface. This does not appear to restrict the drainage system and is considered beneficial in that some of the contaminants and sediments that would otherwise enter the marine system are filtered out. These constrictions do however limit fish movement. Surface drainage from the hospital and golf course flows to fresh water wetlands that have formed behind depositional beaches.

In addition to the ditch system, surface water also occurs in several created ponds on the golf course and in wetlands located throughout the site. All surface water features are included on the wetlands map that is presented with the subsequent discussion on wetlands. The two watersheds that account for most of the drainage from Ault Field were inventoried by the Navy in 1995. These watersheds are described below, with a focus on the quality of potential fish habitat.

Clover Valley Drainage System to Dugualla Bay

The Clover Valley watershed is a low gradient landform that drains the primary airfield infrastructure, including the runways, taxiways, hangars, auxiliary buildings and supporting roadways. The drainage system includes perennial and intermittent channels, small wetlands and sumps. The water flow is eastward through a large off-site marsh complex adjacent to Dugualla Bay.

These lower stream channels historically were a natural stream complex that has been channeled and straightened and are characterized by low gradients (< 1 percent) and gravel bottoms overlaid with 10 to 18 inches (25 to 45 cm) of silt and clay. Water velocity is low throughout the uniform channel configuration unless constrictions occur due to localized vegetative debris. The lower valley channel has a bankfull discharge (BD) width of 25 to 28 feet (7.6 to 8.5 m) and flow depth in excess of 4 feet (1.2 m) at BD.

Both channel banks are adjacent to, or within, agricultural outlease lands. Less than 25 percent of the bank vegetation functions as riparian cover. It is composed primarily of berry vines, wild grasses intermixed with agricultural vegetation escapement, and limited areas of alder and willow. Instream vegetation consists of scattered grasses in the maintained channel sections. Bank overflow onto the outlease fields occasionally occurs.

The upper watershed drainage channels follow the same basic pattern as the lower channels but in reduced scale. A couple of notable exceptions exist. The first is a relative increase in streambank and instream cover. This is due primarily to the narrower channel widths, wherein shorter vegetation is providing more adequate thermal cover. Secondly, the narrow channels maintain a slightly higher gradient (one percent) and therefore an attendant increase in flow velocity. The higher velocity has the ability to transport a larger percentage of fines downstream where they are deposited in the lower channel sections.

Since about 1949, the Navy has maintained a freshwater to saltwater flume and pumping system at the dike across the mouth of Clover Valley Lagoon, separating the lagoon from Dugualla Bay. The dike was built by the Dugualla Bay Diking District in 1918 to reclaim land for agricultural purposes from the bay. The Navy's system supplemented an older flume installed by the Diking District. The Diking District's flume and the Navy's flume are considered non-functioning now due to siltation on both sides of the dike (Hart Crowser 2000). Two large pumps operated by the Navy maintain the lagoon level to –4.8 to –6.2 feet at mean sea level, which equates to lagoon gage datum levels of 15.5 to 17.0 feet. These levels provide a balance between remaining wetland survivability and agricultural land increases or decreases. It should be noted that the Clover Valley Lagoon and dike are on private property outside of the installation boundary; Navy personnel do not currently manage or monitor resources at the location. Several outside parties from the state to local tribes have discussed exploring the restoration of tidal action back into the lower portion of this system that would benefit juvenile salmonids from the Skagit River. Under most likely scenarios, all restoration activities would occur off of Navy property, but would be under the approach end of runway 25. Restoration would need to be designed not to increase bird/aircraft strike risk for the airfield. The current condition of the subject restoration site already has many bird/aircraft strike risks associated with it and restoration may improve or at least not make worse some of those. One definite benefit to the Navy from restoration of tidal flow would be that pumping of water over the dike into Dugualla Bay would no longer be necessary. Given this benefit and the potential for bird/aircraft strike risk, the Navy should stay engaged in any restoration discussion for the site and cooperate with potential feasibility studies and designs.

A comprehensive hydrologic study of the Clover Valley watershed was completed for the Navy in 2000 (Hart Crowser 2000). The purpose of the study was to model the current flows and runoff totals, determine the portion contributed by Ault Field, and predict future growth patterns and increases in runoff within the watershed. Increases in runoff may result in additional pumping time and associated costs incurred by the Navy. At present, the operation of the pumps and current lagoon levels appear to have little impact to the status quo of natural resources, but future scenarios may have impacts that will have to be addressed.

Cranberry Lake Outlet

Only 567 feet (173 m) of Cranberry Lake Outlet is located within the administrative boundaries of NAS Whidbey Island. This section is the dune shoreline exit point at West Beach for the outlet stream from Cranberry Lake near Deception Pass. This stream has an approximate total length of 1.5 miles (2.4 km). Most of the drainage (90-95 percent) flows in a braided channel through a coastal freshwater marsh heavily overgrown with cattail and grasses.

The channel located within NAS Whidbey Island is a dune tributary with a channel bed and a shoreline composed of sand (95 percent) and pockets of small rubble/gravel (5 percent). These pockets are located in the lower 1/3 of the reach near the high tide line. An artificial breakwater extending from the southern bank protected the outlet, but was removed in 2003. The channel has a sinuosity value of 1.2 and a gradient of less than one percent. The entrance channel has a flow width of 6 feet (1.8 m) and a depth of 5 inches (12.7 cm). Flow velocity was estimated at 2 feet/second (0.6 m/sec). Because of its low gradient, this section is tidally influenced at high tides.

Instream structure is composed of large floatable and submerged woody debris (i.e., beach logs) ponded at the upper limit of the channel next to the start of the marsh zone on private land. The upper channel flow width is approximately 25 feet (7.6 m), and the depth is 2.5 feet (0.8 m). Some in-channel grasses are evident in the upper reach. Bank protection is provided by dune grasses and embedded beach drift logs. Incidental berry brush and alders provide limited visual and thermal cover. Low to moderate amounts of dissolved organics are evident along with some minor amounts of "beach debris" (i.e., styrofoam, plastic containers, etc.).

After removal of the rock groin in 2002-2003, the Cranberry Lake outlet naturally fills with sand during the summer months by longshore movement of sand along the beach. This causes the water level behind the coastal dune to rise as precipitation events occur during the rainy season. Those rising water levels have caused complaints from up-channel property owners and requests for the Navy to remove the sand and driftwood debris to lower the water levels. The Navy has acquired a permit from the US Army Corps of Engineers and can excavate the sand and woody debris up to 4 times a year from July 16 - November 15. In a typical year, the Navy removes the sand and woody debris from the channel just after July 16 and just before November 15. All materials removed from the outlet channel are place shoreward of the Mean Higher High Water line. This will normally reduce water levels in the channel sufficient to reduce possible impacts to adjacent landowners' septic systems.

2.4.7.2 Surface Runoff

Estimates of annual runoff volume for Ault Field are 240 million gallons (750 acre-feet, 909 million liters) for all of the areas in grass and cropland, roughly 2,300 acres (8.5 km^2), and 180 million gallons (565 acre-feet, 682 million liters) for areas covered by buildings or pavement (SCS 1991). Impervious surfaces cover approximately 600 acres (2.2 km^2) at Ault Field. The average annual runoff depth from the grassy areas varies from 0.8 to 7.2 inches (2 to 18 cm) and impervious areas have an average annual runoff depth of 9.5 inches (24 cm) (SCS 1991).

Surface Water Management

The primary management goal for surface water at NAS Whidbey Island is to minimize the impacts of erosion, sedimentation, and point and nonpoint water pollution to bodies of water. Toward this goal, station managers attempt to revegetate all bared areas as soon as possible and to maintain undisturbed vegetated buffer zones between aquatic and riparian habitats and base facilities. Issues related specifically to water quality are addressed in a subsequent section of this chapter.

2.4.7.3 Wetlands

Wetlands are scattered throughout Ault Field but are concentrated in the flat, low-lying areas near the center of the installation. Non-linear wetlands comprise a total of 514 acres (1.9 km^2) or 12 percent of Ault Field, while linear wetlands in streams and ditches total 19.8 miles (51.3 km) in length. Saltwater wetlands account for approximately 49 acres (0.18 km^2) of the total non-linear wetland area. Freshwater marshes and wet meadows are the most commonly occurring types of wetlands at Ault Field. These are classified under the USFWS system as palustrine, persistent emergent wetlands with a variety of flooding regimes. The distribution of the wetland types at Ault Field is shown in Figure 2-15 and summarized in Table 2-7.

2.4.7.4 Wetland Enhancement

Opportunities exist for creation or expansion of wetlands through water impoundment. Prime locations for creating wetlands include depressional areas that have clay soils, areas underlain by compacted gravel till, and areas that once received surface runoff prior to diversion and creation of the existing drainage system. Creation or expansion of wetlands will not occur where it could cause BASH problems.

Table 2-7. Acreage and Mileage of Wetlands at Ault Field.

USFWS Wetland Type*	Definition	Modifiers	Water Regime and Special Conditions	Total Acreage/ Mileage at Ault Field
E2EM1	Estuarine, Intertidal, Emergent, Persistent	N	Regularly Flooded	0.4
		P	Irregularly Flooded	0.2
M2US	Marine, Intertidal, Unconsolidated Shore	N	Regularly Flooded	48.4
PEM1/SS1	Palustrine, Emergent, Persistent/ Scrub-shrub, Broad Leaved Deciduous	C	Seasonally Flooded	17.9
		F	Semipermanently Flooded	0.8
PEM1	Palustrine, Emergent, Persistent	A	Temporarily Flooded	38.5
		Ad	Temporarily Flooded, ditched or drained	14.0
		Ax	Temporarily Flooded, excavated	0.2
		B	Saturated	0.4
		C	Seasonally Flooded	161.5/ 1.21
		Cd	Seasonally Flooded, Drained	37.7
		Ch	Seasonally Flooded, Impounded	0.4
		Cx	Seasonally Flooded, Excavated	0/ 2.27
		F	Semipermanently Flooded	8.7
		Fh	Semipermanently Flooded, Impounded	3.0
		Fx	Semipermanently Flooded, Excavated	0.8/ 0.78
PFO1	Palustrine, Forested, Broad Leaved Deciduous	A	Temporarily Flooded	23.9
		C	Seasonally Flooded	18.9
PSS1	Palustrine, Scrub-shrub, Broad Leaved Deciduous	A	Temporarily Flooded	3.8
		C	Seasonally Flooded	113.8
		Ch	Seasonally Flooded, Impounded	0.8
		Fh	Semipermanently Flooded, Impounded	0.7
PUB	Palustrine, Unconsolidated Bottom	F	Semipermanently Flooded	0.2

USFWS Wetland Type*	Definition	Modifiers	Water Regime and Special Conditions	Total Acreage/ Mileage at Ault Field
		Fx	Semipermanently Flooded, Excavated	0.7
		Krx	Artificially Flooded, Artificial Substrate, Excavated	17.3
R4SB	Riverine, Intermittent, Streambed		None	0/ 0.67
		C	Seasonally Flooded	0/ 2.06
		Cx	Seasonally Flooded, Excavated	1.3/ 12.79
Total Wetland Area/ Mileage at Ault Field				514.3/ 19.78

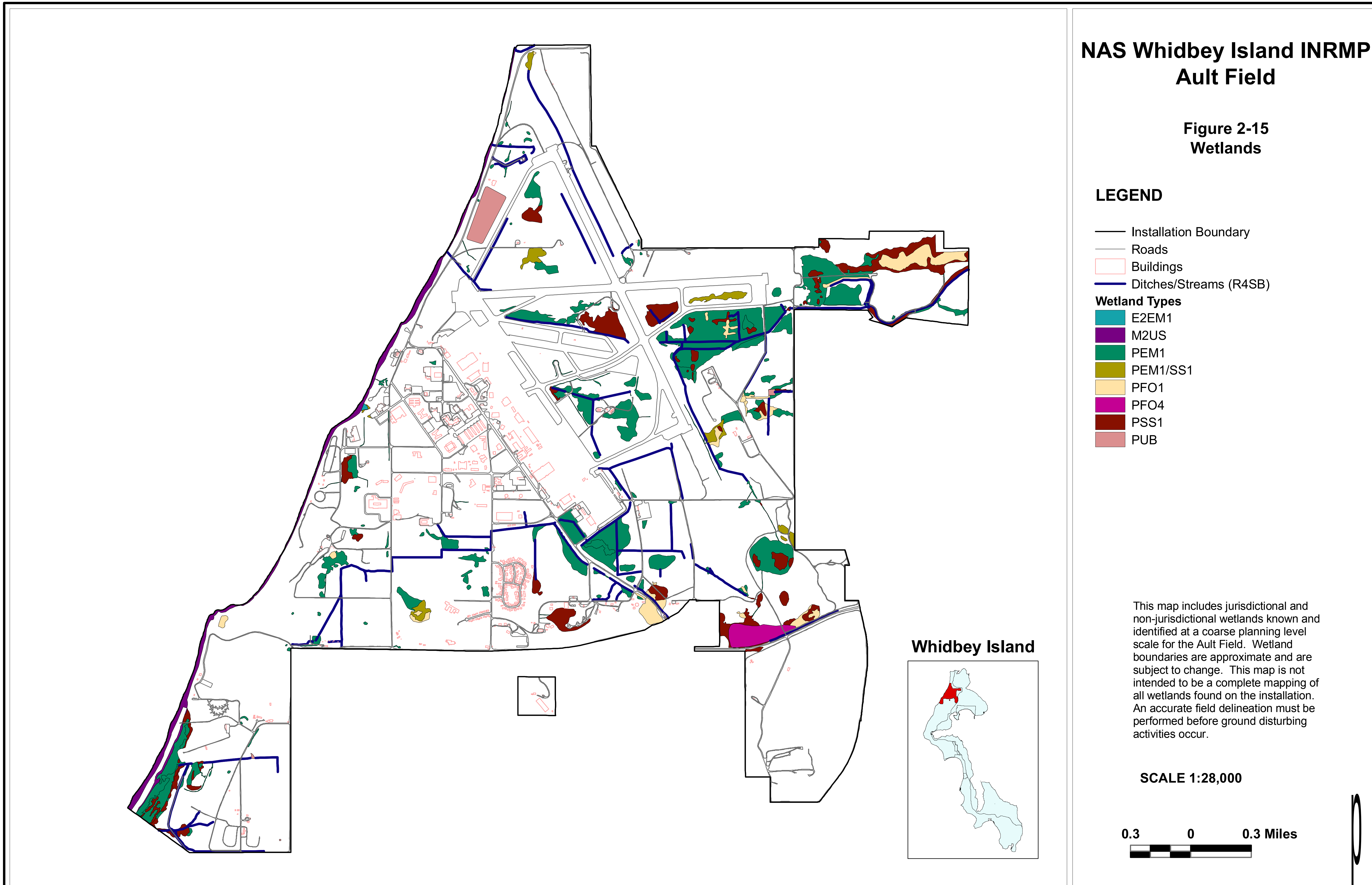
*From *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979)

2.4.7.1 Water Quality

Sites at Ault Field previously contaminated with petroleum products include the Western Highland Landfill, the Hoffman Road Landfill, the current landfill, the runway ditch complex, the Clover Valley Fire School, the Runway Fire School, and a total of twelve sites in the Ault Field Central Core Area. This included fire schools, abandoned fuel oil tanks, hangars and others industrial sites(TIWET 1995). An estimated 30,000 to 50,000 gallons (113,500 to 189,000 liters) of jet fuel were discharged into the runway ditches between 1965 and 1974 (TIWET 1995). In addition, very large quantities of aviation fuel, waste motor oil, solvents, paint strippers, and paint thinners ended up in the runway ditch complex. Very high levels of petroleum hydrocarbons were reported in the sediments and soils of the runway ditch complex, but the ditches were dredged in the late 1990s, and the spoils were deposited in the landfill, then capped and sealed (E. Bergen, pers. communication 2002). All of the above sites were investigated, evaluated, remediated and/or are continually monitored under the Comprehensive Environmental Response, Compensation and Liability Act. Remediation included reducing exposure of the contaminants to fish and wildlife.

2.4.7.2 Flooding

Flooding is not a major concern at Ault Field. Occasional, storm-related tidal flooding occurs in the low-lying, southernmost portions of Clover Valley. This occurs when high winds occur during extreme high tides, bringing the tidal surge further inland than normal. No buildings have been constructed in this area, and all roads in the area are set on fill and elevated above flood level. Areas within the 100 year coastal flooding zone were not mapped at Ault Field by FEMA.


NAS Whidbey Island INRMP
Ault Field
Figure 2-15
Wetlands
LEGEND
Installation Boundary
Roads
Buildings
Ditches/Streams (R4SB)
Wetland Types
E2EM1
M2US
PEM1
PEM1/SS1
PFO1
PFO4
PSS1
PUB
Whidbey Island
This map includes jurisdictional and non-jurisdictional wetlands known and identified at a coarse planning level scale for the Ault Field. Wetland boundaries are approximate and are subject to change. This map is not intended to be a complete mapping of all wetlands found on the installation. An accurate field delineation must be performed before ground disturbing activities occur.
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2.4.8 Seaplane Base Resources

2.4.8.1 Surface Water

A system of surface ditches and subsurface storm drains provides drainage of surface runoff from the Seaplane Base. The system has several outfalls to Oak Harbor and Crescent Harbor. Surface ditches include a large main ditch adjacent to the sewage disposal pond, roadside ditches, small field ditches, and small grass and concrete channels in the grass areas around the family housing units. Other surface water bodies include the sewage disposal pond, Penfold Pond, and a small pond to the south of the fuel farm. Surface water features are shown on the wetlands map in Figure 2-16.

Two primary drainage systems were identified at Seaplane Base during a 1995 inventory by the Navy. These systems drain into Crescent Harbor Marsh and Maylor's Marsh.

Crescent Harbor Marsh

Crescent Harbor Marsh originated as a lowland salt marsh with minor tributaries. Later the marsh was levied and drained for agricultural purposes. When East Pioneer Road was constructed, the salt marsh was cut off from marine waters by the levy on which the road was built. The Crescent Creek drainage flows into the marsh system as does the outflow from Penfold Pond.

The East Pioneer Road levy was breached in August 2009 to restore tidal flow and salmonid access to a diked wetland complex on the northcentral portion of Crescent Harbor.

Maylor's Marsh

This salt marsh is located on Oak Harbor at the extreme west end of Seaplane Base. A channel complex bisects the marsh, flowing through between Oak Harbor and Saratoga Passage. There are no freshwater incursions into this marsh; it is solely a marine-influenced habitat supporting common coastal vertebrate and invertebrate species.

The low intertidal marsh located to the north of Maylor's Point (Maylor's Marsh) was evaluated by WDNR personnel and was determined to lack sufficient quality to qualify as a Natural Heritage element occurrence (WDNR 1995). This finding is due to the major human alterations that have occurred in the marsh over the years (e.g., ditches, dikes). However, salt marshes with native vegetation are considered relatively rare and should be protected. This marsh was built up as a result of deposition of dredge spoils from port development at Oak Harbor. A natural berm of sand and gravel occurs along the west side of the marsh. In addition to this gravel berm, the marsh has been altered by installation of a tide gate at the south end, excavation of a straight-walled tidal channel, and excavation along the northern edge of the marsh. The Maylor's marsh constructed south berm was breached by a storm in the mid-1980s just west of the old tide gate. Since then a series of tidal channels have established and the system is a fully functional low intertidal salt marsh.

2.4.8.2 Surface Runoff

Grassland, agricultural fields, and landscaped areas at Seaplane Base have an estimated annual runoff volume of 190 million gallons (580 acre-feet, 719 million liters). The estimated runoff for impervious surfaces, including buildings and pavement is 120 million gallons (454 million liters) (SCS 1991).

2.4.8.3 Wetlands

Wetlands at Seaplane Base are concentrated primarily in two low-lying areas with both freshwater and salt marshes occurring at Crescent Harbor Marsh and Maylor's Marsh (Figure 2-16). Non-linear wetlands comprise a total of 408 acres (1.5 km^2), or 14 percent of Seaplane Base, while linear wetlands in streams and ditches total 3.1 miles (5.0 km) in length, as indicated in Table 2-8. Saltwater wetlands, including salt marshes and coastal beaches, are the most commonly occurring types of wetlands, accounting for approximately 53 percent of the total wetland area mapped at Seaplane Base. These are classified under the USFWS system as estuarine, intertidal, emergent or unconsolidated shore. The lower elevations in these wetlands tend to be regularly flooded by the tides; upper intertidal areas are irregularly flooded.

Vegetation in Maylor's Marsh is dominated by jaumea, sea plantain, pickleweed, and salt grass (WDNR 1995a). The non-native Townsend's cordgrass (*Spartina anglica*) is invading this marsh system. Other non-native plant species occur on the berm along the west side of the wetland. The salt marsh portion of Crescent Harbor Marsh is dominated by pickleweed and salt grass. In the freshwater part of the marsh, four community types dominate: (1) cattail; (2) hard-stem bulrush; (3) slough sedge-Pacific silverweed; and (4) common mare's tail (WDNR 1995).

2.4.8.4 Wetland Enhancement

In August 2009, the restoration of Crescent Harbor Marsh to full tidal flow was completed by the cutting of a new free flowing tidal channel to Crescent Harbor. Channel morphology is still evolving and vegetation is converting to more salt tolerant types. The enhancement was done to provide pocket wetland refugia habitat for juvenile salmonids that use the Crescent Harbor shoreline.

Restoration actions included the following actions:

- cut and armor a notch in an existing berm that carries a sewerline into the wastewater treatment plant,
- replace and enlarge a culvert through the existing sewer treatment plant access road,
- cut and armor a notched weir through an existing earthen berm
- reroute an existing communication line
- excavate a tidal channel from East Pioneer Way bridge to the existing tidal inlet channel
- excavate the marsh inlet opening from East Pioneer Way bridge into the intertidal area
- remove historically placed fill material from marsh surface

2.4.8.5 Water Quality

A sewage disposal pond in Crescent Harbor Marsh at Seaplane Base discharges effluent into Crescent Harbor. This discharge is monitored by EPA under an NPDES permit. The effluent is sampled and tested weekly for the permitted discharge constituents. Water quality in the ponds and stormwater ditches occurring at Seaplane Base is unknown. Regular monitoring of water quality is not conducted.

2.4.8.6 Flooding

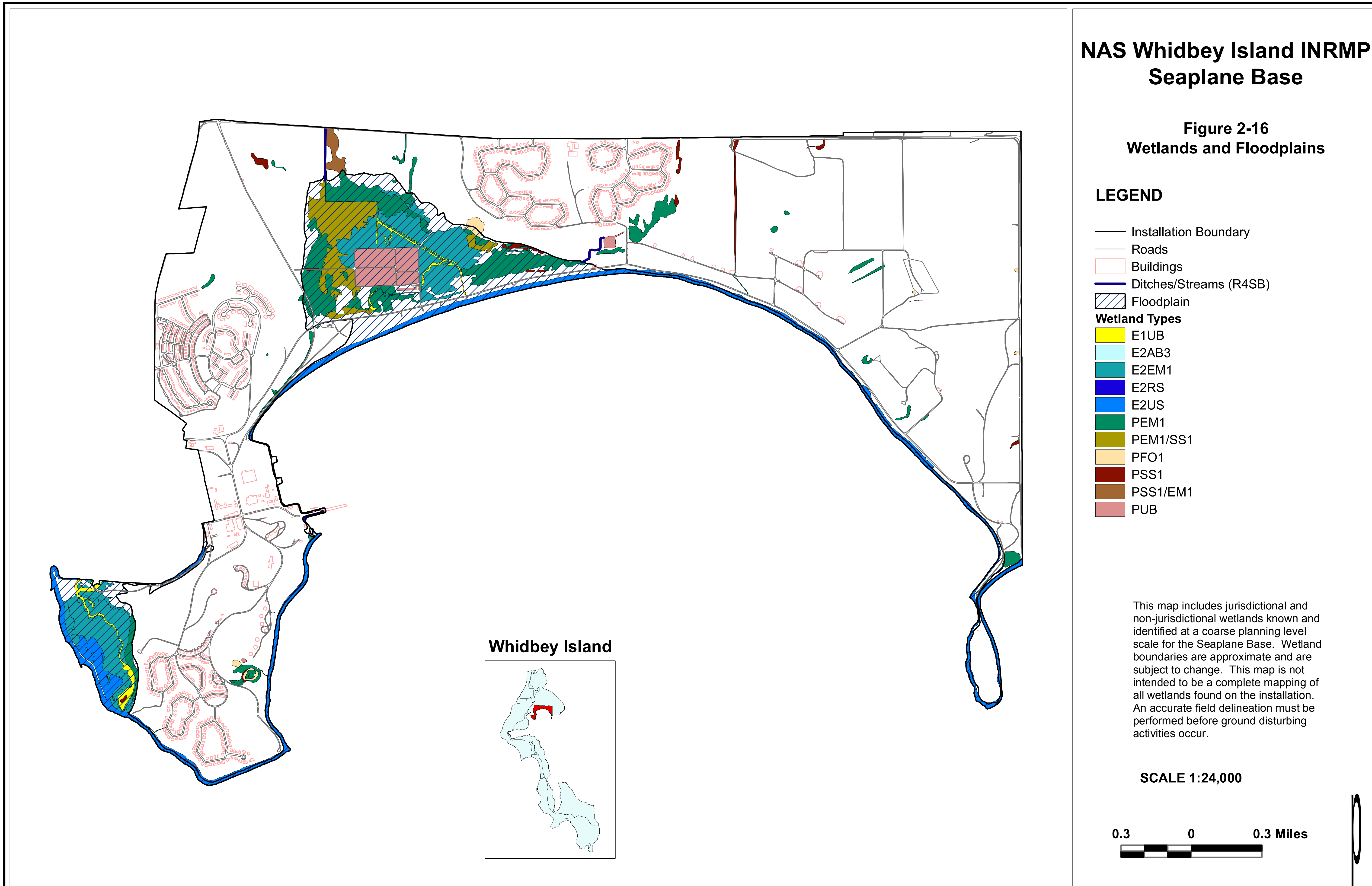
Tidal flooding of Maylor's Marsh and Crescent Harbor Marsh occur on a regular basis. Extreme high tides combined with wind action can create tidal surges that flood higher areas. Areas that lay within the 100 year coastal floodplain have been mapped by FEMA and are shown on the Wetlands and Floodplain Map (Figure 2-16). With the exception of roads and the sewage disposal pond, no structures occur within the floodplain. Roads occurring in the floodplain are built up on fill and flooding has not been a problem in these areas.

Table 2-8. Acreage and Mileage of Wetlands at Seaplane Base.

USFWS Wetland Type*	Definition	Modifiers	Water Regime and Special Conditions	Total Acreage/ Mileage at Seaplane Base
E1UB	Estuarine, Subtidal, Unconsolidated Bottom	L	Subtidal	6.9/ 0.32
		Lx	Subtidal, Excavated	1.6/ 0.21
E2AB3	Estuarine, Intertidal, Aquatic Bed	N	Regularly Flooded	0.9
E2EM1	Estuarine, Intertidal, Emergent, Persistent	N	Regularly Flooded	32.6
		Nx	Regularly Flooded, Excavated	0.1/ 1.10
		P	Irregularly Flooded	77.8
E2RS	Estuarine, Intertidal, Rocky Shore	Pr	Irregularly Flooded, Artificial Substrate	0.8
E2US	Estuarine, Intertidal, Unconsolidated Shore	N	Regularly Flooded	85.9
		P	Irregularly Flooded	10.9
PEM1/SS1	Palustrine, Emergent, Persistent/ Scrub-shrub, Broad Leaved Deciduous	T	Tidally Influenced-Semipermanently Flooded	41.5
PEM1	Palustrine, Emergent, Persistent	A	Temporarily Flooded	6.5
		Ax	Temporarily Flooded, Excavated	0/ 0.15
		B	Saturated	0.2
		C	Seasonally Flooded	22.4/ 0.07
		Cx	Seasonally Flooded, Excavated	0/ 0.78
		F	Semipermanently Flooded	0.5
		R	Tidally Influenced-Seasonally Flooded	30.0
		T	Tidally Influenced-Semipermanently Flooded	41.2
PFO1	Palustrine, Forested, Broad Leaved Deciduous	A	Temporarily Flooded	1.4
		C	Seasonally Flooded	0.4/ 0.09
		R	Tidally Influenced-Seasonally Flooded	2.9

USFWS Wetland Type*	Definition	Modifiers	Water Regime and Special Conditions	Total Acreage/ Mileage at Seaplane Base
PSS1/EM1	Palustrine, Scrub-shrub, Broad Leaved Deciduous/ Emergent, Persistent	C	Seasonally Flooded	5.8
PSS1	Palustrine, Scrub-shrub, Broad Leaved Deciduous	A	Temporarily Flooded	0.2
		C	Seasonally Flooded	3.5/ 0.04
		Cx	Seasonally Flooded, Excavated	2.4
		N	Regularly Flooded	0.3
		R	Tidally Influenced-Seasonally Flooded	2.0
PUB	Palustrine, Unconsolidated Bottom	F	Semipermanently Flooded	0.2
		Fx	Semipermanently Flooded, Excavated	1.9/ 0.01
		Kx	Artificially Flooded, Excavated	27.1
R4SB	Riverine, Intermittent, Streambed		None	0/ 0.02
		Cx	Seasonally Flooded, Excavated	0/ 0.29
Total Wetland Acreage and Mileage at Seaplane Base				407.9/ 3.08

*From *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979)


NAS Whidbey Island INRMP
Seaplane Base
Figure 2-16
Wetlands and Floodplains
LEGEND
Installation Boundary
Roads
Buildings
Ditches/Streams (R4SB)
Floodplain
Wetland Types
E1UB
E2AB3
E2EM1
E2RS
E2US
PEM1
PEM1/SS1
PFO1
PSS1
PSS1/EM1
PUB
This map includes jurisdictional and non-jurisdictional wetlands known and identified at a coarse planning level scale for the Seaplane Base. Wetland boundaries are approximate and are subject to change. This map is not intended to be a complete mapping of all wetlands found on the installation. An accurate field delineation must be performed before ground disturbing activities occur.
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Whidbey Island

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2.4.9 OLF Coupeville Resources

2.4.9.1 Surface Water

This site does not contain a stream system nor does it drain into streams with freshwater habitats suitable for supporting resident or anadromous species.

The only surface water occurring at OLF Coupeville is a large drainage ditch that runs along the east side of the runway. This ditch receives surface runoff from higher grounds.

2.4.9.2 Wetlands

A wetlands inventory conducted by Geonex Inc. in 1995 identified one 0.82 mile (1.3 km) long riverine wetland occurring in the drainage ditch that parallels the runway. Figure 2-17 shows the location. The wetland is classified as riverine, intermittent, stream bottom. Seasonally flooded, excavated (R4SBCx). This classification indicates that the wetland is limited to the bottom of an excavated ditch. The wetland may not fall under USACE jurisdiction because the ditch appears to have been dug in an area that was previously upland, solely for the purpose of stormwater drainage.

2.4.9.3 Groundwater

Most water for domestic use in the central and southern portions of Whidbey Island is drawn from aquifers ranging from 40 to 200 feet below the ground surface. The aquifers are generally small and discontinuous, and are typically associated with surficial recharge areas such as wetlands. Since these aquifers are small, there is limited water available for development or irrigation uses. Larger, deeper aquifers in this area are generally contaminated with salt water. A groundwater well near the caretaker's house is the primary source of water for personnel working at OLF Coupeville.

2.4.9.4 Water Quality

Groundwater quality in the aquifer in this area is generally considered good.

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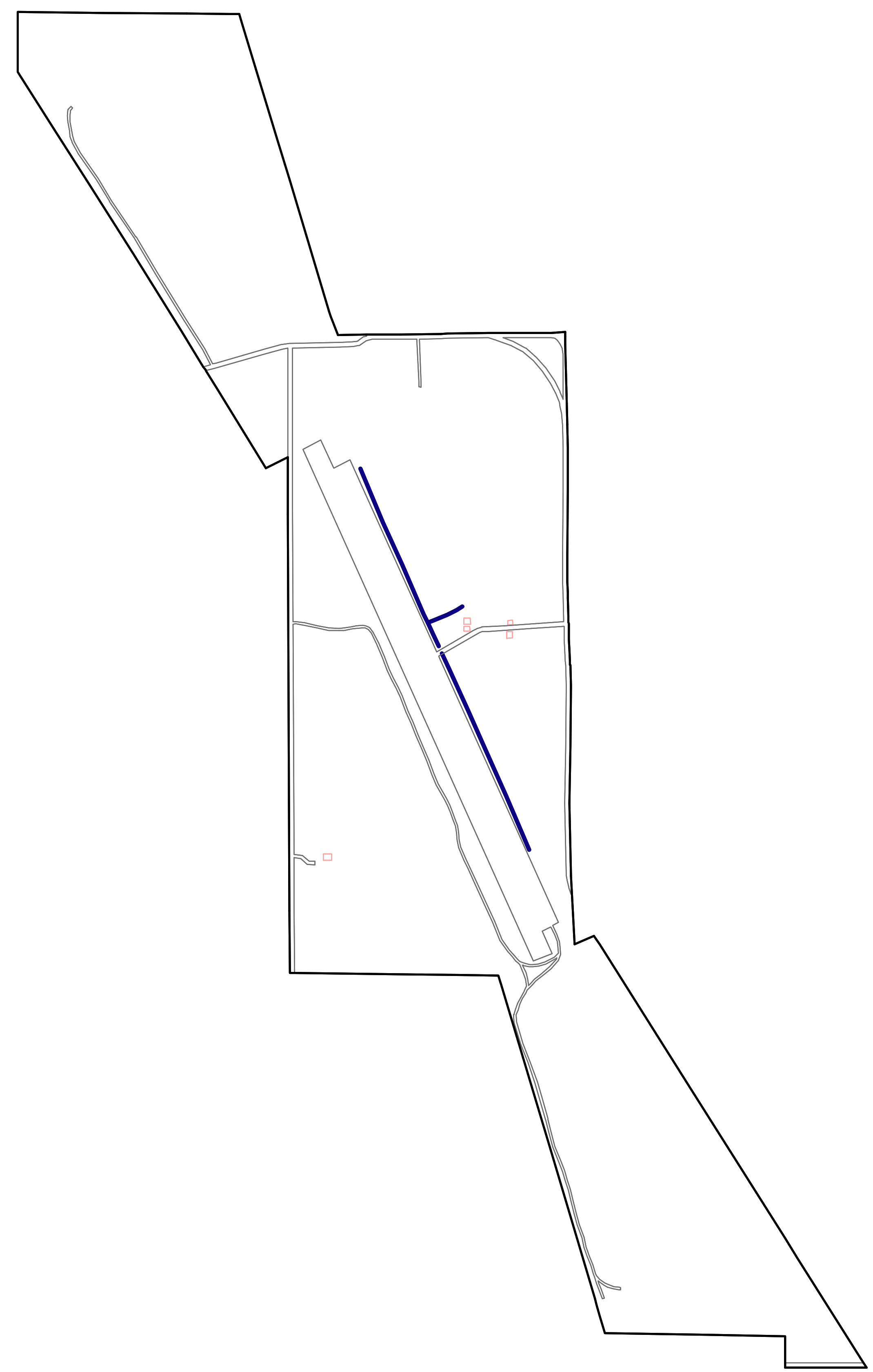


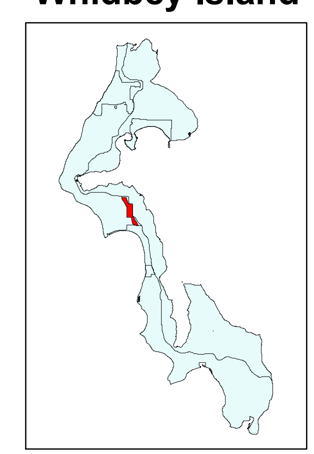
NAS Whidbey Island INRMP Outlying Field - Coupeville

Figure 2-17 Wetlands

LEGEND

- Installation Boundary
- Roads and Runway
- Buildings
- Ditches/Streams (R4SB)

Whidbey Island



This map includes jurisdictional and non-jurisdictional wetlands known and identified at a coarse planning level scale for Outlying Field - Coupeville. Wetland boundaries are approximate and are subject to change. This map is not intended to be a complete mapping of all wetlands found on the installation. An accurate field delineation must be performed before ground disturbing activities occur.

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2.4.10 Lake Hancock Resources

2.4.10.1 Surface Water

An estuarine salt marsh ecosystem occurs at Lake Hancock. It is tidally inundated via a primary slough and associated tidal channel complex. There are no significant freshwater incursions into this marsh, and it exists solely as a marine-influenced habitat.

There are no constructed stormwater ditches or drains on this site. All surface flow is overland toward the lagoon, with the exception of the bluff faces and beach slope, from which water drains directly into Admiralty Inlet. Surface runoff or penetration would be the only freshwater entering the wetland system at Lake Hancock.

2.4.10.2 Wetlands

Wetlands occurring at Lake Hancock are shown in Figure 2-18. A saltwater lagoon, salt marsh, and freshwater wetland system occupy approximately 200 acres (0.7 km^2) of the Lake Hancock site (Table 2-9). The lagoon is connected to Admiralty Inlet by a saltwater slough, and the hydrology in the marsh system is tidally driven. Approximately 32 acres (0.1 km^2) of freshwater marsh scrub-shrub wetland and forested bog border the salt marsh. Overall, wetlands comprise roughly 55 percent of the area at the Lake Hancock installation.

Lake Hancock is a coastal lagoon surrounded by salt marsh and driftwood-strewn mudflats. The area was once a freshwater lake and marsh, but in 1913 a powerful storm breached the sand bar. Repeated attempts by local farmers to close the bar and maintain the lake as freshwater were partially successful, although the area became more brackish over time. Another storm in 1934 swept away even larger sections of the bar, and the lake transitioned to a salt water lagoon. Tidal flow was established via two channels, one of which has since been closed off by beach dune development. The remaining inlet provides for tidal access during each cycle.

Entrance channel to Lake Hancock

True salt marshes are a relatively rare wetland type in the State of Washington. The marsh at Lake Hancock is considered to have biological values of statewide significance and so was listed in 1992 on the Washington Register of Natural Areas under an agreement between the Navy and The Nature Conservancy. This program is administered by the Natural Heritage Program of WDNR and by the Non-game Program of WDFW. The criteria for biologically significant sites include having a diversity of biological and physical features, rarity of features, relative absence of introduced plant species, lack of human disturbance, good water quality, of significant size, and adequately buffered from development.

Table 2-9. Acreage of Wetland Types at Lake Hancock.

USFWS Wetland Type*	Definition	Modifiers	Water Regime and Special Conditions	Total Acreage/ Mileage at Lake Hancock
E1UB	Estuarine, Subtidal, Unconsolidated Bottom	L	Subtidal	49.1/ 0.78
E2EM1	Estuarine, Intertidal, Emergent, Persistent	N	Regularly Flooded	100.0
		P	Irregularly Flooded	12.6
E2US	Estuarine, Intertidal, Unconsolidated Shore	M	Irregularly Exposed	1.6
		N	Regularly Flooded	27.4
		P	Irregularly Flooded	8.8
PFO1	Palustrine, Forested, Broad Leaved Deciduous	F	Seasonally Flooded	5.8
PFO4	Palustrine, Forested, Needle Leaved Evergreen	C	Seasonally Flooded	2.6
PSS1	Palustrine, Scrub-shrub, Broad Leaved Deciduous	F	Seasonally Flooded	18.9
PEMIC	Palustrine, Emergent, Persistent	C	Seasonally Flooded	4.7
Total Wetland Acres/ Miles at Lake Hancock				231.5/ 0.78

*From *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979)

High Quality Wetland/Aquatic Ecosystems

WDNR has identified Lake Hancock as a high quality wetland/aquatic ecosystem (WDNR 1995). Most of the wetland area at the site has been designated as an element occurrence of "High Salinity Lagoon, Northern Puget Trough". This is a landscape level element occurrence that incorporates four specific types of estuarine marsh occurrences: sandy, high salinity low marsh; sandy, moderate salinity low marsh; silty, moderate salinity low marsh; and transition zone wetland. These occurrences are summarized in Table 2-10 and shown in Figure 2-32 in the flora/plant resources section. Two other marsh types occur on the south side of the lagoon: high salinity low marsh and low salinity low marsh. These areas were not considered of sufficient quality to be element occurrences (WDNR 1995).

Table 2-10. High Quality Wetland Ecosystems Occurring at Lake Hancock.

Element Occurrence	Acreage	Dominant Plant Species	Salinity (parts per thousand)	Ecological Condition	State Priority for Protection
High salinity lagoon (landscape level occurrence)	191, includes 38 acre high salinity pond, additional smaller ponds, and marsh wetlands listed below	unvegetated lagoon, tidal sloughs, 12 acres of driftwood-covered mudflat, and marsh vegetation listed below	variable	good	high
Sandy, high salinity low marsh Sandy, moderate salinity low marsh	80.4	pickleweed, seashore saltgrass, jaumea, seaside arrowgrass, orache, Canada sandspurry, sea plantain, saltmarsh dodder	27-46	very good	moderate
Silty, moderate salinity low marsh	30.1	seaside arrowgrass, pickleweed, seashore saltgrass, orache, sea plantain, jaumea, alkaligrass	27-28	very good	moderate
Transition zone wetland	4.7	cattail, Pacific silverweed	not specified	good	very high
Low elevation freshwater wetland	9.0	red alder, lodgepole pine, Sitka spruce, western hemlock, sweet gale, slough sedge	not specified	good	high

Source: WDNR 1995.

A total of 10 occurrences of high salinity lagoon are known in the Puget Trough (WDNR 1995). The Lake Hancock system is recognized for its high quality and has been designated as a registry site in the Washington Register of Natural Areas. This type of element occurrence is high priority (Priority 2) for protection in Washington State (WDNR 1995). The primary threat to this system is the invasion of spartina (*Spartina anglica*) clones in the low marsh.

2.4.10.3 Water Quality

Water quality data are not available for Lake Hancock. The quality of water in the lagoon and tidal sloughs is expected to be good as these areas are tidally flushed regularly, and water quality in Admiralty Inlet is known to be relatively good. Drainage from agricultural fields does not enter into the Lake Hancock drainage, and Navy mission activities at the site are not believed to introduce significant chemical contaminants into the drainage.

2.4.10.4 Flooding

Tidal flooding occurs regularly throughout the low-lying areas of the Lake Hancock installation. Occasional winter storms combined with high tides can result in flooding at higher elevations than normal. Flooding does not threaten any Navy structures at the site.

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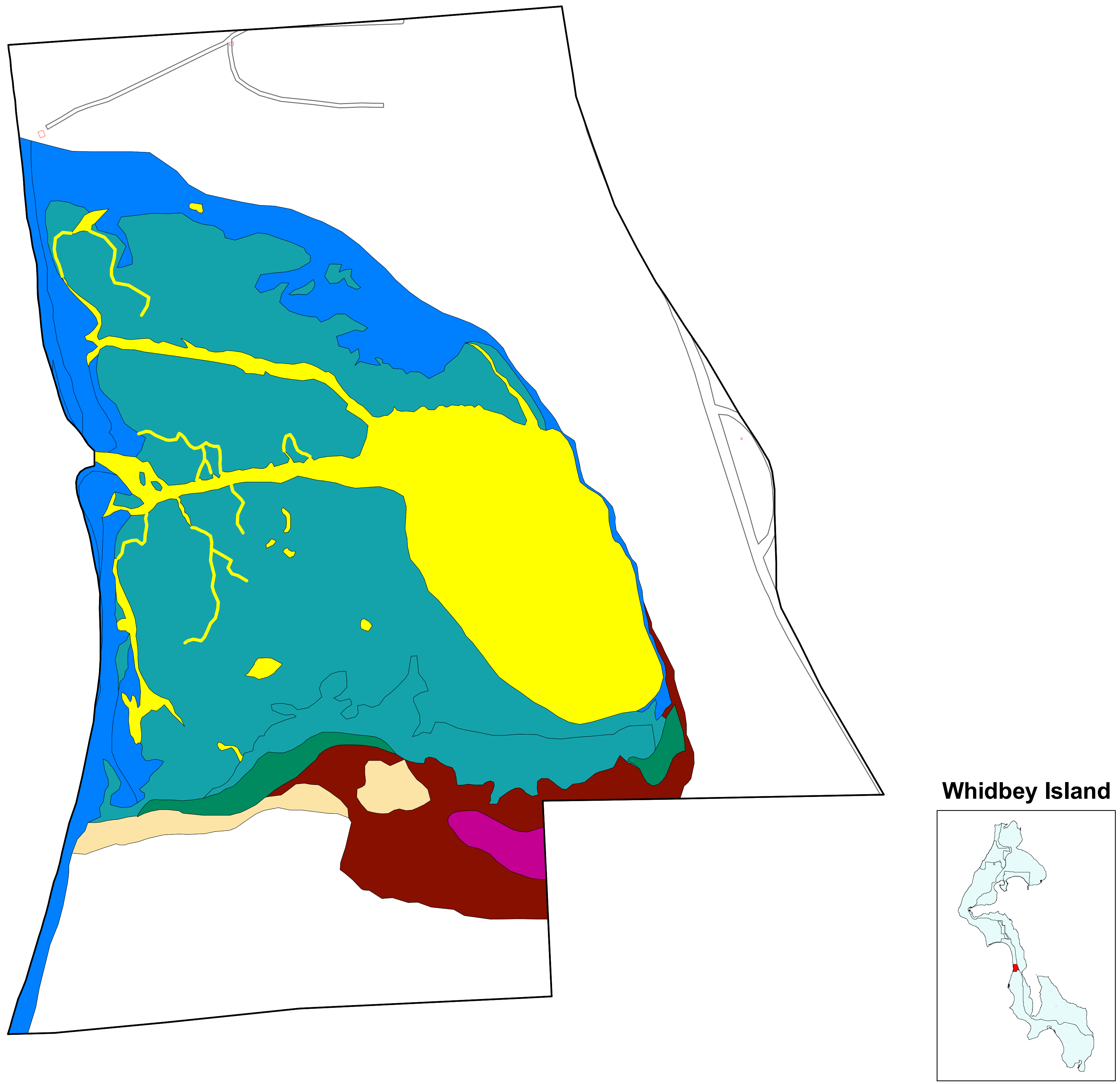

NAS Whidbey Island INRMP
Lake Hancock

Figure 2-18
Wetlands

LEGEND

Installation Boundary
Roads
Buildings
Tidal Channels (E1UB)

Wetland Types

E1UB
E2EM1
E2US
PEM1
PFO1
PFO4
PSS1

This map includes jurisdictional and non-jurisdictional wetlands known and identified at a coarse planning level scale for Lake Hancock. Wetland boundaries are approximate and are subject to change. This map is not intended to be a complete mapping of all wetlands found on the installation. An accurate field delineation must be performed before ground disturbing activities occur.

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2.4.11 Project Recommendations – Water Resources

See Appendix A for a detailed list of projects for NAS Whidbey Island water resources management.

2.5 General Biotic Environment

All of NAS Whidbey Island properties are located in the Puget Lowland Ecoregion. The northern portion of the ecoregion consists of low elevation flats (sea level to 500 feet) surrounding the Puget Sound and interspersed with high hills, approaching 2,000 feet in elevation. The northern portion of the ecoregion is located in the rain shadow of the Olympic Mountains, so rainfall in this area is less than much of the rest of the ecoregion.

Most of the land is forested and Douglas-fir is a major subclimax tree species. Local vegetation communities differing from the major forest vegetation are related to local variations in climate and soil types. Examples are prairie, oak woodland, northwest paper birch, quaking aspen, Rocky Mountain juniper, and swamp and bog communities.

The majority of the soils in the northern portion of the ecoregion are formed from glacial materials under the influence of coniferous forest vegetation.

2.5.1 Threatened, Endangered and Sensitive (TES) Species

One federally threatened plant species, golden paintbrush (*Castilleja levisecta*), is found on NAS Whidbey Island. Additionally, there is potential habitat for seven additional sensitive plant species. Table 2-11 lists known and potential TES plant species for NAS Whidbey Island including their status and habitat. The federally protected plant species that has been documented on NAS Whidbey Island is addressed in further detail in subsequent sections.

Table 2-11. TES Plant Species Potentially Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Status[1]	Habitat
golden paintbrush*	*Castilleja levisecta*	FT, SE	Meadows, grasslands, prairies, open woodlands.
bulb-bearing water-hemlock	*Cicuta bulbifera*	SS	Lowland marshes, ditches, other wet places.
black lily	*Fritillaria camschatcensis*	SS	Moist meadows, low salinity tideflats.
Alaska alkaligrass	*Puccinellia nutkaensis*	SS	Tideflats, coastal areas.
Puget balsamroot	*Balslamorhiza deltodea*	SR	Dry, open grassy meadows.
tall agoseris	*Agoseris elata*	SS	Meadows, open woods, up to middle elevations in mountains.

Common Name	Scientific Name	Status[1]	Habitat
white meconella	*Meconella oregana*	ST	Open grasslands, grass-dominated rock outcrops.
white-top aster	*Aster curtus*	SS	Prairies, grasslands.

[1] FT - Federal Threatened, ST – Washington State Threatened, SE - Washington State Endangered, SS - Washington State Sensitive, SR – Washington State (in) Review.
* Species documented as occurring at NAS Whidbey Island
Source: WDNR 2002.

A total of eleven federally-listed species are known to directly or indirectly utilize the nearshore intertidal zone of the installation or the waters immediately adjacent to NAS Whidbey Island for some part of their life history. Additionally, one federally-listed species has been found in Puget Sound and could potentially utilize the nearshore intertidal zone of the installation or the waters immediately adjacent to the installation. Also, the two eagle species that breed on or migrate through the installation are protected under the federal Bald and Golden Eagle Protection Act. Finally, there are also seven known sensitive animal species that can be found on the installation and potential habitat for five others. Table 2-12 lists threatened, endangered, and sensitive animal species as well as additional species that are candidates for state listing including their status and habitats. Those species that are documented as occurring at NAS Whidbey Island are indicated in the table. Comprehensive surveys for all of these federal or state threatened, endangered, and sensitive animal species have not yet been fully completed. Those federally protected species that have been documented on NAS Whidbey Island are addressed in further detail in subsequent sections.

Table 2-12. TES Animal Species Potentially Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Status[1]	Habitat
Puget Sound Chinook salmon*	*Oncorhynchus tshawytscha*	FT, SC	marine waters, estuaries, salt marshes
bull trout*	*Salvelinus confluentus*	FT, SC	marine waters, estuaries, salt marshes
Puget Sound steelhead*	*Oncorhynchus mykiss*	FT	marine waters, estuaries, salt marshes
Southern DPS of North American green sturgeon	*Acipenser medirostris*	FT	marine waters
bocaccio rockfish*	*Sebastes paucispinis*	FE, SC	marine waters
canary rockfish*	*Sebastes pinniger*	FT, SC	marine waters
yelloweye rockfish*	*Sebastes ruberrimus*	FT, SC	marine waters

Common Name	Scientific Name	Status[1]	Habitat
Southern resident killer whale*	*Orcinus orca*	FE, SE	marine waters
humpback whale*	*Megaptera novaengliae*	FE, SE	marine waters
marbled murrelet*	*Brachyramphus marmoratus*	FT, ST	mature forest near coastal areas
leatherback sea turtle	*Dermochelys coriacea*	FE, SE	marine waters
bald eagle*	*Haleaeetus leucocephalus*	BGEPA, SS	mature forest near open water
golden eagle*	*Aquila chrysaetos*	BGEPA, SC	cliffs, grasslands, open woodland
Taylor's checkerspot butterfly	*Euphydryas Edina taloryi*	FE, SE	Grasslands, oak savannahs
Pacific herring*	*Culpea pallasii*	SC	marine waters, estuaries
chum salmon*	*Oncorhynchus keta*	SC	marine waters, estuaries, salt marshes
sockeye salmon*	*Oncorhynchus nerka*	SC	marine waters, estuaries, salt marshes
Pacific cod	*Gadus macrocephalus*	SC	marine waters
Pacific hake	*Merluccius productus*	SC	marine waters
walleye pollock	*Theragra chalcogramma*	SC	marine waters
black rockfish*	*Sebastes melanops*	SC	marine waters
brown rockfish*	*Sebastes auriculatus*	SC	marine waters
copper rockfish*	*Sebastes caurinus*	SC	marine waters
greenstriped rockfish	*Sebastes elongatus*	SC	marine waters
Quillback rockfish*	*Sebastes maliger*	SC	marine waters
redstripe rockfish	*Sebastes proriger*	SC	marine waters

Common Name	Scientific Name	Status[1]	Habitat
yellowtail rockfish	*Sebastes flavidus*	SC	marine waters
Eastern Steller sea lion	*Eumetopias jubata*	ST	marine subtidal, beaches, nearshore rocks
gray whale*	*Eschrichtius robustus*	SS	marine waters
Pacific harbor porpoise*	*Phoceona phocoena*	SC	marine waters
Keen's long-eared bat	*Myotis keenii*	SC	dense forests
Pacific Townsend's big-eared bat	*Corynorhinus townsendii townsendii*	SC	caves, buildings
Brandt's cormorant*	*Phalacrocorax penicillatus*	SC	rocky marine islands, headlands, rocky seacoasts
common murre	*Uria aalge*	SC	rocky marine islands, headlands, rocky seacoasts
tufted puffin	*Fratercula cirrhata*	SC	rocky marine islands, headlands, rocky seacoasts
Western grebe*	*Aechmophorus occidentalis*	SC	marine coasts and bays; freshwater lakes and marshes
northern goshawk*	*Accipiter gentilis*	SC	mature forest
peregrine falcon*	*Falco peregrinus*	SS	bluffs, snags near coastal areas, open fields, marshes- esp. where prey birds are abundant
yellow-billed cuckoo	*Coccyzus americanus*	SC	Riparian forests, marshes, young deciduous forests
pileated woodpecker*	*Dryocopus pileatus*	SC	mature forests
purple martin*	*Progne subis*	SC	meadows near ponds, coastal marshes, grasslands, woodlands
Vaux's swift*	*Chaetura vauxi*	SC	forests near lakes and rivers
Western Toad	*Bufo boreas*	SC	Grasslands, young deciduous forests, meadows
Pacific pond turtle	*Actinemys marmorata*	SE	vegetated areas of ponds, small lakes, marshes, slow-moving streams

Common Name	Scientific Name	Status[1]	Habitat
pinto abalone	*Haliotis kamtschatkana*	SC	marine waters
Olympia oyster	*Ostrea Lurida*	SC	marine waters
sand-verbena moth*	*Copablepharon fuscum*	SC	coastal dunes, grasslands adjacent to beaches

[1]FE – Federal Endangered, FT – Federal Threatened, BGEPA – Bald and Golden Eagle Protection Act, SE – Washington Endangered, ST – Washington Threatened, SC – Washington Candidate, SS – Washington Sensitive.
*Species documented as occurring at NAS Whidbey Island.

2.5.1.1 Golden Paintbrush

On NAS Whidbey Island, golden paintbrush (see below photo) is found only on Forbes Point of the Seaplane Base. Only eleven known populations remain in the world, nine of which occur in Washington State (USFWS 2000). Of the nine known sites in Washington, five are located on Whidbey Island.

Golden Paintbrush (*Castilleja levisecta*)

Golden paintbrush is a perennial herb in the figwort or snapdragon family. The plant occurs in the Puget Trough at elevation from sea level to about 330 feet (100 m) above sea level. It occurs on generally flat grasslands and on steep coastal bluffs that are grass dominated. Low, deciduous shrubs are commonly present as small to large thickets, and, in the absence of fire, are prone to colonization by trees and shrubs such as Douglas-fir, Nootka rose, and Scotch broom (USFWS 2000).

Threats to golden paintbrush include habitat modification as succession causes parries and grasslands to become shrub and forested lands, development of property for commercial, residential, and agricultural use, constricted habitat, and recreational harvesting (USFWS 2000).

Golden paintbrush is very sensitive to grazing pressures and other forms of disturbance. The primary threats to the population at Forbes Point are human foot traffic and competing vegetation, both native and non-native. The area was fenced off from public access in 1994. The most conspicuous competitors are two native shrubs, trailing blackberry and Nootka rose (WDNR 1995). These shrubs tend to shade out and eliminate surrounding plants as they grow. A number of non-native grasses and herbaceous species also pose a threat to the golden paintbrush population. Rabbits have been observed grazing on this population (Klope 1995). The exclusion fences was modified with wire mesh on the lower third half of the fence to keep rabbits and voles out of the enclosure.

Forbes Point is the only known population on NAS Whidbey Island properties. Investigations of other potentially suitable areas have not documented any additional plant groups. The golden paintbrush population has been surveyed and monitored regularly at Forbes Point since the late 1990s. Table 2-13 shows the results of documented surveys. Since 2001, the population has been has been steadily declining, and is currently at a level below recovery plan goals. Additionally, the extent of plant coverage has also been intermittently monitored and has shown should contraction as the population decreased.

Table 2-13. Golden Paintbrush Population Size at Forbes Point[1].

1985	1995	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
2700	1346	1572	1882	1834	711	765	532	123	260	105	247	75	50	23	45

[1] 1985 - Calculated based on 1995 and 1999 average infl./plant; 1995 and 1999 - Count all fl; 2002 count all flowering stems (2739), divide by 3.85 (average stems/plant 1999-2001). All other years count all individual flowering plants. Counts only include identified naturally-occurring plants (outplantings are excluded).

Recent plant numbers do not meet recovery plan goals of a stable population of 2000 plants. It is believed competing vegetation is the primary reason for the suppressed plant numbers. Rodent herbivory may also reduce seed production, especially in low plant number years. Several different management prescriptions have been taken since 1995 to increase plant numbers. An area north of the fenced population was bladed to removed plant competition. After removal of the vegetation and upper topsoil, several plants groups colonized the area and established themselves at the location. In the early 2000s, seeds were collected from the Forbes Point population and were nursery grown. In 2002, 2004, 2005, and 2007, these plants were outplanted in several locations in and out of the fenced enclosure (see figure 4-1). Success has been mixed with almost all of the outplantings in the fenced compound eventually failing, but with some success in the previously bladed area. In 2005, the area in the fenced enclosure and the surrounding 10-acre management area was control burned in September of that year to control vegetation and reduce vole habitat. There was a positive golden paintbrush plant response from that action for a year or two in the fenced enclosure, but there was also a large response by vetch outside the enclosure. In some areas, the vetch was 3-feet high and so dense to shade out other vegetation. Mowing in September had been done numerous times after the seed pods had opened. Much of the mowing response was lost before paintbrush sprouting because of the earlier response from competing vegetation. In 2006-2007, the Navy constructed new housing just south of the golden paintbrush management area. The housing area was designed to catch all stormwater, so no disperse over land flow comes off the area. However, all stormwater is collected and was discharged into the road ditch that runs along the east side of the management area. In 2011 and 2012, standing water and/or damp conditions were noticed during the annual population surveys. This could have been a function of later rains, stormwater overflowing the road ditch, or a combination of both sources. To resolve design issues with the housing stormwater outfalls, the Navy and its PPV housing partner, in 2012, needed to alter stormwater flow from the adjacent housing area. General stormwater flow was removed from the adjacent road ditch and diverted into two underground dispersion trenches located northeast of the golden paintbrush management area and in the southwest edge of the management area. During high-flow events, some stormwater may still discharge into the road ditch, but the majority of water will now enter the dispersion trenches. If stormwater from the housing are was a contributing factor to the moist conditions, then keeping as much water as possible out of the road ditch and the use of the dispersion ditches away from the paintbrush management area should improve water conditions in the management area. The Navy will continue to monitor water conditions in the management and develop alternative solutions if the damp conditions continue.

2.5.1.2 Puget Sound Chinook Salmon

The Puget Sound Chinook salmon includes stocks from all rivers within Hood Canal and Puget Sound. To the east of Whidbey Island, there are three primary estuarine rearing areas for Chinook salmon: those associated with the Skagit, the Stillaguamish, and the Snohomish Rivers. Chinook salmon are known to leave these estuaries in the late spring months when they are one to six inches in length. They tend to migrate along sloping beaches with a preference for beaches with structure and macrophytic vegetation that are utilized as foraging and refugia areas.

Juvenile Chinook salmon are known to migrate along the western and eastern shore of Whidbey Island. Washington Trout, a non-profit conservation-ecology organization, conducted surveys at sites along the west side of Whidbey Island on a bi-monthly schedule, beginning in 2005 and ending in 2006. Area usage by juvenile salmonids was documented as well as all fish caught in the seine nets (Wait et al. 2007). Chinook salmon were caught at all sites (Wait 2006).

2.5.1.3 Bull Trout

As a species, bull trout exhibit primarily freshwater phases, including resident and migratory life cycles. A portion of coastal bull trout may use an anadromous life strategy that was not well documented in the past (Rieman and McIntyre 1993). Recent work by Goetz et al (2004/2005) has tracked bull trout from Puget Sound river systems into marine waters and back again, suggesting that some bull trout utilize both fresh and salt water habitats for foraging within the same year or even within the same season. They have also been tracked from one river system to another, which also suggests that they are not bound to natal or birth river systems but are able to explore and forage in different watersheds in Puget Sound.

There are no spawning streams on Whidbey Island so bull trout found along the shoreline would likely originate in the Skagit, Stillaguamish, and the Snohomish River systems where they may travel along the shorelines foraging for food. It is unknown if bull trout from Olympic Peninsula/Straits of Juan de Fuca streams would migrate across the deep open waters to Whidbey Island. During fish capture studies conducted by Washington Trout in 2006, the only location where a bull trout was observed was in the channel into Lake Hancock (Wait 2006). This sighting was of a 24-inch long adult bull trout.

2.5.1.4 Puget Sound Steelhead

Steelhead in the Puget Sound DPS are most abundant in northern Puget Sound, with winter-run steelhead in the Skagit and Snohomish rivers supporting the two largest populations. Steelhead typically migrate to marine waters after spending 2 years in freshwater. They then reside in marine waters for 2 to 3 years prior to returning to their natal stream to spawn as 4- or 5-year-olds. In the marine environment, steelhead may migrate to the high seas but may also spend considerable time as juveniles or adults in the protected marine environment of the Puget Sound. During their marine phase, steelhead may prey upon fish, including sand lance, herring, and squid.

Steelhead have been caught by recreational fisherman along the shoreline of Crescent Harbor. Although forage fish spawning takes place along the beach areas of Ault Field, it is unknown if steelhead utilize this area as a feeding zone. Since other salmonids have been caught along the west Whidbey shoreline (Wait et al. 2007) it is likely steelhead also use the nearshore areas of NAS Whidbey Island.

2.5.1.5 Southern DPS of North American Green Sturgeon

NOAA NMFS has published data that shows green sturgeon traveling from California and Oregon spawning rivers to Washington, British Columbia, and southeast Alaska coastal areas, estuaries, and bays (NMFS 2005a). NMFS has also published map data that shows green sturgeon migrating through the Strait of Juan de Fuca into Puget Sound (NMFS 2007). Tagged Southern DPS subadults and adults have been detected in coastal marine waters from Monterey Bay, CA, to Graves Harbor, AK, including the Strait of Juan de Fuca (NMFS 2008). Tagged subadults and adults have been documented to make sustained coastal migrations of up to 100 km per day but may also reside in aggregation/feeding areas in coastal marine waters for several days at a time, primarily occupying waters within 110 meters of depth (NMFS 2008).

Adult and subadult green sturgeon in the Columbia River estuary, Willapa Bay, and Grays Harbor feed on crangonid shrimp, burrowing thalassinidean shrimp (primarily the burrowing ghost shrimp (*Neotrypaea californiensis*), but possibly other related species), amphipods, clams, juvenile Dungeness crab (*Cancer magister*), anchovies, sand lances (*Ammodytes hexapterus*), lingcod (*Ophiodon elongatus*), and other unidentified fishes (NMFS 2008). Burrowing ghost shrimp made up about 50 percent of the stomach contents of green sturgeon sampled in 2003 (NMFS 2008). Habitat in the nearshore west of Ault Field at the wastewater treatment plant diffuser location is limited but amphipods, shrimps, crabs, sand lance, and other fish species could be in the vicinity. It is possible that green sturgeon could travel near the diffuser during migrations in and out of Puget Sound but it is unknown if they would use the diffuser site to feed. It seems likely that they would not linger but move to bays and estuaries in Puget Sound that would be more suitable for foraging.

2.5.1.6 Rockfish

Adult rockfish can be the most abundant fish in various coastal benthic habitats, such as kelp forests, rocky reefs, and rocky outcrops in submarine canyons at depths greater than 300 m (980 feet) (Love et al.2002). Larvae are found in surface waters and may be distributed over a wide area extending several hundred miles offshore. Larvae and small juvenile rockfish may remain in open waters for several months. Juveniles and subadults may be more common than adults in shallow water and are associated with rocky reefs, kelp canopies, and artificial structures such as piers and oil platforms (Love et al. 2002). Adults generally move into deeper water as they increase in size and age and many species exhibit strong site fidelity to rocky bottoms and outcrops (Love et al. 2002). In the Georgia Basin/Puget Sound area, the primary habitat for nearshore rockfish is composed of pebble, cobble, boulder, bedrock, and hardpan substrates that are continuous or isolated and that form crevices or other structures to protect rockfish from currents and predators (Palsson et al. 2009). Palsson et al (2009) does not show any of this habitat type along the NAS Whidbey Island shorelines. However, the Palsson et al (2009) mapping is a large-scale coarse data set that is not site specific to NAS Whidbey Island properties. Some suitable habitat is likely present along the high bluffs with rocky substrate along Polnell and Maylor Points on the Seaplane Base, along Rocky Point on Ault Field, and along the bluffs on the north and south ends of Lake Hancock. The quantity, quality, and use of these areas by rockfish is not known at this time. Since this INRMP manages and covers only a nearshore area from the high tide line down to extreme low tide (about -4.5' MLLW in this area), suitable and heavily used habitat is likely limited on NAS Whidbey Island properties.

Bocaccio

Bocaccio range from Punta Blanca, Baja California, to the Gulf of Alaska, Alaska (Love et al. 2002). Little is known about the habitat requirements of bocaccio in Puget Sound (Palsson et al. 2008a), but they are believed to have commonly occurred along steep walls in most of Puget Sound prior to fishery exploitations, although they are currently very rare in these Puget Sound habitats (Love et al. 2002).

Larval and pelagic juvenile bocaccio are found in the nearshore, near the water surface, with young-of-the-year associated with drifting kelp mats (Love et al. 2002). Larval fish feed upon microplankton, but juveniles are more opportunistic feeders (e.g., fish larvae, copepods, krill) (Love et al. 2002). Bocaccio generally settle to nearshore habitats around 3.5 months (around 1.5 inches total length), although they may stay near the surface up to 5.5 months (Love et al. 2002). Settlement generally takes place in shallow, nearshore waters over rocks with algae or in sandy areas with eelgrass or drift algae (Love et al. 2002). As bocaccio grow older, they move into deeper waters with adults found over high relief boulder fields and rocks. They can occur well off the bottom (over 100 feet above the substrata) or as deep as 900 feet (Love et al. 2002).

Palsson et al. (2009) reported that only four bocaccio have been reported observed in the east Juan de Fuca area. The Ault Field wastewater treatment plant outfall diffuser is in relatively shallow depths (-13 feet below Mean Lower Low Water (MLLW)) about 1000 feet offshore in the Strait of Juan de Fuca and is located in a sandy, silty bottom. The diffuser and anchor block may have some algae growing on it, but it will be limited in area and size, providing some habitat for bocaccio larvae and juveniles. Adults are unlikely to be found in the vicinity near the diffuser location.

Canary Rockfish

Larvae and pelagic juveniles (0.5 to 0.8 inch) are found in the upper 330 feet of the water column from January until about March when they start to move into intertidal tide pools and kelp beds, although some juveniles remain pelagic until July (Love et al. 2002). Large juveniles and sub-adults have been seen in water depths ranging from 36 feet to deeper adult habitats of 264 to 660 feet (Love et al. 2002). Adults and sub-adults aggregate around pinnacles and high-relief rock with substantial current (Love et al. 2002). They tend to be found near the sea floor, sometimes over flat rock and mixed mud-boulder habitat.

Palsson et al. (2009) reported that only fourteen canary rockfish have been reported observed in the east Juan de Fuca area. The outfall diffuser is in relatively shallow depths (-13 feet below MLLW) and is located in a sandy, silty bottom. The diffuser and anchor block may have some algae growing on it, but it will be limited in area and size, providing little habitat for canary rockfish larvae and juveniles. Adults could be found in the vicinity near the diffuser location, but based on historical records (Palsson et al. 2009) it seems unlikely that sub adult or adult canary rockfish would be found near the diffuser.

Yelloweye Rockfish

Yelloweye rockfish is a deep-water species that is relatively sedentary living in association with high relief rocky habitats and often near steep slopes (Palsson et al. 2009). Larvae and juveniles remain pelagic for up to 2 months, settling to shallow, high relief zones, crevices, and sponge gardens (Love et al. 2002). Yelloweye larvae and juveniles are opportunistic feeders, preying upon fish larvae, copepods, amphipods, krill eggs, and larvae. Adult diets consist of rockfishes, herring, sand lance, flatfishes, shrimps, crabs, and lingcod eggs (Love et al. 2002). Yelloweyes move into deeper water as they grow into adults, continuing to associate with caves and crevices and spending large amounts of time lying on the substratum, sometimes at the base of rocky pinnacles and boulder fields (Love et al. 2002).

Palsson et al. (2009) reported that only three yelloweye rockfish have been reported observed in the east Juan de Fuca area. The outfall diffuser is in relatively shallow depths (-13 feet below MLLW) and is located in a sandy, silty bottom. The diffuser and anchor block may have some algae growing on it, but it will be limited in area and size, providing little habitat for yelloweye rockfish larvae, juveniles, or adults.

2.5.1.7 Southern Resident Killer Whale

Southern resident killer whales (SRKW) have been observed in the Straits of Juan de Fuca and in Puget Sound on numerous occasions. The SRKW typically hunt for fish in deeper waters, but females and sub-adults have been observed hunting for salmon in rock crevices in shallow water (NMFS 2005b, c). SRKW seem to prefer salmon but will also eat lingcod, flat fish, rockfish, and herring (NMFS 2005b, c).

Two populations of resident orca, northern and southern resident, seasonally occur in Puget Sound waters. The northern residents normally occur in Canadian waters off British Columbia with occurrences in Washington State waters considered rare (Wiles 2004). Southern resident orcas are the best-known stock and are comprised of the well-known J, K, and L pods. Resident whales feed almost exclusively on salmon, especially Chinook, and other fish (Wiles 2004). As a result, resident orca home range and seasonal occurrence is strongly associated with the timing and location of adult salmon returning to their natal streams to spawn (Heimlich-Boran 1986, Osborne 1986).

Because of their long life span, position at the top of the food chain, and their blubber stores, killer whales accumulate high concentrations of contaminants. Organochlorines, such as PCBs and DDT, and many other chemical compounds including polychlorinated napthalenes, brominated flame retardants, PAHs, dioxins, furans, and heavy metals, are a concern because of their ability to induce immune suppression, reproductive impairment, or other physiological damage in marine mammals (Wiles 2004).

2.5.1.8 Humpback Whale

The humpback whale has a worldwide distribution, with three major distinct populations: the North Atlantic, North Pacific, and southern oceans. This species inhabits waters over continental shelves, along edges, and around some oceanic islands. During the winter, individuals are usually found in tropical or temperate waters ($10\text{-}23^{o}$ latitude). During the summer, most migrate considerable distances to waters with higher biological productivity, typically at high latitudes ($35 - 65^{o}$).

In the North Pacific, there are three distinct population groups: a western north Pacific population, a central population that migrates between Hawaii and Alaska, and a Mexico-California-Alaska population that seasonally migrates past Washington State between breeding areas and feeding areas. During the summer, humpback whales in the North Pacific migrate and feed over the continental shelf and along the coasts of the Pacific Rim, from Point Conception, California to the Gulf of Alaska, Prince William Sound, and Kodiak Island. Humpback whales spend the winter in
continental shelf and along the coasts of the Pacific Rim, from Point Conception, California to the Gulf of Alaska, Prince William Sound, and Kodiak Island. Humpback whales spend the winter in

three separate wintering grounds: the coastal waters along Baja California and the mainland of Mexico, the main islands of Hawaii, and the islands south of Japan (SAIC 2001).

In recent years, humpback whales have been intermittently sighted in Puget Sound. An analysis of data compiled by the Orca Network, a community based marine mammal monitoring effort, shows humpbacks are regular visitors to the Straits of Juan De Fuca (although in low numbers), but are infrequent visitors to Puget Sound (Orca Network data 2002-2004). A recent presentation at the 2005 Puget Sound/Georgia Basin Research Conference in Seattle stated that humpbacks were sighted regularly (but in low numbers) in the eastern Strait of Juan de Fuca and in southern Puget Sound in 2004 (Falcone et al 2005). In 2012, there were several sightings of humpback whales in Hood Canal.

2.5.1.9 Marbled Murrelet

Marbled murrelets range from the Aleutian Archipelago in Alaska to central California. The majority of their lives are spent in the marine environment within 1.6 miles of shore, where they feed primarily on small fish such as sandlance and Pacific herring. Marbled murrelets nest in inland forests, typically in old-growth, mature stands at lower elevations. Nesting occurs from late March to late September when both parents tend a single young. Small numbers of marbled murrelets have been observed on water along the shores of NAS Whidbey Island. They have not been observed in terrestrial habitats on NAS Whidbey Island.

2.5.1.10 Leatherback Sea Turtle

Leatherback sea turtles are pelagic, most often sighted from 5 to 100 nautical miles offshore, predominantly over the deep outer continental shelf. Leatherback sea turtles are more common in warm temperate waters. The interior waters of Puget Sound do not provide forage or other habitat for leatherback sea turtles. The furthest inland Puget Sound sighting of leatherback sea turtle was a single sighting in 1981 in the Port Angeles area (Adolfson 2005). Leatherback sea turtles are not likely to be found in the waters adjacent to NAS Whidbey Island properties.

2.5.1.11 Bald Eagle

The bald eagle is the only eagle unique to North America. Bald eagles are found throughout most of North America, from Alaska and Canada to northern Mexico. The largest North American breeding populations are in Alaska and Canada, but significant bald eagle populations also occur in the Pacific Northwest. In Washington State, there are some indications that the population may have reached carrying capacity in parts of western Washington. Though the nesting habitat may be near saturation around Puget Sound and other marine coasts, the total late spring/early summer population is expected to continue to grow with an increase in the pool of non-breeding adults until all available food resources are exploited.

Bald eagles generally nest near coastlines, rivers, large lakes, or streams that support an adequate food supply. They often nest in mature or old-growth trees, snags (dead trees), cliffs, rock promontories, and rarely on the ground. Nest sites typically include at least one perch with a clear view of the water where the eagles usually forage. Shoreline trees or snags located near reservoirs provide the visibility and accessibility needed to locate aquatic prey. Breeding bald eagles occupy "territories," areas they will typically defend against intrusion by other eagles. In addition to the active nest, a territory may include one or more alternate nests built or maintained by the eagles but not used for nesting in a given year. Bald eagles exhibit high nest site fidelity and nesting territories are often used year after year. In the lowlands around Puget Sound, bald eagles nest in small patches of residual large trees and second growth forest. The large trees along shorelines used by eagles are a diminishing resource, as more and more shoreline is dedicated to residential development (Stinson et. al. 2007).

Bald eagles are opportunistic feeders. Fish comprise much of their diet, but they also eat waterfowl, shorebirds/colonial waterbirds, small mammals, turtles, and carrion (often along roads or at landfills). Because they are visual hunters, eagles typically locate their prey from a conspicuous perch, or soaring flight, then swoop down and strike. Migrants frequently concentrate in large numbers at sites where food is abundant, and they often roost together communally. In some cases, concentration areas are used year-round.

Studies on bald eagle use of NAS Whidbey Island were conducted in 1994 and 1995 as part of developing the original installation bald eagle management plan. Data from this research along with a WDFW report based on the research is maintained in Appendix G. Bald eagles nest on Ault Field and the Seaplane Base, but can be found foraging or roosting on all NAS Whidbey Island properties.

2.5.1.12 Golden Eagle

Golden eagles can be found from the tundra, through grasslands, forested habitat and woodland brushlands, south to arid deserts, including Death Valley, California. They are aerial predators and eat small to mid sized reptiles, birds, and mammals up to the size of mule deer fawns and coyote pups. They also are known to scavenge and utilize carrion. Golden eagles will migrate from the Canadian provinces and northern tier and northeastern states to areas that are milder in the winter and/or may have less snow cover. During winter, golden eagles are found throughout the continental United States. Golden eagles will forage during migration flights and use lift from heated air from open landscapes to move efficiently during migration and seasonal movements (US Fish and Wildlife Service 2011).

Golden eagles are foraging transient visitors to NAS Whidbey Island during migration periods. There are no known nests of golden eagles on the installation.

2.5.1.13 Taylor's Checkerspot Butterfly

The Taylor's checkerspot is a prairie species once found throughout grasslands in the Willamette Valley, Puget Sound, and south Vancouver Island. Historically, the checkerspot was documented at more than 70 sites in British Columbia, Washington, and Oregon. These sites included coastal and inland grasslands (prairies) on southern Vancouver Island and surrounding islands in British Columbia and the San Juan Island archipelago, as well as open prairies on post-glacial gravelly outwash and balds in Washington's Puget Trough and Oregon's Willamette Valley. Adults emerge in the spring, during April and May, when they mate and lay clusters of as many as 1,200 eggs.

Habitat requirements for the Taylor's checkerspot consist of open grasslands and grass/oak woodland sites where food plants for larvae and nectar sources for adults are available. These sites include coastal and inland prairies on post-glacial, gravelly outwash and balds. Taylor's checkerspot larvae have been documented feeding on members of the figwort or snapdragon family (Scrophulariaceae), including paintbrush (*Castilleja hispida*) as well as native and non-native *Plantago spp*. in the plantain family (Plantaginacea). The major limiting factors affecting this species are related primarily to the significant loss of suitable habitat that is largely due to agricultural and urban development, encroachment of trees, and spread of invasive plants which threaten the native grasslands in which the species is found (US Fish and Wildlife Service 2013a).

Taylor's checkerspot butterfly was historically found on Whidbey Island and likely used some of NAS Whidbey Islands native grassland areas but has since been extirpated from the island. Even though no populations of Taylor's checkerspot butterfly are currently found on Whidbey Island, there is still suitable habitat present including some of NAS Whidbey Island remnant native grassland areas. Three areas on Whidbey Island near NAS Whidbey Island that are currently unoccupied have been designated as critical habitat because they are necessary for the long-term survival of the species and contain one or more Primary Constituent Elements (PCE) for the species (US Fish and Wildlife Service 2013b). There are future proposals to re-establish butterfly populations at these three currently unoccupied locations. It would be reasonable to expect that at some point after re-establishment adult and/or juvenile Taylor's checkerspot butterflies could start to use or colonize NAS Whidbey Island grassland areas near the re-establishment sites.

2.5.2 Ault Field Resources

Plant Species

TES plant species have not been observed at Ault Field. WDNR conducted surveys in areas of potential habitat for TES species in 1994 and 1995, but found no populations or individual occurrences. However, potential habitat is present for bulb-bearing water hemlock, a state sensitive species. While not observed, it is possible that this species currently occur or will occur in the habitat type listed in Table 2-14.

Table 2-14. TES Sensitive Plant Species Potentially Occurring at Ault Field.

Common Name	Scientific Name	Status[1]	Habitat	Areas of Potential Habitat
Bulb-bearing water-hemlock	*Cicuta bulbifera*	WS	lowland marshes, ditches, other wet places	perimeter of wetland south of Rocky Point Picnic Area

[1] WS - Washington State Sensitive. Source: WDNR 2002.

Fish and Wildlife Species

Chinook Salmon and Steelhead

The waters of northern Puget Sound, the Straits of Juan de Fuca, and Strait of Georgia are migratory corridors for Puget Sound populations of Chinook salmon and steelhead heading to and from ocean feeding grounds. Juvenile Chinook salmon and adult steelhead may use the intertidal areas of the beaches along Ault Field, but frequency of occurrence is unknown. There are no suitable Chinook or steelhead spawning streams on Ault Field.

During their migration and rearing, juvenile salmon occur almost exclusively in shallow water directly adjacent to the shoreline (SAIC 2000). They have been observed utilizing tidal mud flats, moving into shallow water with the rising tide and retreating to deeper water as the tide falls. The shoreline along Ault Field is primarily sand over a substrate of rock and experiences high-energy wave action during storm events. Consequently, the Ault Field area is not ideal juvenile salmon rearing habitat. Adult Chinook salmon and steelhead may forage along the shoreline as they migrate past.

Historically prior to diking, the Clover Valley drainage was open to Dugualla Bay and tidal exchange almost to what is now the end of runway 25. This "pocket" estuary would have provided quality rearing habitat for juvenile salmonids that come out of the Skagit River similar to the restored Crescent Harbor marsh site. This salmon habitat was separated from Dugualla Bay and from juvenile salmonid use when the system was diked in the early 1900s.

Bull Trout

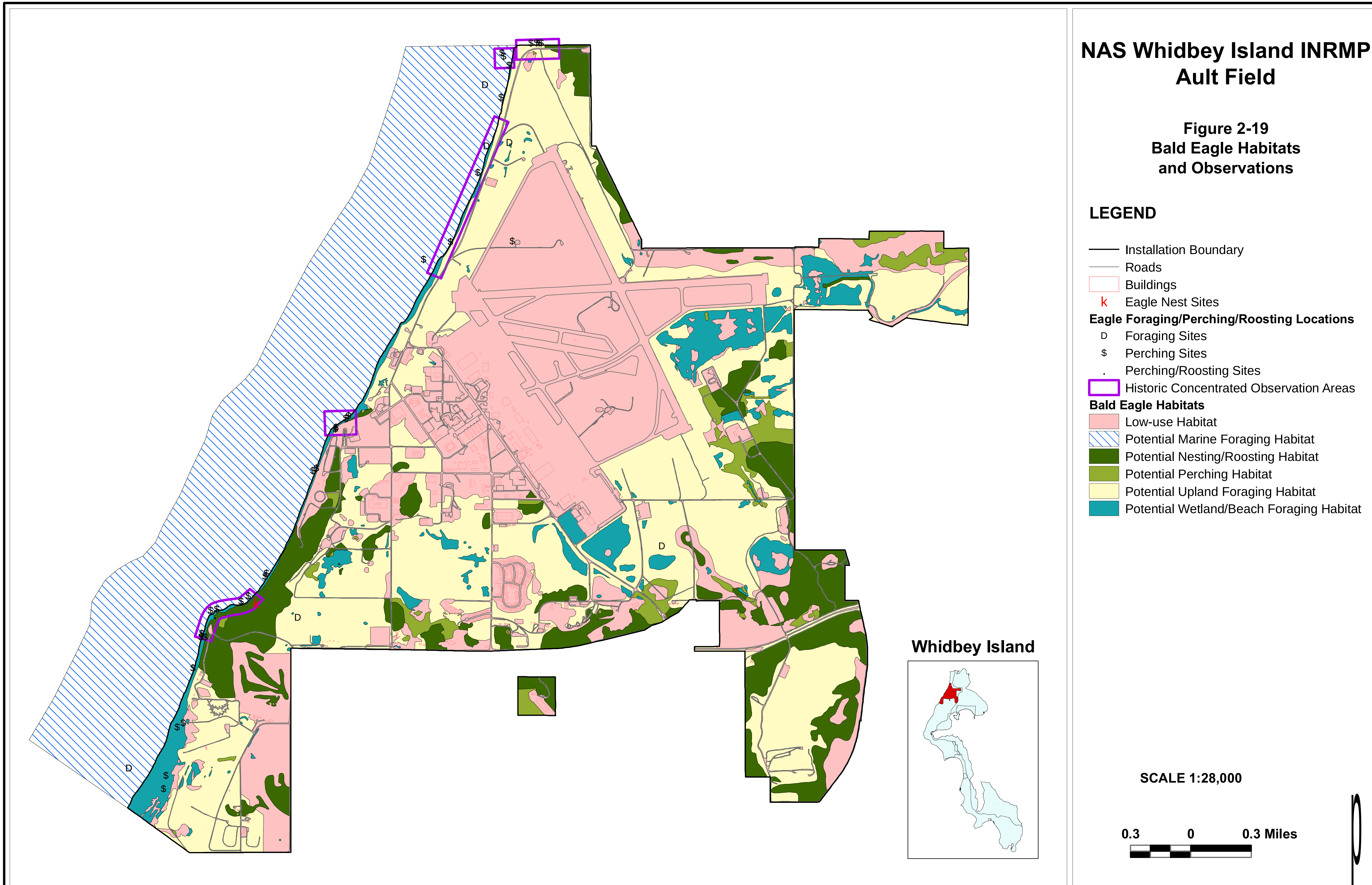
Bull trout adapting an anadromous life history may be found in estuaries of Puget Sound and also foraging along beaches, bluffs, and near the mouths of streams. With the exception of Cranberry Lake Outlet, there are no streams on Ault Field discharging west to marine waters, and the Clover Valley stream that flows east does not reach marine waters (other than by pumping) due to the protective dike separating the lagoon from Dugualla Bay. Cranberry Lake Outlet is normally blocked by sand; fresh water flows through the porous beach deposits to the sea. It is unknown if bull trout use the shoreline along Ault Field, but their presence cannot be ruled out without extensive surveys.

Marbled Murrelet

Marbled murrelets have been observed foraging in the waters along Ault Field. No nests or nesting activity has been observed at Ault Field.

Bald Eagle

Bald eagles nest on Ault Field at Rocky Point and use many habitats on the property. Figure 2-19 shows mapped bald eagle habitats and concentrated observation areas.


NAS Whidbey Island INRMP
Ault Field
Figure 2-19
Bald Eagle Habitats
and Observations
LEGEND
Installation Boundary
Roads
Buildings
Eagle Nest Sites
Eagle Foraging/Perching/Roosting Locations
Foraging Sites
Perching Sites
Perching/Roosting Sites
Historic Concentrated Observation Areas
Bald Eagle Habitats
Low-use Habitat
Potential Marine Foraging Habitat
Potential Nesting/Roosting Habitat
Potential Perching Habitat
Potential Upland Foraging Habitat
Potential Wetland/Beach Foraging Habitat
Whidbey Island
SCALE 1:28,000
0.3
0
0.3 Miles

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2.5.3 Seaplane Base Resources

Plant Species

Golden Paintbrush

A population of golden paintbrush (*Castilleja levisecta*) occurs on the bluff-top at Forbes Point on Seaplane Base. The species is listed as endangered by Washington State, and in 1997 was listed as a federally threatened species under ESA (62 FR 31740). The beginning of this chapter provides a detailed description of the Navy's management criteria for the Forbes Point population.

The most recent inventory of the population at Forbes Point was conducted by WDNR botanists in the summer of 1995 when 1,346 individual plants were counted (WDNR 1995). The plants are concentrated in the south half of the fenced enclosure where competing shrubs were cut back in 1994. Observations during the growing season of 1995 indicate that the areal extent of the plant is decreasing, although no conclusions have been drawn as to trends in population size.

Although small, the population is significant because it is one of the few remaining, and because it is under federal agency management, which provides both an obligation and an opportunity to manage the site for the benefit of the species. The USFWS should be consulted regarding any projects in the vicinity in accordance with the provisions of Section 7 of the ESA.

Other Species

WDNR conducted surveys in areas of potential habitat for other TES species in 1994 and 1995, but found no populations or individual occurrences. Potential habitat is present at Seaplane Base for the species listed in Table 2-15. While not observed, it is possible that these species currently occur or could occur at the sites listed in the table.

Table 2-15. Threatened, Endangered, and Sensitive Plant Species Potentially Occurring at Seaplane Base.

Common Name	Scientific Name	Status[1]	Habitat	Areas of Potential Habitat
Bulb-bearing water-hemlock	*Cicuta bulbifera*	WS	lowland marshes, ditches, other wet places	Freshwater portion of Crescent Harbor Marsh
Alaska alkaligrass	*Puccinellia nutkaensis*	WS	moist meadows, low salinity tideflats	Maylor's Marsh
Tall bugbane	*Cimicifuga elata*	WT	moist, shady woods at lower elevations	Survival Area where there is bigleaf maple or red alder component in stand
White-top aster	*Aster curtus*	WS	open prairies, grasslands	Perimeter of oak woodland, along ecotone between mowed field and forested areas on Forbes Point

[1] WT - Washington Threatened, WS - Washington State Sensitive. Source: WDNR 1995.

Fish and Wildlife Species

Chinook Salmon and Steelhead

During their migration and rearing, juvenile salmon occur almost exclusively in shallow water directly adjacent to the shoreline (SAIC 2000). They have been observed utilizing tidal mud flats, moving into shallow water with the rising tide, and retreating to deeper water as the tide falls. Crescent Harbor has extensive tidal mud flats along the northern shore, and juvenile Chinook have been regularly caught in beach seining that has occurred along the Crescent harbor shoreline. Adult steelhead are present along the shoreline of Crescent Harbor and have been caught in the past by recreational fishermen.

Salt marshes are important rearing and foraging areas for Chinook salmon (Healy 1991) and steelhead. Crescent Harbor marsh (on the northside of Crescent Harbor) has been reopened to full tidal flow in August 2009. This restoration project restored fish access to the site and juvenile Chinook have been caught during the 2011 fish sampling and monitoring. Additionally, juveniles of all five pacific salmon species have been caught in the nearshore during beach seining as part of the feasibility for the restoration project. Given that steelhead are known to migrate along and inhabit the Crescent harbor shoreline, they would also be expected to use this restored tidal wetland complex. The marsh along Maylor's Point is flushed by tidal action, but is lacking in deep pools suitable for salmon and steelhead during low tide.

Bull Trout

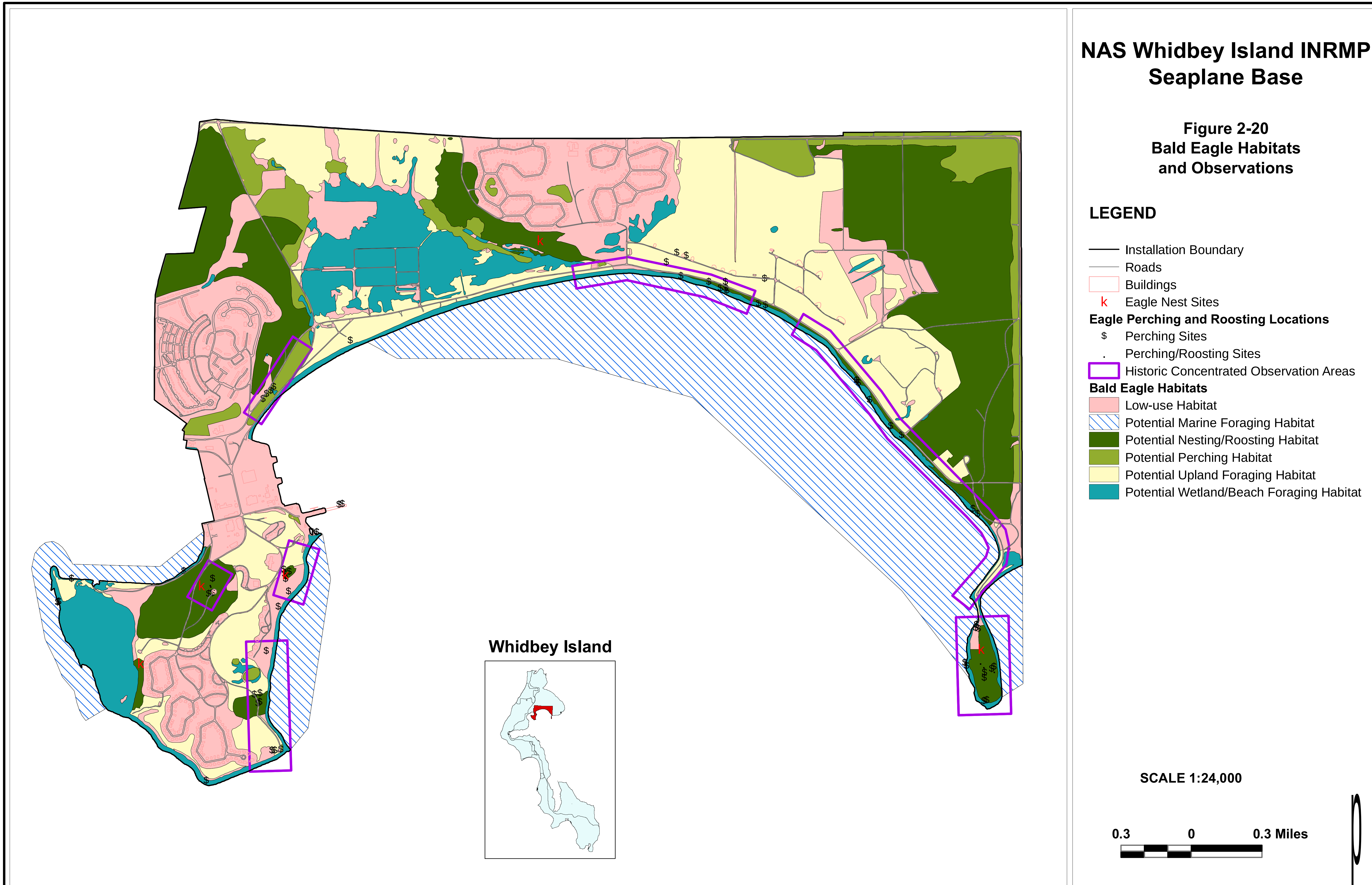
Typically, bull trout that may be present in the waters of Seaplane Base would spawn in the headwaters of streams and rivers that are tributaries to the Skagit River, Stillaguamish River, and Snohomish River. Bull trout adapting an anadromous life history may be found in estuaries of Puget Sound and also foraging along beaches, bluffs, and near the mouths of streams. Bull trout may be expected to be found periodically along the riprap of the Seaplane Base and along the beaches and mudflats along Maylor's Point and Crescent Harbor, but frequency of occurrence is unknown.

Marbled Murrelet

Marbled murrelets have been observed foraging off of Polnell Point. Marbled murrelets have been observed in low numbers (1-8 birds) in surveys conducted between 1992 and 1999 (SAIC 2000). There are no known marbled murrelet nests near Crescent Harbor (SAIC 2000).

Bald Eagle

Bald eagles nest on the Seaplane Base at Maylors Point, Polnell Point and along the Crescent Harbor shoreline and use many habitats on the property. Figure 2-20 shows mapped bald eagle habitats and concentrated observation areas.


NAS Whidbey Island INRMP
Seaplane Base
Figure 2-20
Bald Eagle Habitats
and Observations
LEGEND
Installation Boundary
Roads
Buildings
Eagle Nest Sites
Eagle Perching and Roosting Locations
Perching Sites
Perching/Roosting Sites
Historic Concentrated Observation Areas
Bald Eagle Habitats
Low-use Habitat
Potential Marine Foraging Habitat
Potential Nesting/Roosting Habitat
Potential Perching Habitat
Potential Upland Foraging Habitat
Potential Wetland/Beach Foraging Habitat
Whidbey Island
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2.5.4 OLF Coupeville Resources

Plant Species

TES plant species have not been observed at OLF Coupeville. However, potential habitat exists for the white-top aster along the east edge of the site (WDNR 1995). White-top aster typically grows in prairies dominated by Idaho fescue, but it may occur in degraded grassland remnants.

Fish and Wildlife Species

No TES fish and wildlife species have been documented on OLF Coupeville and no likely suitable habitat is present. There is a potential for some sensitive species from Table 2-12 could potentially be found on OLF Coupeville but have not been identified during surveys.

Marbled Murrelet

There are no suitable forest stands for marbled murrelet nesting.

Bald Eagle

There are no known bald eagle nests or likely nesting areas on OLF Coupeville. Eagles have intermittently used OLF Coupeville for foraging especially after the grassland areas are mowed or hayed. Otherwise, bald eagles are primarily seen flying over the property.

Taylor's Checkerspot Butterfly

One of the re-establishment sites for this butterfly is immediately adjacent to northeast corner of OLF Coupeville in the Smith prairie restoration site. OLF Coupeville has not been surveyed to determine if some of the species Primary Constituent Elements currently exist on OLF Coupeville, but it is possible that some remnant native components are present OLF Coupeville grassland areas. Given this, OLF Coupeville would be the most likely place on NAS Whidbey Island that the butterflies may begin to use or colonize after re-establishment.

2.5.5 Lake Hancock Resources

Plant Species

TES plant species have not been observed at Lake Hancock, although comprehensive plant inventories have not been conducted at the site. Of the TES plant species listed in this chapter, potential habitat exists only for Indian rice (*Fritillaria camschatcensis*) at the Lake Hancock site. Indian rice is a facultative wetland (FACW) plant that occurs in moist meadows and low salinity, transition zone wetlands. It is considered a sensitive plant in Washington State but has no federal listing. There is only one recorded occurrence of this species within Island County, a 1975 collection on Camano Island (WDNR 1995). The suitability of the transition zone wetland at Lake Hancock as habitat for Indian rice is unknown. If present, suitable habitat is limited.

Fish and Wildlife Species

Chinook Salmon and Steelhead

Salt marshes are important rearing and foraging areas for Chinook salmon (Healy 1991) and steelhead. The salt marsh and lagoon of the Lake Hancock site may be significant to juvenile Chinook and adult steelhead since these habitats are increasingly rare in the Puget Sound region. Steelhead use of the area is unknown at this time, but juvenile Chinook have been caught during sampling events conducted by Washington Trout (Wait 2006).

Bull Trout

Like Chinook salmon, bull trout use salt marshes and intertidal lagoons for rearing and foraging. Bull trout have been caught during sampling events conducted by Washington Trout at Lake Hancock (Wait 2006).

Marbled Murrelet

Approximately 22 acres of the forest stand at Lake Hancock is considered structurally complex forest. No marbled murrelet nesting activities have been observed or reported, but formal protocol surveys have not been conducted at Lake Hancock.

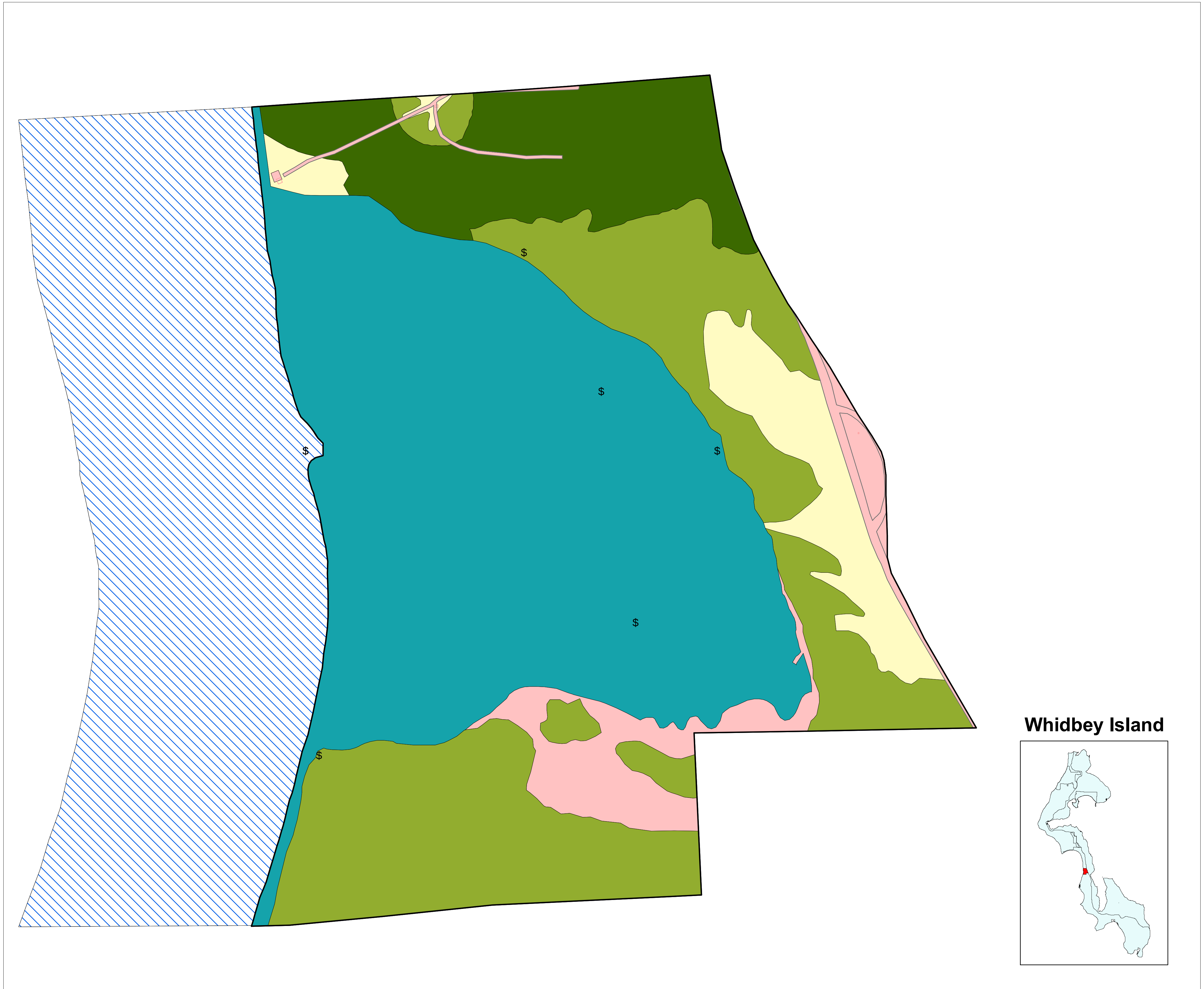
There have been no surveys to identify marbled murrelet foraging use of the marine waters offshore of the Lake Hancock site, but foraging birds may use the waters when food sources are available. A comprehensive survey to determine marbled murrelet use is recommended.

Bald Eagle

There currently are no bald eagle nesting on Lake Hancock, but there are known nests near the property. Even though there are no nests on the property, bald eagles regularly use Lake Hancock for foraging and roosting. Figure 2-21 shows mapped bald eagle habitats and concentrated observation areas.

2.5.5.1 Project Recommendations – TES Species

See Appendix A for a detailed list of projects for NAS Whidbey Island TES species management.



NAS Whidbey Island INRMP
Lake Hancock

Figure 2-21
Bald Eagle Habitats
and Observations

LEGEND

Installation Boundary
Roads
Buildings
Eagle Perching Locations
$ Perching Sites
Bald Eagle Habitats
Low-Use Habitat
Potential Marine Foraging Habitat
Potential Nesting/Roosting Habitat
Potential Perching Habitat
Potential Upland Foraging Habitat
Potential Wetland/Beach Foraging Habitat

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2.5.6 Flora

Whidbey Island is considered part of the Puget Sound Area sub-category of the larger *Tsuga heterophylla* Zone (Western Hemlock Zone), a vegetative zone which occupies extensive areas of western Washington (Franklin and Dyrness 1988). Plant communities that have not experienced alteration from wildfire, logging, natural disaster or urbanization would typically consist of Western hemlock (*Tsuga heterophylla)*, Douglas-fir (*Pseudotsuga menziesii)*, Western redcedar (*Thuja plicata)* with an understory of swordfern (*Polystichum munitum),* vine maple *(Acer circinatum)* and salmonberry *(Rubus spectabilis*). The Puget Sound Area sub-category is characterized by more moderate climate conditions. It experiences less rainfall than areas farther east towards the foothills of the Cascades due to a rain shadow effect from the Olympic Mountains. In addition to the above named tree species, Garry oak (*Quercus garryana*), western white pine (*Pinus monticola*), Sitka spruce (*Picea sitchensis*), shore pine (*Pinus contorta var.* contorta), bigleaf maple (*Acer macrophyllum*), Pacific madrone (*Arbutus menziesii*), and willow (*Salix spp.*) may be found on Whidbey Island. Common shrubs include Oregon grape (*Berberis nervosa*), Nootka rose (*Rosa nutkana*), clustered wild rose (*Rosa pisocarpa*), and red elderberry (*Sambucus racemosa*). See Appendix F for a complete list of the plants that are or potentially could be located on NAS Whidbey Island.

2.5.6.1 Vegetation Communities

The vegetated areas at the station are divided into the cover types listed in Table 2-16 and described in the following paragraphs. The forested categories are based on the classification system developed by Franklin and Dyrness (1973) but have been modified to better describe the plant communities occurring on NAS Whidbey Island. The modifications are necessary due to the level of disturbance, mostly prior to Navy ownership, which occurred on these lands relative to that of the natural communities for which the system was originally developed.

Plant communities occurring at NAS Whidbey Island have been classified as follows:

Douglas-fir forest - This community typically occurs on dry, well-drained soil and is dominated by Douglas-fir, and in some areas there is a significant amount of Pacific madrone (*Arbutus menziesii*). These stands have a broadleaf evergreen understory of salal (*Gaultheria shallon*), evergreen huckleberry (*Vaccinium ovatum*), Pacific rhododendron (*Rhododendron macrophyllum*) and Oregon grape (*Berberis nervosa*). Sword fern (*Polystichum munitum*) is one of the most common species occurring in the herb layer. Less common associates in this community are lodgepole pine (*Pinus contorta*), western redcedar, western hemlock, red alder (*Alnus rubra*), ocean spray (*Holodiscus discolor*), clustered wild rose (*Rosa pisocarpa*), red elderberry (*Sambucus racemosa*), and snowberry (*Symphoricarpos albus*).

Mixed forest - This vegetation type typically occurs on soils moister than the Douglas-fir forest type. Dominant tree species include Douglas-fir, western hemlock, western redcedar (*Thuja plicata*), and red alder, with an understory of red huckleberry (*Vaccinium parvifolium*), salal, Oregon grape, red elderberry, and several fern species. Other common associates include Sitka spruce (*Picea sitchensis*), bigleaf maple (*Acer macrophyllum*), grand fir (*Abies grandis*), cascara (*Rhamnus purshiana*), bitter cherry (*Prunus emarginata*), and red-osier dogwood (*Cornus stolonifera*). While Douglas-fir is a dominant in some mixed forest stands, this cover type can be differentiated from the Douglas-fir forest type by the co-dominance of cedar, hemlock, and/or deciduous broadleaf tree species.

Table 2-16. Vegetation Cover Types Occurring at NAS Whidbey Island.

Cover Type	**Acres of Vegetation Cover Types**				
	Ault Field	**Seaplane Base**	**Lake Hancock**	**OLF**	**Total Acres**
Douglas-fir forest	135.4	492.0	31.3	67.3	726.0
Mixed forest	374.4	354.5	122.0	34.1	885.0
Alder forest	119.0	51.6	9.4	4.2	184.2
Quaking aspen grove		0.4			0.4
Garry oak grove		8.8			8.8
Willow stand	14.4	18.4			32.8
Orchard	1.8	1.7		0.05	3.5
Scrub-shrub	338.1	211.0	19.1	46.6	614.8
Sitka spruce bog			2.6		2.6
Freshwater marsh	92.0	133.1	4.7		229.8
Wet meadow	166.5	7.7			174.2
Salt marsh	0.4	85.5	114.2		200.1
Dune natives	9.2				9.2
Grasslands and cultivated fields	1,956.5	725.9	27.2	458.5	3,168.1
Disturbed area	21.2	9.5			30.7
Landscaped area	361.0	372.9	2.9	3.9	740.7

Alder forest - The occurrence of red alder stands at NAS Whidbey Island is due either to relatively high soil moisture or to some kind of past disturbance such as land clearing, road maintenance, construction, or logging. Red alder stands occur in moist to wet areas on poorly drained organic soils, often over an impervious clay layer. These are usually monotypic stands of alder with an understory of salmonberry (*Rubus spectabilis*), thimbleberry (*Rubus parviflorus*), and lady fern (*Athyrium filix-femina*). Where a disturbance has occurred in forests that are dominated by Douglas-fir and western hemlock, red alder comes in as a successional stage. These successional areas often contain minor amounts of young Douglas-fir, western hemlock, and western redcedar. Sword fern is often present in these communities.

Quaking aspen grove - Several small, isolated stands of quaking aspen (*Populus tremuloides*) occur on Seaplane Base. These are monotypic stands with minor shrub components. The trees may have been planted as landscaping in the 1950s or 1960s and have continued to spread since then.

Garry oak grove - One remnant stand of Garry oak (*Quercus garryana*) remains on a hill near the west edge of Seaplane Base. It is located on the bluff north of Building #13. This is a small monotypic stand with an understory dominated by snowberry. The oak grove is bordered to the north by chain link fence and maintained turf grass in a housing area. The town of Oak Harbor was named for this native species, which was once prevalent in the area. This grove has five oak trees that are tagged and included in the U.S. Forest Service Garry Oak study. The Navy performs the annual acorn productivity survey of these oaks and provide the information to the U.S. Forest Service Olympia Forestry Sciences Laboratory. Records regarding the Garry oak grove are maintained at NAVFAC NW.

Willow stand - Willow communities on NAS Whidbey Island occur in moist to wet soils around lakes, ponds, marshes, and waterways. The stands are dominated by willows (*Salix* spp.) and black cottonwood (*Populus trichocarpa*) and may include dense thickets of Douglas spiraea, also known as hardhack (*Spiraea douglasii*). Herbaceous associates include common cattail (*Typha latifolia*), skunk cabbage (*Lysichitum americanum*), and curly dock (*Rumex crispus*). Hard-stemmed bulrush (*Scirpus acutus*) and various sedges, rushes, and grasses are also common to this vegetation type.

Scrub-shrub - This is a classification for areas that have received significant disturbance and are revegetating with both native and nonnative shrubs. Tree seedlings may be present but shrubs less than 20 feet in height are the dominant plant form. Scrub-shrub areas are dominated by wild rose, snowberry, Himalayan blackberry (*Rubus discolor*), Douglas spiraea, Scotch broom (*Cytisus scoparius*), and other shrub species. Scrub-shrub wetlands may be dominated by Pacific ninebark (*Physocarpus capitatus*), red alder seedlings, willow shrubs and saplings, and Douglas spiraea. Upland and wetland scrub-shrub areas are not differentiated on the vegetation cover type maps.

Sitka spruce bog - Spruce bog can be found on station lands only at Lake Hancock. The bog occurs on poorly drained peat soils and is dominated by Sitka spruce, willows, lodgepole pine, bog birch (*Betula glandulosa*), salal, Labrador tea (*Ledum groenlandicum*), western swamp laurel (*Kalmia occidentalis*), sweet gale (*Myrica gale*), and a variety of sedges. Sphagnum moss is present in some portions of the bog.

Freshwater marsh - Freshwater marshes occur on Ault Field, Seaplane Base, and Lake Hancock. They are typically saturated, seasonally flooded, or semi-permanently flooded. These areas contain a wide variety of emergent herbaceous and graminoid (i.e., grass-like; e.g., sedges, rushes, grasses) wetland plant species. Plant associations in freshwater marshes vary depending on the hydrologic regime, shade, and soil type. Some of the most frequently occurring species in emergent wetlands at NAS Whidbey Island include lady fern (*Athyrium filix-femina*), curly dock, skunk cabbage, marsh willow herb (*Epilobium watsonii*), water parsley (*Oenanthe sarmentosa*), climbing nightshade (*Solanum dulcamara*), floating-leaved pondweed (*Potamogeton natans*), common cattail, hardstem bulrush, soft rush (*Juncus effusus*), reed canarygrass (*Phalaris arundinacea*), burreed (*Sparganium* spp.), and tufted hairgrass (*Deschampsia caespitosa*).

Wet meadow - Wet meadows at NAS Whidbey Island include those wetlands that are temporarily flooded and are dominated by a variety of herbs and graminoid species. Where many freshwater marshes may remain inundated or saturated throughout the year, the surface soils in wet meadows tend to dry up during the summer months. Common plants in wet meadows at NAS Whidbey Island may include curly dock, creeping buttercup (*Ranunculus repens*), cow parsnip (*Heracleum lanatum*), reed canarygrass, soft rush, and dagger-leaf rush (*Juncus ensifolius*). Wet meadows occur at Ault Field and Seaplane Base.

Salt marsh - Areas of salt marsh occur at Lake Hancock, Seaplane Base, and Ault Field. Salt marsh is typically divided into two subtypes, high and low, based on the elevation and relative salinity. The plant communities vary with these factors. In high salt marsh areas, dominant species include redtop (*Agrostis alba*), Pacific silverweed (*Potentilla pacifica*), seaside arrowgrass (*Triglochin maritimum*), Lyngby's sedge (*Carex lyngbyei*), Baltic rush (*Juncus balticus*), springbank clover (*Trifolium wormskjoldii*), meadow barley *(Hordeum brachyantherum*), and Douglas aster (*Aster subspicatus*). Low salt marsh areas are dominated by pickleweed *(Salicornia virginica*), seashore saltgrass (*Distichlis spicata*), seaside arrowgrass, orache or saltweed (*Atriplex patula*), sea plantain (*Plantago maritima*), saltmarsh sandspurry (*Spergularia marina*), and fleshy jaumea (*Jaumea carnosa*).

Dune natives - This vegetation cover type is limited to a sandy coastal berm to the south of Rocky Point on Ault Field. Vegetation on the spit is comprised of a mosaic of three plant communities, each dominated by one of the following species: dune wildrye *(Elymus mollis*), big-headed sedge (*Carex macrocephala*), and sea thrift (*Armeria maritima*). Important secondary species in the dune wildrye and big-headed sedge communities include silver bursage (*Ambrosia chamissonis*) and Puget gumweed (*Grindelia integrifolia*).

Grassland and cultivated field - Open fields and agricultural lease areas comprise the largest component of the vegetative cover of station lands. This cover type includes a variety of native and exotic grasses, grains, annual crops, and annual weeds. Common species include Canada thistle (*Cirsium arvense*), clover (*Trifolium* spp.), plantain (*Plantago* spp.), ryegrass (*Lolium* spp.), orchard grass *(Dactylis glomerata*), velvet grass (*Holcus lanatus*), western fescue (*Festuca occidentalis*), bentgrass (*Agrostis* spp.), quackgrass (*Agropyron repens*), and bluegrass (*Poa* spp.). Cole crops, field mustard (*Brassica campestris*), and timothy (*Phleum pratense*) are especially common in the cultivated fields.

Disturbed area - This category includes areas that have been recently disturbed or that receive ongoing disturbance, apart from regular landscape maintenance. Disturbed areas typically have extensive patches of bare soil and may or may not be dominated by vegetation. Bare soil is interspersed with seral herbs and weedy exotic species. Common plant species include lamb's quarters (*Chenopodium album*), sheep sorrel (*Rumex acetosella*), curly dock, field mustard, buttercup (*Ranunculus* spp.), clover, tansy ragwort *(Senecio jacobaea*), Canada thistle, a variety of other forbs, and the following grass species: red top (*Agrostis alba*), quack grass, velvet grass, Kentucky bluegrass (*Poa pratensis*), and orchard grass.

Landscaped area - The vegetation of landscaped areas consists of a mix of native and non-native species resulting from a variety of landscape practices. Planted trees and shrubs and maintained turfgrass areas are typical.

2.5.6.2 Significant Native Terrestrial Plant Communities

In 1993, NAS Whidbey Island contracted with the Washington Department of Natural Resources (WDNR) to conduct field surveys on the station for rare plant species, exceptional biological natural areas, and significant habitat for neotropical migratory birds. The WDNR identified four significant native terrestrial plant communities on NAS Whidbey Island during its field surveys in 1994: (1) mature Douglas-fir-western hemlock/swordfern community, (2) red alder/swordfern community, (3) Garry oak woodland and (4) coastal spit with native vegetation (WDNR 1995). These communities are located on Seaplane Base and Ault Field and are described in the vegetation sections for these areas further on in the section.

Significant native plant communities are high quality communities that represent an important element of biodiversity due to their rarity in an area. Some of these communities provide critical habitat for a wide variety of wildlife species or are unusual in the local vegetation mosaic, while others support populations of rare plant species. The four communities listed above have become increasingly rare in Washington, largely through habitat loss and conversion to other land uses or vegetation types. Protection of these communities on NAS Whidbey Island would represent a significant contribution toward maintaining local and regional biological diversity.

2.5.6.3 Invasive Plants and Noxious Weeds

The State of Washington defines a noxious weed as “any plant which when established is highly destructive, competitive, or difficult to control by cultural or chemical practices” (RCW 17.10). The state maintains a noxious weed list from which regional weed control boards select species that are problematic in their region. Landowners are required by state law to control those plant species occurring on the regional lists. Executive Order 13112 requires that each federal agency whose actions may affect the status of invasive species shall prevent the introduction of invasive species, detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner, monitor invasive species populations accurately and reliably, provide for restoration of native species and habitat conditions in ecosystems that have been invaded and conduct research on invasive species and develop technologies to prevent introduction, and provide for environmentally sound control of invasive species. Implementing state and county noxious weed control requirements will help NAS Whidbey Island achieve compliance with EO 13112.

Noxious weeds that occur at NAS Whidbey Island include Canada thistle (*Cirsium arvense*), tansy ragwort (*Senecio jacobaea*), and gorse (*Ulex europaeus*). In addition to these noxious weeds, the station has problems with Scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus discolor*), and fennel (*Foeniculum vulgare*), which are species that do not occur on the regional noxious weed list but are invasive, non-native plants. Canada thistle and tansy ragwort are widespread throughout the station and present the majority of weed control problems. Gorse occurs primarily in one limited area on the Seaplane Base.

Canada thistle - Canada thistle can reduce agricultural crop yields and easily outcompete less aggressive native plant species. Canada thistle was introduced from Eurasia into the United States and southern Canada, where it invades fields, pastures, and areas of disturbed soil. It is a perennial weed with spiny leaves. The plant propagates by spreading of the roots and by wind dispersal of the seeds, which are attached to a small tuft of hairs. Canada thistle grows well in the climate of Whidbey Island in a variety of soils. Invasion of Canada thistle into pastures is often due to overgrazing in the spring.

In the past, control of Canada thistle has been a priority at NAS Whidbey Island. The primary methods used are mowing and chemical spraying with 2,4-D. In the Back to Nature areas where mowing is prohibited, spraying is employed. Thistle is a particular problem in the agricultural lease fields where it is the responsibility of the lessee to manage. When the fields are used for growing and baling hay, lessees seem to avoid cutting the thistle, leaving patches of it to disperse more seed. Where fields are cultivated for crop production, thistle is not typically a problem due to the regular cultivation and cropping practices.

Tansy ragwort - Tansy ragwort is a biennial plant from Eurasia that produces seeds during its second year of growth. The seeds are spread primarily by the wind and can remain dormant in the soil for as long as 15 years before germinating. Tansy is typically found in grasslands and disturbed areas and can survive under most soil moisture conditions. Its establishment is accelerated in areas where other vegetation is sparse and the soils have low nutrient levels. Tansy is toxic to livestock and wildlife, causing severe liver damage if consumed over the long term. This weed is best managed by repeated applications of herbicides or mechanical removal of the flower tops or entire plant prior to development of the seeds.

Gorse - Gorse is a dense, spiny, evergreen legume shrub that resembles Scotch broom. It bears sharp, stout spines and spine-like leaves and grows up to 10 feet tall. Gorse flowers primarily in the early spring and produces seed prolifically. Seeds are scattered for several feet when the seed pods burst and are spread by animals, machinery, and water. The seeds can remain viable in the soil for years. The plant was introduced from Europe and adapts well to regions of mild winters and sandy or gravelly soils with abundant moisture. Gorse forms dense thickets that virtually exclude all other vegetation. The thickets develop substantial amounts of dead, dry matter, and pose a serious fire hazard.

At NAS Whidbey Island, gorse is a problem only on Seaplane Base near the Olympic View School. Treatment thus far has involved mechanical clearing of the area, followed by application of Crossbow (2, 4-D and triclopyr are active ingredients). Any future mechanical clearings should be coupled with seeding to native grass and wildflower species.

Scotch broom - Scotch broom is an ornamental species that was introduced by early settlers of the Pacific Coast. The species spread from cultivation many years ago. In western Washington, it is moving rapidly into forested lands where it can interfere with re-establishment of conifer seedlings on harvested lands. Scotch broom is widely distributed at NAS Whidbey Island but little effort has been made to control it. In 1994, Scotch broom growing on the berms of the sewage ponds was treated with herbicide.

Himalayan blackberry - Himalayan blackberry is a weak-stemmed shrub with stout thorns that forms dense, formidable thickets primarily on disturbed land. It is tolerant of a wide range of soil moisture. Blackberry is not usually found in cropland because it cannot survive tillage procedures. It spreads rapidly by seed and vegetative propagation. The species clambers and spreads over other plants, crushing and smothering them.

Mechanical and cultural control methods can be used to control blackberry but are less effective than foliar-applied herbicides. Blackberry is a common pest at NAS Whidbey Island, but little effort has been made to control it. The herbicide Roundup [Reg TM] (glyphosate is the active ingredient) has been used in the past in certain areas to control blackberry.

Fennel - Fennel is a perennial herb that grows along roadsides and in disturbed places. It can be identified by its strong odor of anise (licorice). Fennel out-competes native plant species. It is a problem primarily in the Survival Area at Seaplane Base where it has been sprayed with 2, 4-D in the past. No consistent effort at controlling fennel has been made. It is considered a minor nuisance plant.

2.5.6.4 Urban Forestry

The urban areas of NAS Whidbey Island support few trees. The Base Exterior Architecture Plan (Jongejan, Gerrard, McNeal Inc. 1983) notes the stark appearance of Ault Field in particular and contrasts its visual character with the beauty of the forest landscape and viewscape surrounding the station. Establishing tree species within the urban areas at Ault Field, Seaplane Base, and OLF Coupeville will vastly enhance habitat for urban wildlife. The station does not currently have an inventory of urban trees or an urban forestry initiative.

2.5.6.5 Forest Resources

A forest inventory was conducted in the winter of 2001 at the station (see Table 2-17). Forested areas were grouped based on dominant tree species, stem density/acre, age, and diameter. The results of this inventory are summarized in Appendix H. A total of 1706.5 acres of forested habitats are found on NAS Whidbey Island, which include resources on all four properties (Ault Field, Seaplane Base, OLF Coupeville and Lake Hancock).

Table 2-17. Forest Areas at NAS Whidbey Island.

Acres of Forest				
Ault Field	Seaplane Base	Lake Hancock	OLF	Total
628.4	808.7	182.6	86.8	1,706.3

The existing forest stands on NAS Whidbey Island may be generally classed in three broad categories: second growth mixed conifer; second growth mixed conifer and broadleaved; and ruderal or emergent, broadleaved, or conifer.

Second growth mixed conifer forest dominates the installation. It is the result of logging that occurred between the 1800s and the 1940s. The second growth stands are dominated by conifers Douglas-fir, western hemlock, western redcedar, and western yew. Pine and spruce are present in lower numbers. The age structure of forest management units varies from less than 20 years to greater than 100 years.

Second growth mixed conifer and broadleaved stands have the above conifers plus fractions of bigleaf maple, black cottonwood, wild cherry, willow, vine maple, and red alder.

Ruderal or emergent, broadleaved, or conifer stands are generally small areas that are on disturbed sites. Some of these areas are naturally occurring as a result of cropland no longer cultivated, cleared zones and areas impacted by historic construction, or landfills.

Overall, most second growth and mixed stands are very densely stocked above the 100 stems per acre level and are deficient in understory vegetation, reproduction, and structural diversity. This is the result of high stem densities that preclude adequate light from reaching the forest floor. Understory characteristics (“understory calls”) are included in the forest inventory.

The recent history of forest management on the Station can be surmised from the existing timber stands. The majority of existing trees are 60 to 100 years old, with a few scattered relict old growth trees. This indicates that most of the acreage was harvested by pioneering land owners prior to Navy acquisition of the properties.

The reforestation of areas harvested in the 1860s and subsequent decades resulted from natural seeding coinciding with favorable environmental conditions for the establishment of new stands of timber. Since Douglas-fir dominated the acreage adjacent to harvested areas, it was the primary tree available to provide seed. In climatic regimes conducive to its growth, Douglas-fir produces an abundance of seed which can germinate on a wide variety of surface conditions. Therefore, naturally established stands of Douglas-fir tend to be very dense, often containing more than 2,000 stems per acre at an early age. The existing Navy forest stands have essentially developed naturally. Since the Navy acquired the property, there has been little active forest management due to the young age of the timber.

2.5.6.6 Ault Field Resources

Vegetation Cover Types

A total of 13 vegetation cover types occur at Ault Field. The predominant cover type is grassland, including the open areas around runways and other facilities, pastures and cultivated or abandoned agricultural fields, and open areas between buildings. This cover type comprises 46 percent of the land area at this component of the installation. This is followed by forest, landscaped area, and scrub-shrub, each of which comprises 8 to 9 percent of the installation. Figure 2-22 shows the vegetation cover types on Ault Field.

These numbers reflect the character of the landscape at Ault Field in that the general appearance of the valley is one of relatively open, grassy expanses with forested areas limited to the elevated margins of the installation. The areas surrounding runways were cleared prior to Navy ownership and are kept devoid of trees for reasons of aircraft operations and safety and to reduce BASH incidence. Most of the low-lying areas are dominated by grassy, wet meadows. Table 2-18 lists the acreage of vegetation cover types occurring at Ault Field.

Table 2-18. Vegetation Cover Types at Ault Field.

Cover Type	Dominant Species	Acres
Douglas-fir forest	Douglas-fir, lodgepole pine, grand fir, western hemlock, red alder, vine maple, salal, Oregon grape, sword fern	135.4
Mixed forest	Douglas-fir, western hemlock, red alder, western redcedar, grand fir, vine maple, red huckleberry, salal, red elderberry, bigleaf maple, red osier dogwood	374.4
Alder forest	red alder, willow, salmonberry	119.0
Willow stand	willow, black cottonwood, reed canarygrass, Douglas spiraea, cattail, skunk cabbage	14.4
Orchard	various fruit trees, snowberry, wild rose	1.8

Cover Type	Dominant Species	Acres
Scrub-shrub	wild rose, snowberry, Himalayan blackberry, Douglas spiraea, Pacific ninebark, red alder saplings, willow	338.1
Freshwater marsh	cattail, bulrush, skunk cabbage, arrowhead, spike rush, sedges	92.0
Wet Meadow	curly dock, creeping buttercup, cow parsnip, reed canarygrass, rushes, and sedges	166.5
Salt marsh	pickleweed, saltgrass, orache	0.4
Dune Natives	Puget gumweed, sea thrift, silver bursage, dune wildrye, beach grass, big-headed sedge	9.2
Grasslands and cultivated fields	timothy, ryegrass, bentgrass, bluegrass, western fescue, orchardgrass, alfalfa, red clover, clover, tall fescue, Canada thistle, cole crops, annual weeds, bluegrass, velvetgrass, quackgrass, vetch	1,956.5
Disturbed area	lamb's quarters, sheep sorrel, curly dock, field mustard, buttercup, clover, tansy ragwort, Canada thistle, red top, quack grass, velvet grass, Kentucky bluegrass, orchard grass	21.2
Landscaped area	lawn grasses, native and exotic ornamentals	361.0

Significant Native Terrestrial Plant Communities

The WDNR has identified a significant plant community occurrence just south of Rocky Point at Ault Field (WDNR 1995). The occurrence is entered in the WDNR database as Coastal Spit with Native Vegetation, Northern Puget Trough. This area is a one mile long sand berm that encompasses approximately 12.6 acres, of which 9.2 acres occur on Navy lands. This dune system has multiple ridges and troughs that have formed from wind and wave action. Three major communities dominate the berm: (1) dune wildrye community (*Elymus mollis*), (2) large-headed sedge community (*Carex macrocephala*) and (3) sea thrift (sea-pink; *Armeria maritima*) community. The dune wildrye community is distributed on the unstable seaward and central portions of the berm, whereas the large-headed sedge community is patchier and limited to the berm's landward troughs and sand flats (WDNR 1995). WDNR assessed this sand berm system to be in fair to good ecological condition (WDNR 1995). A variety of native species adapted to coastal sandy areas are present, and foot traffic and other potential disturbances are generally infrequent. Evidence of disturbance is greatest at either end of the berm where recreational activities occur at the Navy's Rocky Point picnic area and Joseph Whidbey State Park. This element occurrence is considered intermediate in quality relative to the other ten known element occurrences of this type in the WDNR database (WDNR 1995). The site is recommended by WDNR for the Washington Register of Natural Areas due to the rarity of this ecosystem type (WDNR 1995). To protect is plant community, development is avoided in this area. The west end of the installation rifle range abuts this plant community. Since it was identified in 1995, no development has occurred within this area. No major invasive plant infestations have been identified and the area is in a similar condition to what was assessed in 1995.

WDNR also identified potential habitat for bulb-bearing water-hemlock. Figure 2-23 shows significant plant communities and potential habitat for threatened, endangered, and sensitive plant species.

Invasive Plants and Noxious Weeds

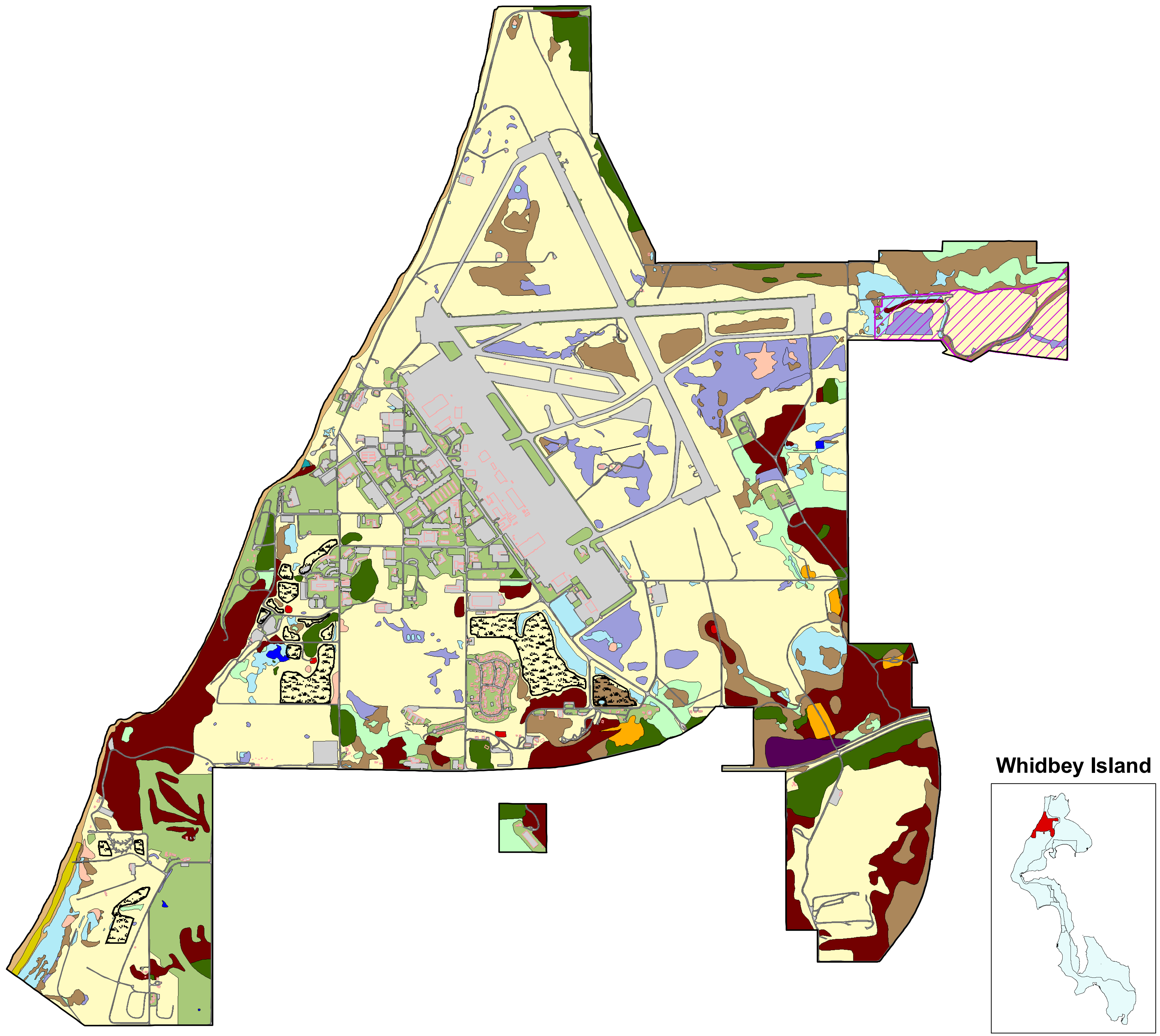
All the noxious weeds listed above in this section occur at Ault Field. Canada thistle and tansy ragwort account for the majority of weed problems, occurring primarily in the agricultural fields and in the Back to Nature areas. Tansy ragwort is particularly problematic in the vicinity of the North Gate, the hospital area, and the landfill site. Patches of Canada thistle are noticeable around the edges of agricultural fields and in the Back to Nature Areas to the south of the main gate, near the Security Department building.

Urban Forestry

A variety of native and non-native trees occur scattered throughout the more urban, developed areas of Ault Field, but are limited in number and areas.

Forest Resource Management

There are a total of 628.4 acres of forested areas on Ault Field. Forest stands appear to be fully stocked, while some areas that were previously cleared for safety and security requirements have slowly become understocked, volunteer forest areas. Examples of this latter category are the old landfill south of Clover Valley Road and the clear zone north of Runway 14-32. Figure 2-24 shows the forest age class structure for forested areas on Ault Field.



NAS Whidbey Island INRMP
Ault Field

Figure 2-22
Vegetation Cover Types

LEGEND

Installation Boundary
Roads
Buildings
Reforested Areas
Agricultural Lease Areas

Vegetation Types

Alder Forest
Beach
Disturbed
Douglas Fir Forest
Freshwater Marsh
Grassland
Landscaped
Mixed Forest
Native Coastal Dune
Open Water
Orchard
Salt Marsh
Scrub Shrub
Sitka Spruce Bog
Structures and Transportation
Wet Meadow
Willow Stand

SCALE 1:28,000

0.3 0 0.3 Miles

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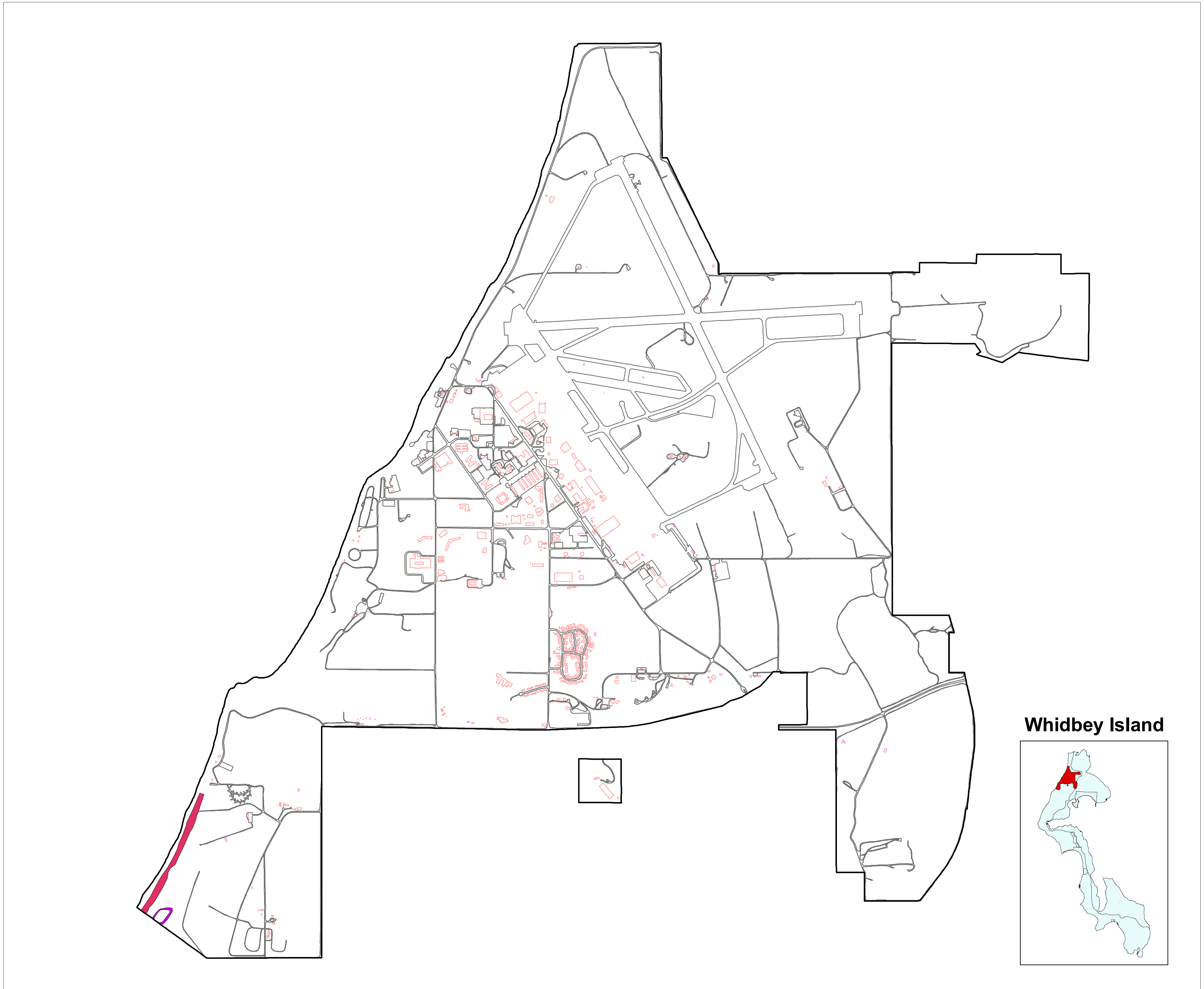

NAS Whidbey Island INRMP
Ault Field

Figure 2-23
Significant Plant Communities and Potential Habitat for TES Plant Species

LEGEND

- Installation Boundary
- Roads
- Buildings

WDNR Element Occurrences of:

- Coastal Spit with Native Vegetation
- Potential Habitat for Cicuta bulbifera

SCALE 1:28,000

0.3 0 0.3 Miles

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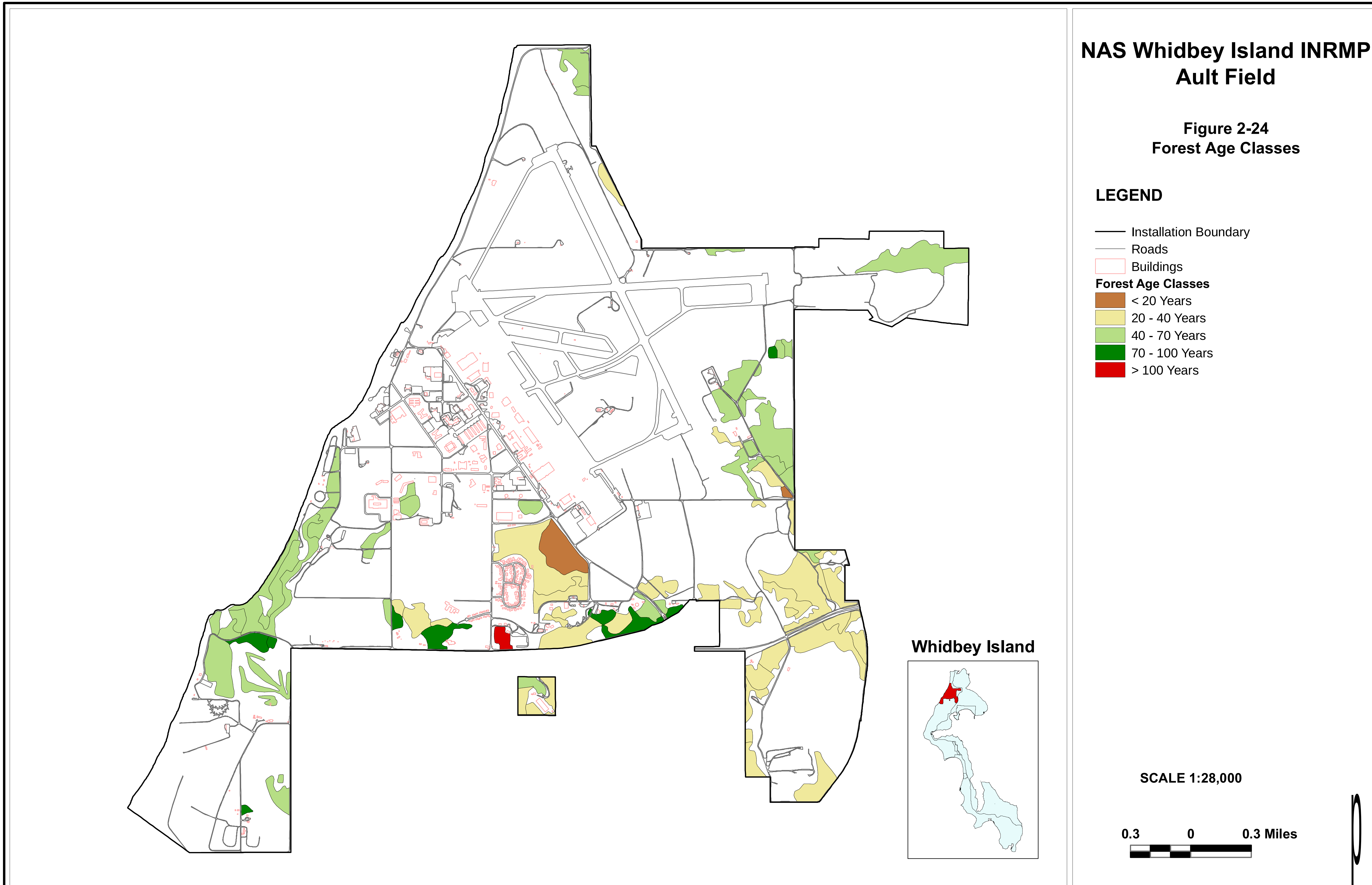
NAS Whidbey Island INRMP
Ault Field
Figure 2-24
Forest Age Classes
LEGEND
Installation Boundary
Roads
Buildings
Forest Age Classes
< 20 Years
20 - 40 Years
40 - 70 Years
70 - 100 Years
> 100 Years
Whidbey Island
SCALE 1:28,000
0.3
0
0.3 Miles

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2.5.6.7 Seaplane Base Resources

Vegetation Cover Types

The main biomes or major communities that comprise the vegetative structure of undeveloped areas at Seaplane Base include temperate coniferous forest, grassland, shrub land, and both freshwater and saltwater marshes. Table 2-19 lists the acreage of vegetation cover types occurring at the Seaplane Base. The forested areas comprise a major portion (33 percent) of Seaplane Base, with the drier Douglas-fir forest type dominating. Forested areas are scattered throughout the base, occurring mostly on hillsides. Grasslands occupy one-fourth of the base in several large blocks on hillsides and hilltops. Grasslands also occur along roadsides and behind the beach berm along East Pioneer Road. Upland and wetland areas dominated by scrub-shrub vegetation are common in the central portion of the base on hillsides, and along the west end of Crescent Harbor Marsh. Salt marsh and freshwater marsh occupy extensive areas in the low-lying portions of Seaplane Base. Figure 2-25 shows the vegetation cover types on the Seaplane Base.

Table 2-19. Vegetation Cover Types at Seaplane Base

Cover Type	Dominant Species	Acres
Douglas-fir forest	Douglas-fir, western hemlock, Pacific madrone, lodgepole pine, salal, Oregon grape, sword fern	492.0
Mixed forest	Douglas-fir, western hemlock, red alder, western redcedar, grand fir, vine maple, red huckleberry, salal, red elderberry, bigleaf maple	354.5
Alder forest	red alder, salmonberry, stinging nettle, bracken fern	51.6
Quaking aspen grove	quaking aspen, various grasses	0.4
Garry oak woodland	Garry oak, snowberry, Nootka rose, tall Oregon grape, oceanspray, serviceberry, various grasses	8.8
Willow stand	willow, black cottonwood, reed canarygrass, Douglas spiraea, cattail, skunk cabbage	18.4
Orchard	domestic fruit trees, Himalayan blackberry, rose	1.7
Scrub-shrub	wild rose, snowberry, Himalayan blackberry, Douglas spiraea, Pacific ninebark, red alder saplings, willow	211.0
Freshwater marsh	cattail, reed canarygrass, hard-stem bulrush, Pacific silverweed, common mare's tail, slough sedge, other sedges, rushes, grasses	133.1
Wet meadow	dock, clover, creeping buttercup, soft rush, reed canarygrass, other grasses	7.7
Salt marsh	pickleweed, saltgrass, sea plantain, jaumea, Pacific silverweed	85.5
Grasslands and cultivated fields	timothy, alfalfa, red clover, white clover, bentgrass, fescues, bluegrass, velvetgrass, Canada thistle, orchardgrass, quackgrass, vetch, annual weeds	725.9

Cover Type	Dominant Species	Acres
Disturbed area	lamb's quarters, sheep sorrel, curly dock, Canada thistle, various grasses	9.5
Landscaped area	lawn grasses, native and exotic ornamentals	372.9

Significant Native Terrestrial Plant Communities

WDNR identified three significant native plant communities at Seaplane Base (WDNR 1995). These communities are sufficiently high in quality or rarity to be designated as element occurrences in the Natural Heritage database. They also identified potential habitat for bulb-bearing water-hemlock, Alaska alkaligrass, tall bugbane and white-top aster. Figure 2-26 shows significant plant communities and potential habitat for threatened, endangered and sensitive plant species.

Douglas-fir - western hemlock/swordfern community

This is a mature forest community, estimated to be 120-150 years old, which shows little remaining evidence of past logging activity. The community is dominated by mature (140-160 years old) and young (60-80 years old) Douglas-fir trees. Other common tree species include western hemlock, grand fir, bigleaf maple, and red alder. The understory is dominated by swordfern with occasional co-dominants of oceanspray, stinging nettle, salmonberry, and low Oregon grape. The community covers approximately 58 acres of the Survival Area on Seaplane Base.

The occurrence is rated as moderately high in priority for protection (WDNR 1995). Only 25 known element occurrences of this community type occur in Washington State (WDNR 1995). The occurrence has been proposed by WDNR as a candidate for the Washington Register of Natural Areas.

Red alder/swordfern community

This community covers 20 acres adjacent to the Douglas-fir/western hemlock/swordfern occurrence in the Survival Area. Red alder/swordfern is an early successional stage of Douglas-fir-western hemlock forests. The community is dominated by 70 year-old red alder. Douglas-fir occurs in areas near the edge of the occurrence. Western hemlock regeneration is scattered throughout the community. The understory is dominated by swordfern, salmonberry, foamflower (*Tiarella trifoliata*), bracken fern, and stinging nettle. Other common species include trailing blackberry (*Rubus ursinus*), red huckleberry, enchanter's nightshade (*Circaea alpina*), sweetscented bedstraw, and Dewey's sedge (*Carex deweyana*). The ecological condition of this community is rated fair to good (WDNR 1995). There are few non-native species and evidence of past logging activity is limited to the edges of the occurrence. Windthrow and fire have been the primary historic disturbances.

Garry oak woodland

This is a stand of Garry oak (*Quercus garryana*) located on the bluff north of Building 13 and south of the chainlink fence bounding the south side of the Saratoga Heights housing area. This bluff is located on the north side of Pioneer Way, overlooking Oak Harbor. The stand is approximately 9 acres in size and is dominated by an open canopy of Garry oak over a dense shrub layer of snowberry and Nootka rose. Also common in the understory are tall Oregon grape, oceanspray, serviceberry, trailing blackberry, long-stolon sedge, blue wildrye, and Kentucky bluegrass. The oaks are estimated to be quite old, but maximum canopy height is only about 50 feet (WDNR 1995). Five of the oaks have number tags and are included in the US Forest Service (USFS) annual acorn productivity survey. This is a very important, wide-ranging, and long-term research project to determine acorn productivity throughout the range of Garry oak. The Navy cooperates with the USFS by conducting the annual acorn survey and providing the information to the USFS.

This stand of oaks is considered of moderately high priority for protection (WDNR 1995). Garry oak is a relict species in Washington that has gradually been replaced by coniferous species as the climate in the Puget Lowland has become cooler over the past 8,000 years, wildfire has been suppressed, oak areas cleared and converted to other uses, and coniferous species overtop the oaks in mixed stands. This oak stand is of relatively low quality because of the intensity of surrounding land use and the small size of the stand. However, this is believed to be the last known undeveloped oak woodland on Whidbey Island (WDNR 1995). The occurrence has been rated of moderate priority for protection. There are only five known occurrences of this plant community type in the Puget Trough, but regionwide inventories are incomplete or lacking (WDNR 1995). The occurrence is recommended by WDNR as a candidate for the Washington Register of Natural Areas (WDNR 1995). The Garry oak stand has a dense understory of Oregon grape and other brush which has been cut several times since 2001. The stand and the surrounding savannah habitat could benefit from additional brush control efforts.

Invasive Plants and Noxious Weeds

Problems with undesirable weeds at Seaplane Base include an invasion of fennel along the access road to Polnell Point; two populations of gorse, one near the Olympic View School and one near the intersection of Torpedo and Pioneer Way Roads; and Spartina (*Spartina alterniflora*) in Maylor's Marsh. Spartina occurs in the tidal marsh on Maylor's Peninsula, concentrated near the tidal channel. This species is capable of displacing native salt marsh species. Herbicide and manual control methods over the last several years have been very successful and Spartina in Maylor's Marsh should be considered controlled at this point, but future monitoring and spot treating needs to continue so any recolonization can be detected and addressed early. The Navy cooperates with the Washington Department of Agriculture, WDFW and Island County noxious weed coordinator for Spartina monitoring and control.

Urban Forestry

A variety of native and non-native trees occur scattered throughout the more urban, developed areas of Seaplane Base. Extensive areas of maintained turf in the residential areas and near the fuel farm provide opportunities for planting more trees without totally eliminating the striking views from Seaplane Base. Any tree planting should be done in compliance with safety and security clearance requirements.

Forest Resources

The forest inventory for this INRMP indicates that there are 808.7 acres of forested areas at Seaplane Base. Figure 2-27 shows the forest age class structure for forested areas on the Seaplane Base.

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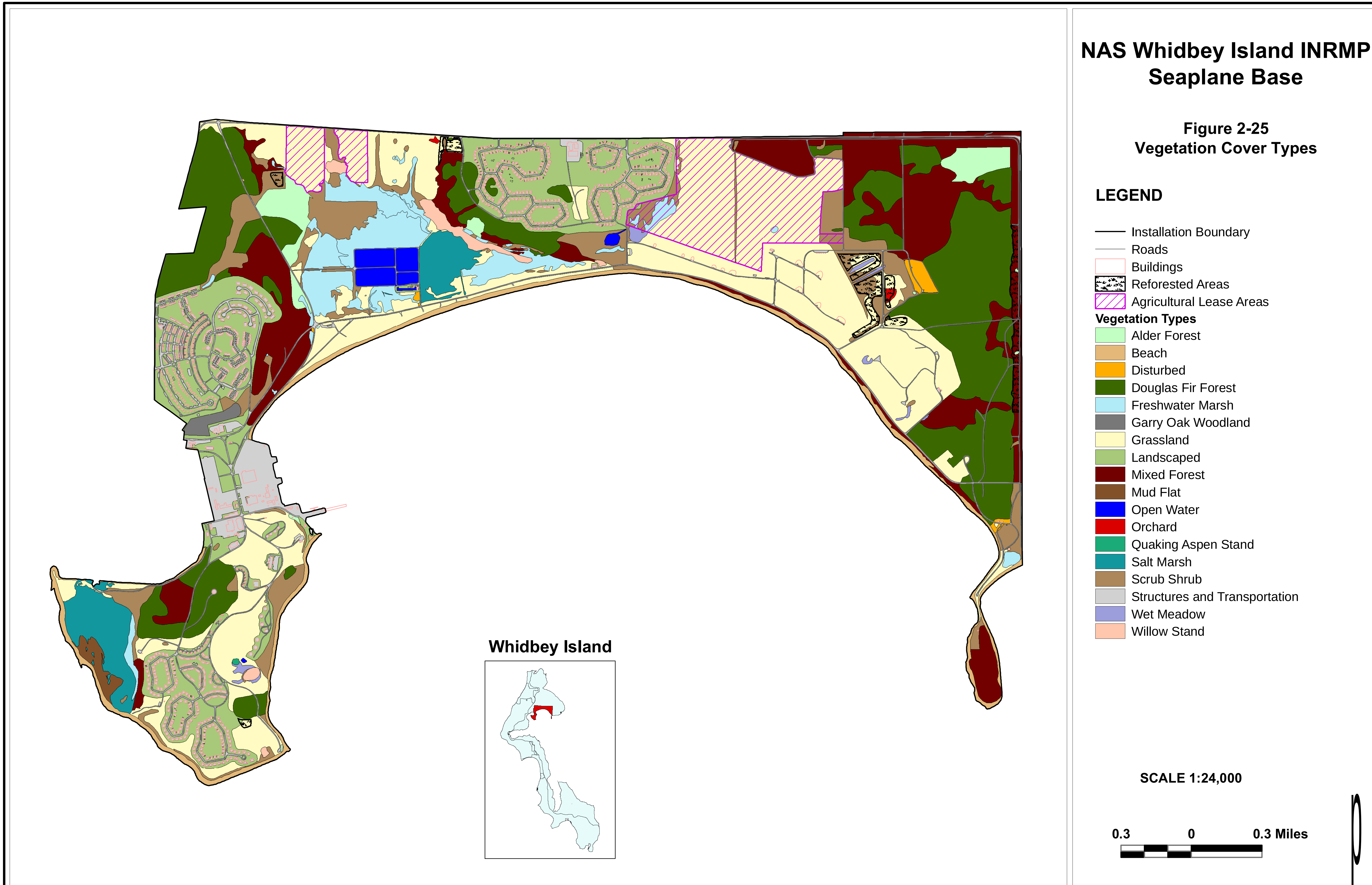
NAS Whidbey Island INRMP
Seaplane Base
Figure 2-25
Vegetation Cover Types
LEGEND
Installation Boundary
Roads
Buildings
Reforested Areas
Agricultural Lease Areas
Vegetation Types
Alder Forest
Beach
Disturbed
Douglas Fir Forest
Freshwater Marsh
Garry Oak Woodland
Grassland
Landscaped
Mixed Forest
Mud Flat
Open Water
Orchard
Quaking Aspen Stand
Salt Marsh
Scrub Shrub
Structures and Transportation
Wet Meadow
Willow Stand
Whidbey Island
SCALE 1:24,000
0.3
0
0.3 Miles

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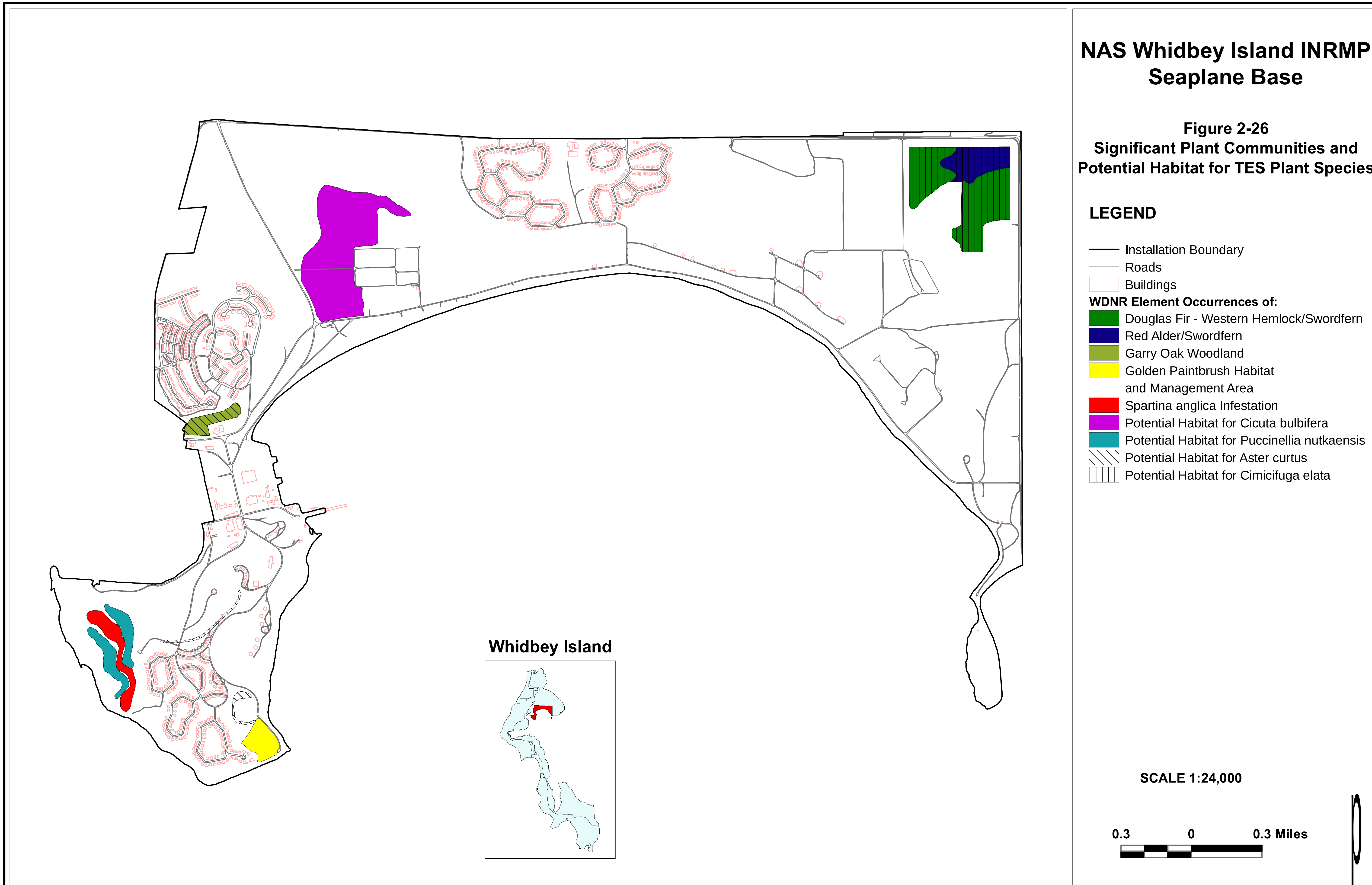

Figure 2-26
Significant Plant Communities and
Potential Habitat for TES Plant Species

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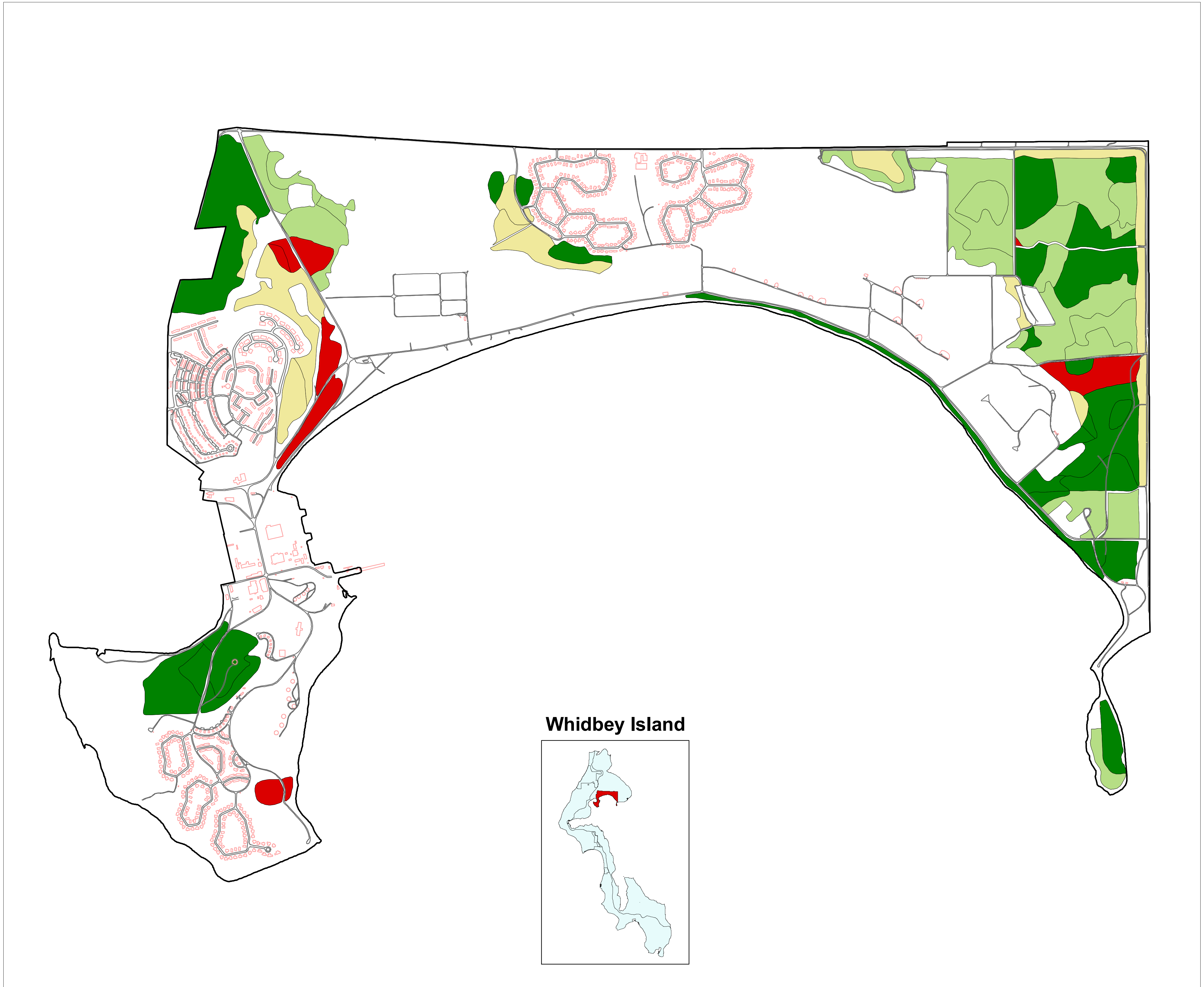

NAS Whidbey Island INRMP
Seaplane Base

Figure 2-27
Forest Age Classes

LEGEND

Installation Boundary
Roads
Buildings
Forest Age Classes
20 - 40 Years
40 - 70 Years
70 - 100 Years
> 100 Years

SCALE 1:24,000

0.3 0 0.3 Miles

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2.5.6.8 OLF Coupeville Resources

Vegetation Cover Types

A total of seven vegetation cover types occur at OLF Coupeville. Dominant plant species and acreage of these types is shown in Table 2-20.

The forested areas at OLF Coupeville are mostly mix conifer forests. Areas of soil with a low water holding capacity are dominated by Douglas-fir with an understory of rhododendron, salal, and Oregon grape. This forest type dominates the north end of the site. Soils with higher water holding capacity dominate the southern portion of the property and support a community dominated by Douglas-fir, western hemlock, western redcedar, grand fir, and red alder. Common understory plants include salal, evergreen huckleberry, Oregon grape, snowberry, red elderberry, oceanspray, and wild rose. Forests at OLF Coupeville cover approximately 16 percent of the installation.

Species associated with the agricultural outlease areas vary by field and year but may include orchardgrass, tall fescue, bromegrass, bluegrass, bentgrass, alfalfa, clover, barley, winter wheat, oats, peas, Canada thistle, quackgrass, and dandelion. Grasslands and cultivated fields dominate the landscape at this site, occupying roughly 68 percent of the land area. Figure 2-28 shows the vegetation cover types on OLF Coupeville.

Table 2-20. Vegetation Cover Types at OLF Coupeville.

Cover Type	Dominant Species	Acres
Douglas-fir forest	Douglas-fir, lodgepole pine, grand fir, western hemlock, salal, vine maple, Oregon grape, sword fern	66.3
Mixed forest	Douglas-fir, western redcedar, western hemlock, grand fir, red alder, evergreen huckleberry, rhododendron, salal, red elderberry, snowberry, oceanspray, wild rose	34.1
Alder forest	Red alder, red elderberry, grasses	3.9
Orchard	Domestic fruit trees	0.05
Scrub shrub	Wild rose, snowberry, Himalayan blackberry, Douglas spirea, Pacific ninebark, willow	46.6
Grassland	Bluegrass, orchardgrass, alfalfa, clover, tall fescue, Canada thistle, quackgrass, bromegrass, oats, mustard, dandelions, winter wheat	453.6
Landscaped area	lawn grasses, native and exotic ornamentals	3.7

Significant Native Terrestrial Plant Communities

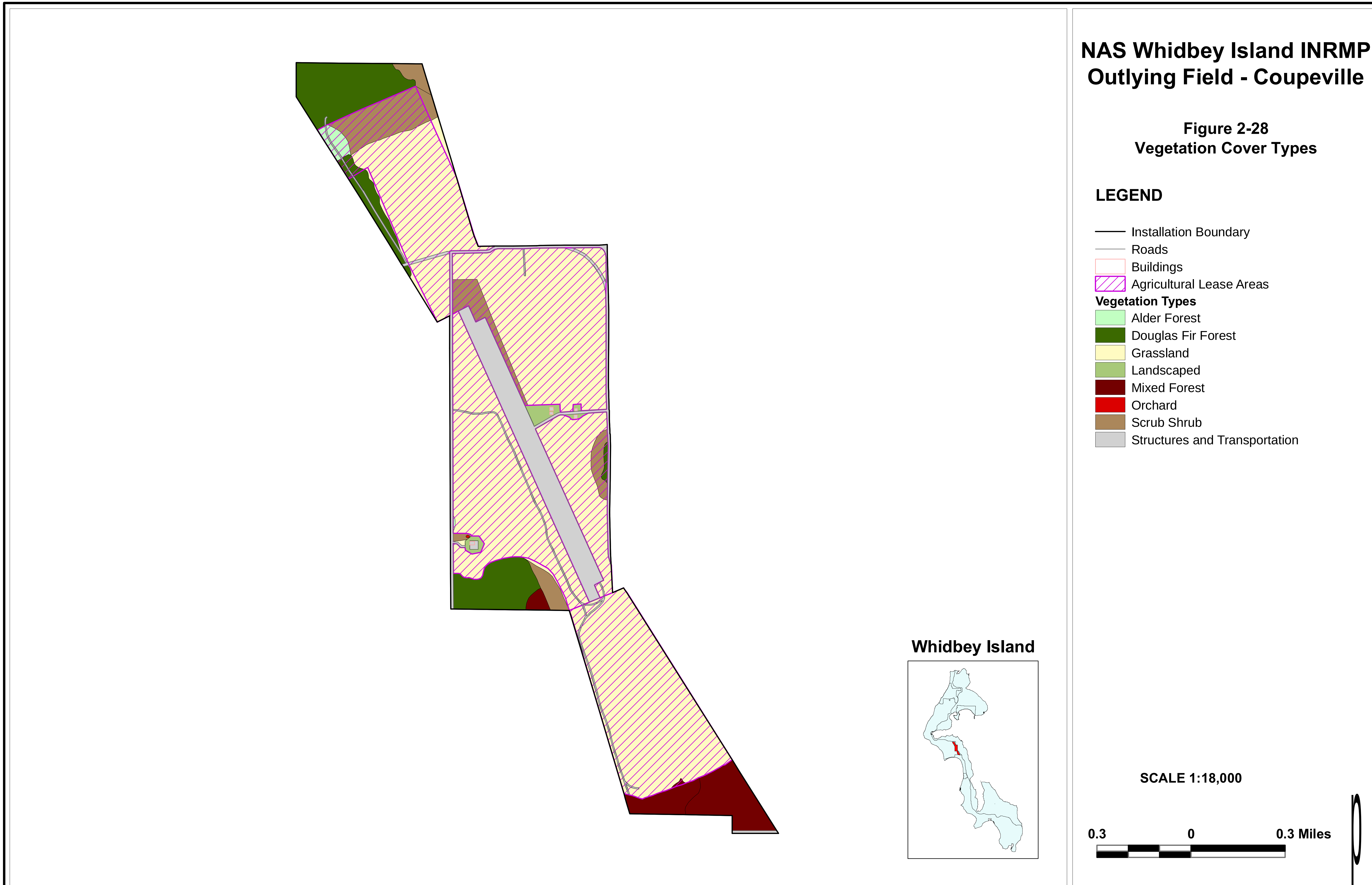
WDNR did not identify any significant native plant communities at OLF Coupeville (WDNR 1995). However, they did identify potential habitat for the white-top aster along the east edge of the site. White-top aster typically grows in prairies dominated by Idaho fescue, but it may also occur in degraded grassland remnants. Figure 2-29 shows significant plant communities and potential habitat for threatened, endangered, and sensitive plant species.

Invasive Plants and Noxious Weeds

Canada thistle is the primary noxious weed identified as occurring at OLF Coupeville. This species grows primarily on the fields that are not currently cultivated for farm crops or in areas of soil disturbed by maintenance operations.

Forest Resources

There are a total of 86.8 acres of forested areas on OLF Coupeville mostly located north and south of the airstrip. Forested areas at OLF Coupeville consist mostly of stands of mixed conifer resulting from natural forest regeneration and plant succession following logging prior to Navy ownership. Figure 2-30 shows the forest age class structure for forested areas on OLF Coupeville.


NAS Whidbey Island INRMP
Outlying Field - Coupeville
Figure 2-28
Vegetation Cover Types
LEGEND
Installation Boundary
Roads
Buildings
Agricultural Lease Areas
Vegetation Types
Alder Forest
Douglas Fir Forest
Grassland
Landscaped
Mixed Forest
Orchard
Scrub Shrub
Structures and Transportation
Whidbey Island
SCALE 1:18,000
0.3
0
0.3 Miles

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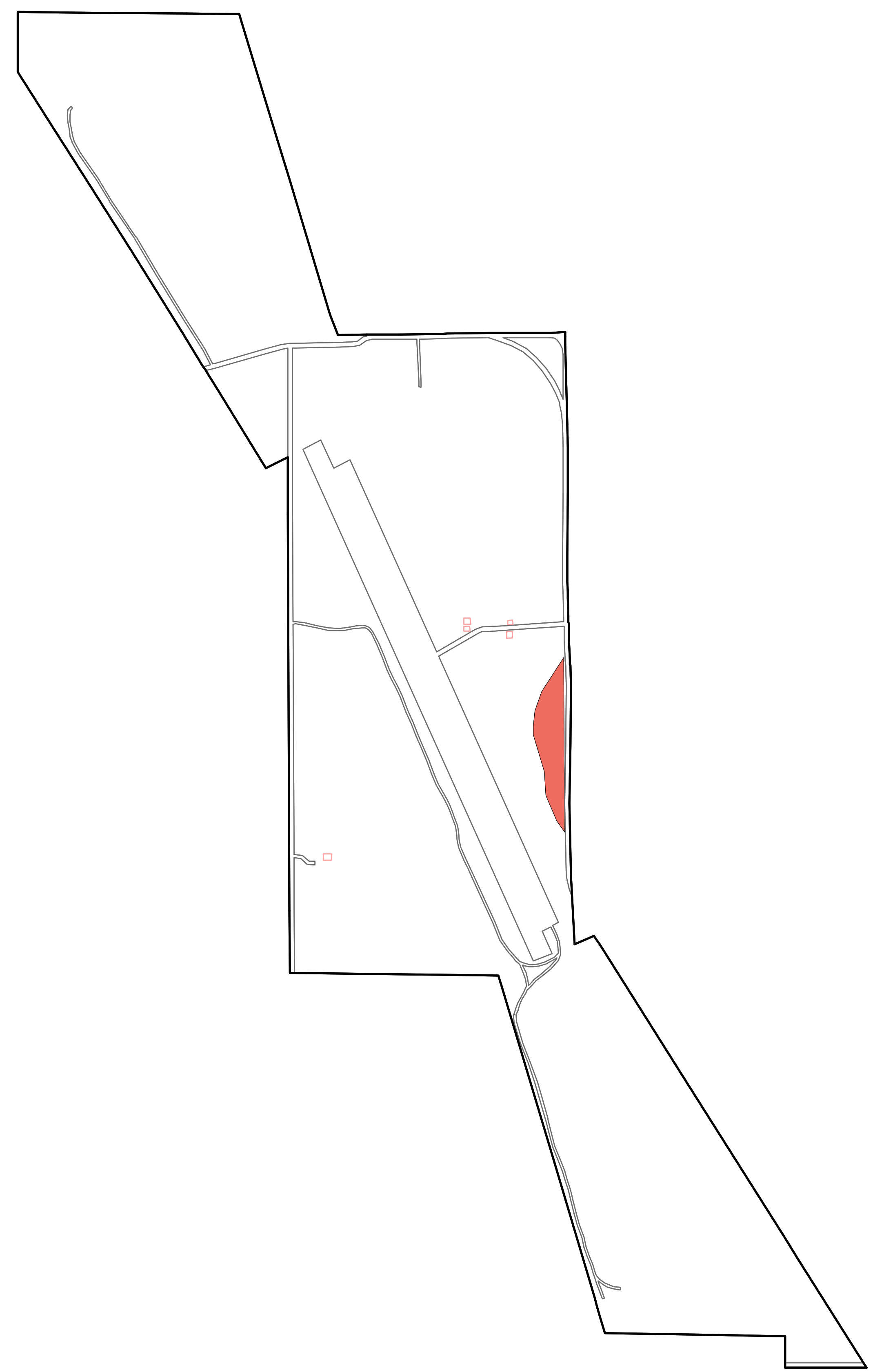

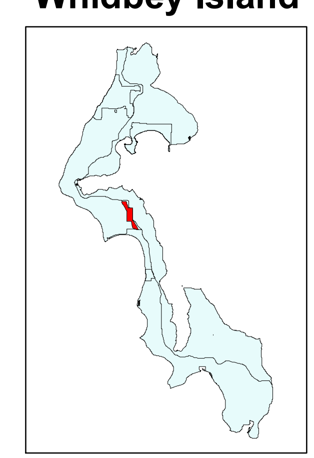

NAS Whidbey Island INRMP
Outlying Field - Coupeville

Figure 2-29
Significant Plant Communities and Potential Habitat for TES Plant Species

LEGEND

Installation Boundary
Roads
Buildings
WDNR Element Occurrences of:
Potential Habitat for Aster curtus

SCALE 1:18,000

0.3 0 0.3 Miles

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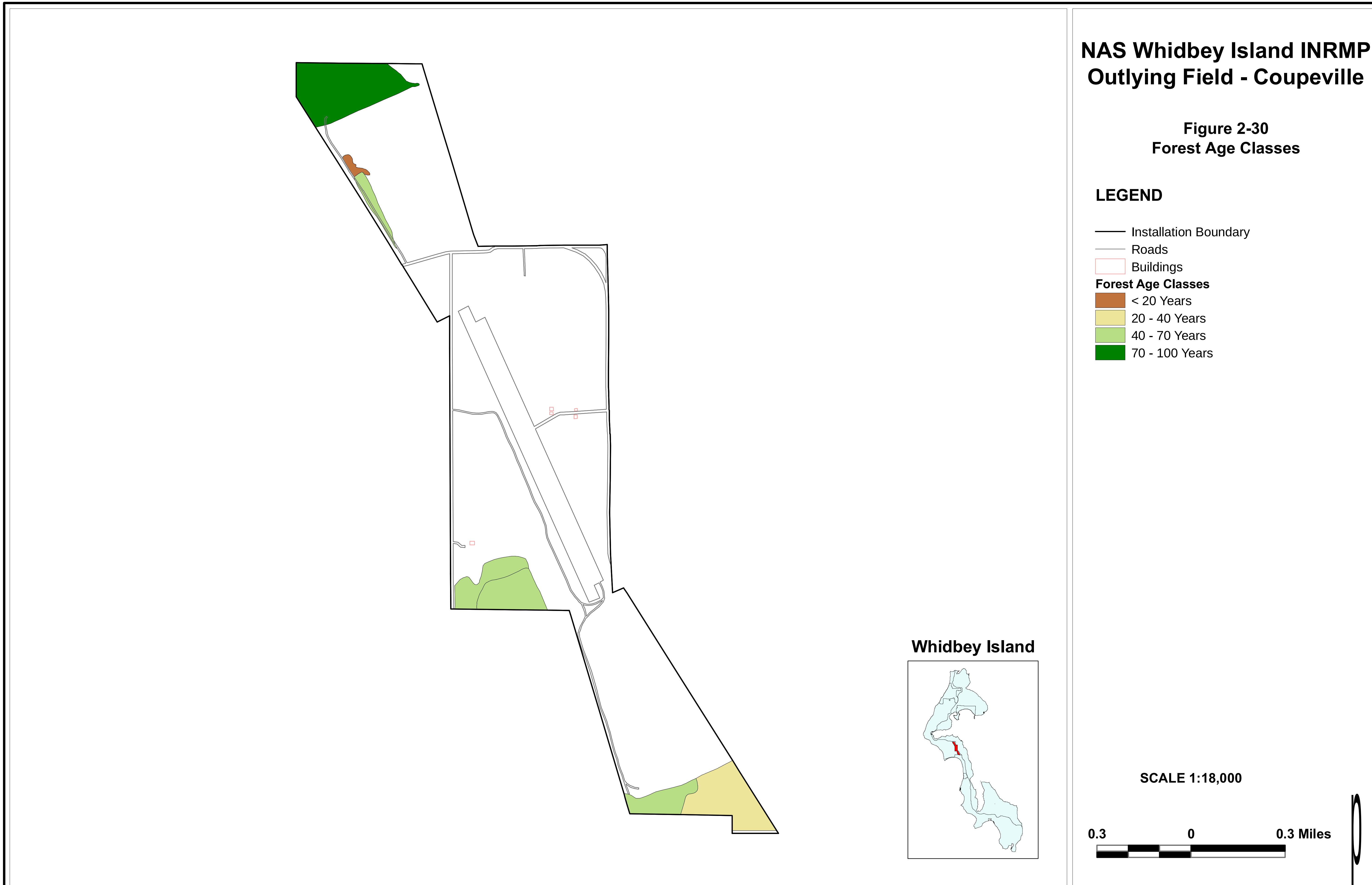
NAS Whidbey Island INRMP
Outlying Field - Coupeville
Figure 2-30
Forest Age Classes
LEGEND
Installation Boundary
Roads
Buildings
Forest Age Classes
< 20 Years
20 - 40 Years
40 - 70 Years
70 - 100 Years
SCALE 1:18,000
0.3
0
0.3 Miles
Whidbey Island

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2.5.6.9 Lake Hancock Resources

Vegetation Cover Types

Wetland areas at Lake Hancock cover roughly 33 percent of the site. Figure 2-31 shows the vegetation cover types on Lake Hancock. The wetlands support five major plant community types: high salt marsh, low salt marsh, scrub-shrub wetland, freshwater marsh and Sitka spruce bog. Upland areas include coniferous and deciduous forests as well as an open grassland area that was planted in the late 1980s with coniferous trees at a spacing of 10 feet on center. Upland forest cover types total 38 percent of the area and include Douglas-fir forest, mixed forest and red alder. The acreage and dominant species in each plant community are summarized in Table 2-21.

Table 2-21. Vegetation Cover Types at Lake Hancock.

Cover Type	Dominant Species	Acres
Douglas-fir forest	Douglas-fir, lodgepole pine, grand fir, western hemlock, rhododendron, salal, Oregon grape, sword fern	31.3
Mixed forest	Douglas-fir, western hemlock, red alder, Sitka spruce, western redcedar, red huckleberry, salal, red elderberry, bigleaf maple	122.0
Alder forest	red alder, willow, salmonberry	9.4
Sitka spruce bog	Sitka spruce, bog birch, willows, lodgepole pine, salal, Labrador tea, bog laurel, sweet gale, sedges, sphagnum moss	2.6
Scrub-shrub	sweet gale, salal, salmonberry, black twinberry, Labrador tea	19.1
Freshwater marsh (transitional zone)	cattail, soft-stem bulrush	4.7
Low salt marsh	pickleweed, seashore saltgrass, seaside arrowgrass, orache, sea plantain, Canada sandspurry, jaumea, saltmarsh dodder	101.5
High salt marsh	seashore saltgrass, redtop, Pacific silverweed, Baltic rush	12.7
Grassland	timothy, ryegrass, bentgrass, bluegrass, western fescue, orchardgrass, alfalfa, red clover, clover, tall fescue, Canada thistle, cole crops, annual weeds, bluegrass, velvetgrass, quackgrass, vetch	27.2
Landscaped area	lawn grasses, native and exotic ornamentals	2.9

Significant Native Terrestrial Plant Communities

WDNR identified six significant native wetland plant communities at Lake Hancock (WDNR 1995). These communities are sufficiently high in quality or rarity to be designated as element occurrences in the Natural Heritage database. They also identified potential habitat for Indian rice (*Fritillaria camschatcensis*), also commonly called chocolate lily, at the Lake Hancock site. Indian rice is a facultative wetland plant (FACW) that occurs in moist meadows and low salinity, transition zone wetlands. The suitability of the transition zone wetland at Lake Hancock as habitat for Indian rice is unknown. If present, suitable habitat is limited. Figure 2-32 shows significant plant communities and potential habitat for threatened, endangered, and sensitive plant species.

Invasive Plants and Noxious Weeds

The non-native perennial cordgrass species known as Spartina (*Spartina sp*.) has been identified growing in Lake Hancock (WDNR 1995). This grass is an invasive weedy species that can significantly alter native salt marsh communities. The infestation has been treated annually since 2001, but Spartina still occurs in the tidal basin. Annual monitoring and control continues and is important to containing the infestation. The Navy cooperates with the Washington Department of Agriculture, WDFW and Island County noxious weed coordinator for Spartina monitoring and control.

Forest Resources

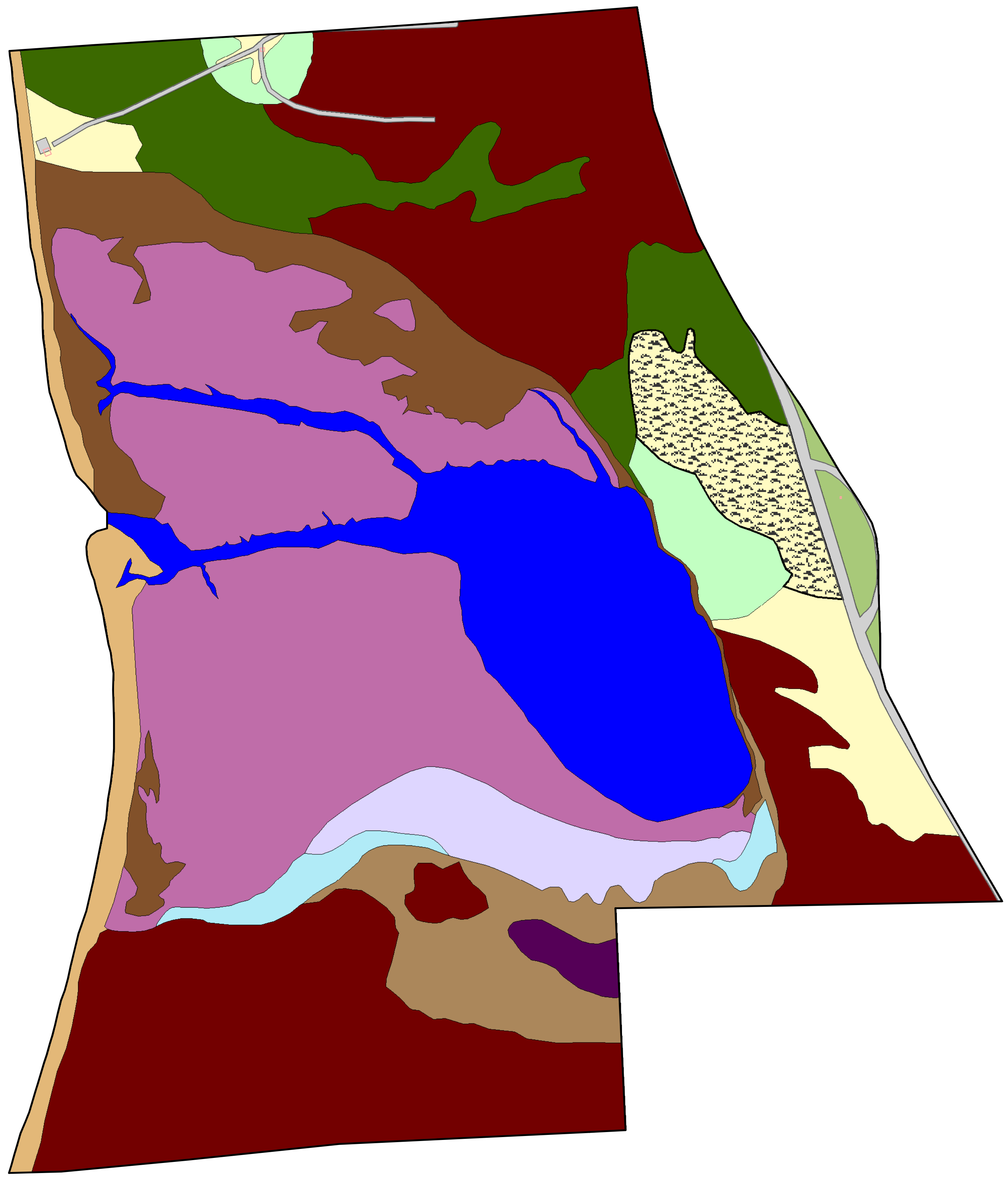
There are a total of 182.6 acres of forested areas on Lake Hancock. Historical periods of intensive logging are in evidence at Lake Hancock in large stumps and in the age of the current forest stands. Only three forest unit contain trees older than 75 years. Most stands are dominated by young trees ranging between 60 and 80 years old. Figure 2-33 shows the forest age class structure for forested areas on Lake Hancock. A few relict older, larger trees remain and will be conserved as wildlife trees, especially along the northern side of the lake. The majority of these are fully stocked, healthy, and vigorous.

2.5.6.10 Project Recommendations – Flora and Vegetation Resources

See Appendix A for a detailed list of projects for NAS Whidbey Island plant and vegetation resources management.

NAS Whidbey Island INRMP
Lake Hancock

Figure 2-31
Vegetation Cover Types

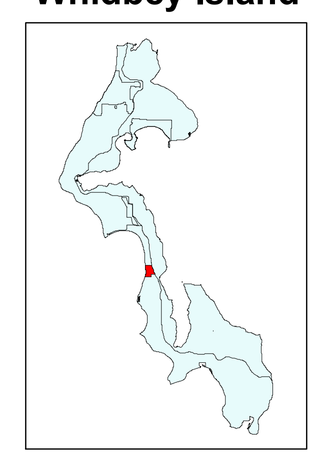


LEGEND

- Installation Boundary
- Roads
- Buildings
- Reforested Areas

Vegetation Types

- Alder Forest
- Beach
- Douglas Fir Forest
- Freshwater Marsh
- Grassland
- High Salt Marsh
- Landscaped
- Low Salt Marsh
- Mixed Forest
- Mud Flat
- Open Water
- Scrub Shrub
- Sitka Spruce Bog
- Structures and Transportation



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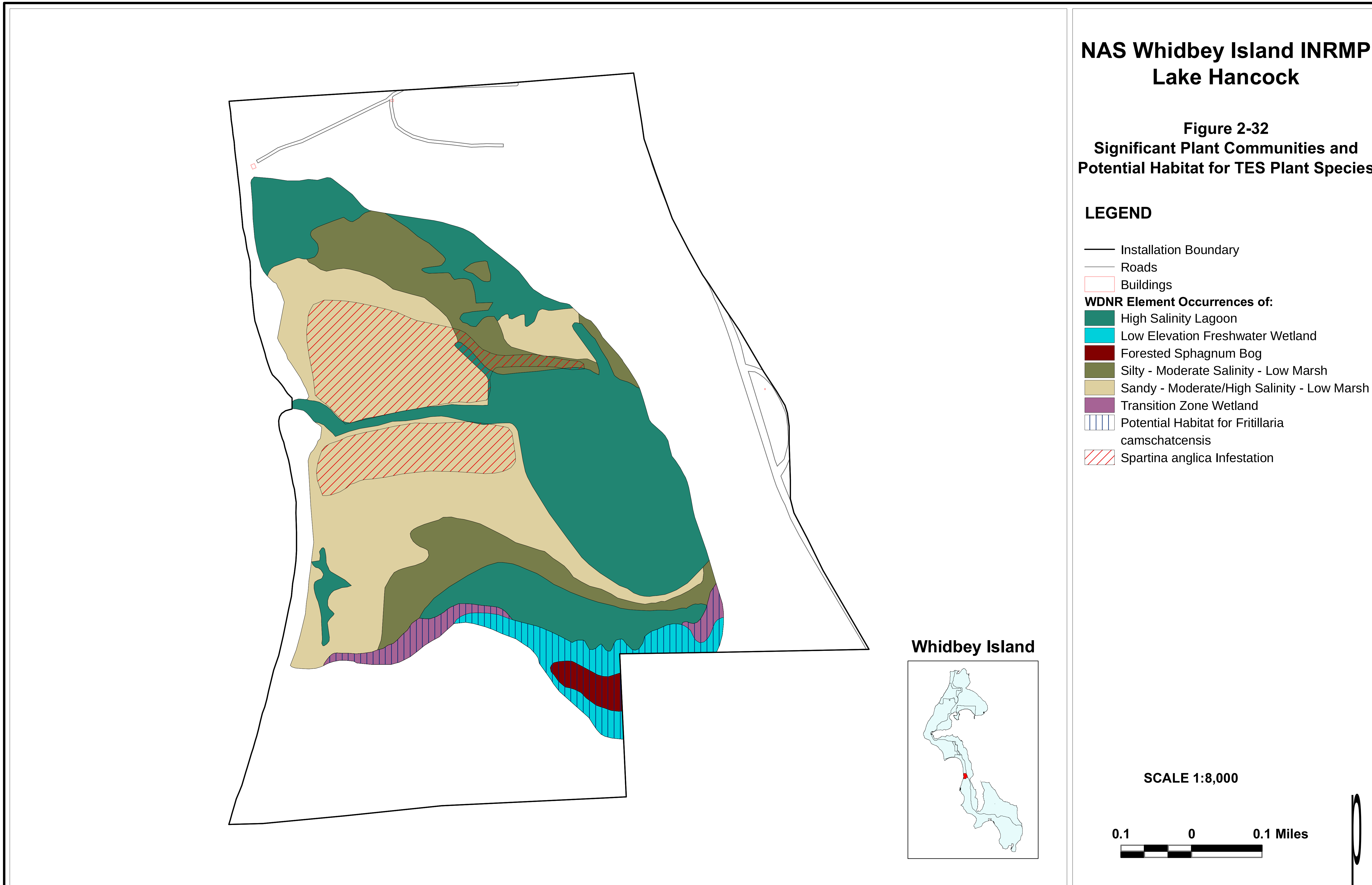
Whidbey Island
NAS Whidbey Island INRMP
Lake Hancock
Figure 2-32
Significant Plant Communities and
Potential Habitat for TES Plant Species
LEGEND
Installation Boundary
Roads
Buildings
WDNR Element Occurrences of:
High Salinity Lagoon
Low Elevation Freshwater Wetland
Forested Sphagnum Bog
Silty - Moderate Salinity - Low Marsh
Sandy - Moderate/High Salinity - Low Marsh
Transition Zone Wetland
Potential Habitat for Fritillaria camschatcensis
Spartina anglica Infestation
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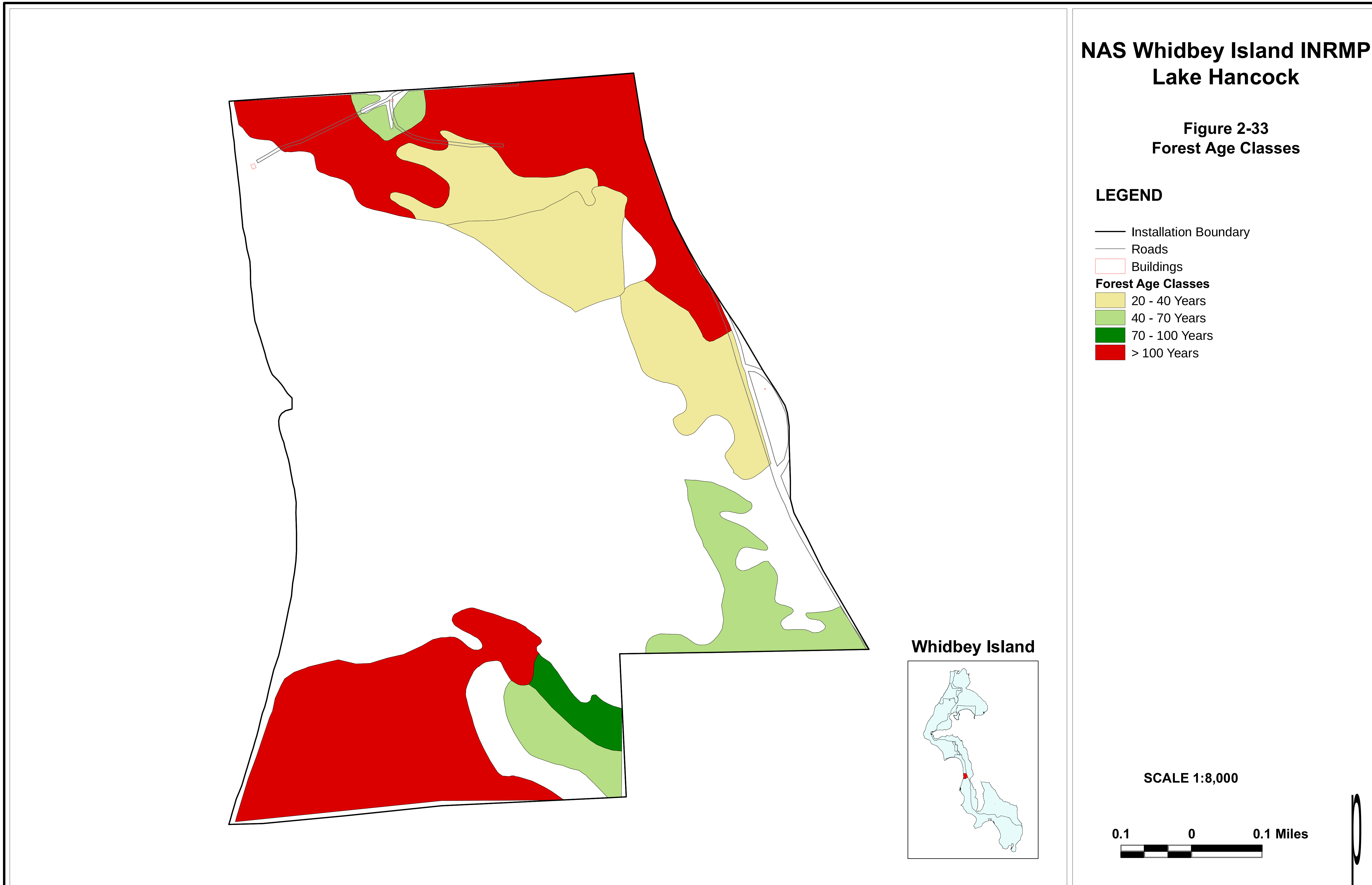
NAS Whidbey Island INRMP
Lake Hancock
Figure 2-33
Forest Age Classes
LEGEND
Installation Boundary
Roads
Buildings
Forest Age Classes
20 - 40 Years
40 - 70 Years
70 - 100 Years
> 100 Years
Whidbey Island
SCALE 1:8,000
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2.5.7 Fauna

2.5.7.1 Biological Diversity and Habitat Fragmentation

Diversity is important to ecosystems because it increases community stability and the ability of a community to withstand catastrophe. Preserving diversity of habitats minimizes the likelihood of species extirpations and maintains natural balance of ecosystems. Declining diversity of plant and animal species is believed by many to be an indicator of the declining health of ecosystems and a threat to the life supporting systems humans depend upon (Ehrlich 1988, Ray 1988, Cairns 1988). Thus, biological diversity has become an increasingly important issue worldwide. Maintaining the integrity of natural ecosystems in order to promote and preserve biological diversity directly affects the quality of human lives, providing us with clean air and water, food, shelter, medicine, and an enjoyable place to live. Careful environmental planning and conservation of natural resources plays a critical role in the success of maintaining biological diversity.

Biological diversity, or biodiversity, is defined by the U.S. Office of Technology Assessment (OTA) as "...the variety and variability among living organisms and the ecological complexes in which they occur" (OTA 1987). Biodiversity is not represented simply by the number of species in an area, but takes into account the ecosystem in which the organism occur and the interaction among organisms. For this reason, it is very difficult to quantify biodiversity for the purpose of meeting resource management objectives. Attempts to measure relative values of, or changes in, biodiversity typically rely on species counts, plant association and habitat type classifications, measures of habitat heterogeneity and fragmentation, and monitoring indicator species to assess changes in habitat quality.

For this document, biodiversity at NAS Whidbey Island is assessed both quantitatively and qualitatively. The lands at the station have been grouped by habitat type based on vegetation, forest stand age, hydrology, substrate type, and geomorphic features. For each habitat type, major habitat features were characterized and a list of potentially occurring plant and wildlife species was developed based on vegetative structure, water sources, other habitat features, and documented observations.

Biodiversity on NAS Whidbey Island varies based on property, habitat type and the level of habitat fragmentation. Habitat fragmentation is a serious threat to biological diversity and is believed to be one of the primary causes of species extinction (Franklin 1988). Maintaining a landscape mosaic of forest stands with different age and size structures benefits wildlife populations by providing for sustained seed production, vertical diversity, and recruitment in the local landscape (Franklin 1988). However, at NAS Whidbey Island, it is the extent of fragmentation and the young age of many of the forest stands that appear to be the limiting factors in the diversity of animal species. Fragmentation can be expected to produce one or more of the following effects: loss of wide-ranging species, loss of interior or area-sensitive species, erosion of genetic diversity from within rare species, and increased abundance of weedy plant species (USFS 1979).

While some land use decisions at NAS Whidbey Island have served to limit the extent of forest fragmentation (e.g., dense clustering of administrative buildings near the flightline at Ault Field), others have resulted in increased fragmentation (e.g., maintaining vast areas as agricultural lease lands at Ault Field and Seaplane Base). Fragmentation of habitat is a particular problem at Ault Field and OLF Coupeville due to the extent of development and to the requirements associated with the presence of airfields. Large blocks (>50 acres) of continuous forest occur at Seaplane Base and Lake Hancock. Lake Hancock is an excellent example of a relatively undisturbed, but heterogeneous ecosystem with a mosaic of habitat types that are utilized by a wide variety of wildlife species.

2.5.7.2 Habitat Types

The wildlife habitat types at the station have been categorized using existing information from forest and wetland inventories, from aerial photos and existing natural resource maps, from information provided by station resource managers, and from a limited amount of ground truthing of these sources. The habitat types are based loosely on the vegetation cover types identified in Chapter 2.5.6.1 but have been modified to emphasize the importance of forest stand age in habitat selection by wildlife. The forest age classes used in this chapter were developed by WDNR for an environmental impact statement (EIS) for a habitat conservation plan for WDNR lands in Washington State. Forest habitats were divided according to forest structure and composition, key factors in habitat selection for forest-dwelling wildlife. It is generally assumed that, under normal circumstances, forest complexity, plant species richness, and the number of wildlife habitat niches increase with forest age (USFS 1979).

Following the WDNR system, conifer-dominated forests were classified as structurally complex forest (including fully functional forest and interior forest); closed-canopy forest; dense pole forest; open, multi-aged forest; regeneration forest; and open forest. Other categories developed specifically for NAS Whidbey Island include mature and young deciduous forest, Sitka spruce bog, freshwater marsh, wet meadow, drainage ditch/slough, pond, salt marsh, coastal lagoon, mud flat, rocky/sand beach, cobble/sand beach, gravel/sand beach, dune natives, bluff, marine subtidal, grassland (including cultivated agricultural fields), orchard, disturbed area, and landscaped area.

Additional habitat types that are not dominated by vegetation have also been incorporated into this classification scheme. Areas of each habitat type were estimated using GIS ArcInfo. The fish and wildlife species that are likely to occur in each habitat type are listed in Appendix F.

The four installations that comprise NAS Whidbey Island include a wide range of habitat types, although several of these are represented only by a few occurrences that encompass a small area. For example, mud flats occur in only two areas of relatively small acreage. Conversely, closed canopy forest occurs at all four installations and is the most common habitat type in terms of areal coverage. Salt marsh occurs in only three areas, but is the major habitat type at Lake Hancock. Beach habitats occupy little total area but are important components of the natural ecosystems at Ault Field, Seaplane Base, and Lake Hancock.

Species use counts for each habitat type indicate that closed canopy forests have the highest species richness of all the habitat types occurring at the station and landscaped habitats have the lowest. Although species richness should not be used as the only index of biological diversity in an area, it is an important indicator of the health and variety of niches in a specific habitat. Clearly the relative value of some habitat types can be intuitively assessed, but the availability of a convenient, quantitative comparison among habitats is a valuable tool when defending proposed management actions.

Snags and Downed Woody Debris

Many species of birds and mammals are dependent on cavities excavated in snags by the species themselves or by other species. Over 100 wildlife species in western Washington and Oregon use cavities in snags for nesting and roosting (Brown 1985). Some species, such as ospreys, nest on the tops of snags and broken-off trees. In addition, many birds, especially diurnal birds of prey, use snags as perches. Just a few of the local species known to commonly use cavities in large snags include the pileated woodpecker, wood duck, chickadees, nuthatches, house wren, hooded merganser, and raccoon.

Snags and felled trees produce downed logs that also provide habitat for many species of insects and for the vertebrates that feed on them. Some wildlife species also use downed logs for cover or nesting sites. Down logs provide habitat for such species as the Trowbridge shrew, Douglas squirrel, hairy woodpecker, winter wren, dark-eyed junco, and the Pacific tree frog.

2.5.7.3 Marine Habitats

Marine habitats at NAS Whidbey Island include marine and estuarine intertidal and subtidal areas. In Washington State, these habitats are typically classified using a system that is modified from the USFWS wetland classification scheme. To better apply the system to marine habitats, the marine classification scheme emphasizes and further classifies substrate type and incorporates a relative measure of energy level, or combined wave and current action (Dethier 1990). Using this classification scheme, six marine and seven estuarine habitats were identified at NAS Whidbey Island.

2.5.7.4 Fish and Aquatic Invertebrates

Marine Fishes

All five species of North Pacific salmon (Oncorhynchus spp.), as well as the sea-run cutthroat trout, utilize the nearshore and offshore areas during juvenile and adult migration periods of their lifestyle. During their marine occupancy lifestage, these species contribute to a substantial recreational and commercial fishery. In addition to salmonids, resident bottom fish are also found in the waters adjacent to NAS Whidbey Island (see Appendix F).

Marine Invertebrates

A variety of coelenterates, crustaceans, mollusks, echinoderms, and other groups inhabit the intertidal and subtidal areas of NAS Whidbey Island (see Appendix F). Species that are commonly collected for human consumption include littleneck clams, butter clams, cockles, horse clams, softshell clams, Geoduck clams, California and blue mussels, Dungeness and red rock crabs, and Pacific oysters.

Freshwater Fish

Two species of salmon, coho (*Oncorhynchus kisutch)* and chum (*Oncorhynchus keta*), utilize the limited available spawning and rearing habitat located on Whidbey Island; however, neither species is believed to utilize freshwater streams on NAS Whidbey Island (Washington State 1993, Williams et al. 1975). The only fish species of note believed to occur in freshwater streams on the station are the rainbow trout (*Oncorhynchus mykiss*) and coastal cutthroat trout (*Oncorhynchus clarki clarki*).

2.5.7.5 Reptiles and Amphibians

A field inventory of potential habitats for reptiles and amphibians was conducted at NAS Whidbey Island in the spring of 1995 by EA Engineering, Science, and Technology, Inc. A very limited amount of trapping was attempted to gain more information about what species commonly occur at the station. No comprehensive trapping inventories for reptiles or amphibians have been conducted on station lands.

Based on information from the field survey and the agency database searches, a list of reptiles and amphibians likely to occur at NAS Whidbey Island, and their preferred habitats was compiled (Appendix F). For each installation, specific areas of habitat are identified and estimates of acreage of habitat types likely to support reptiles and amphibians are provided in the appropriate sections in this chapter.

Studies have identified red alder stands near streams as being particularly valuable habitat to amphibians, showing that the animals are more abundant in riparian alder stands than in old-growth Douglas-fir forests (Gomez 1992, McComb et al. 1993). Red alder stands with some component of Douglas-fir and western redcedar are considered even more valuable habitat because of the compositional complexity introduced by greater heterogeneity and the higher potential for large log recruitment.

Of the amphibian species potentially occurring at NAS Whidbey Island, the following are expected to occur in red alder stands: roughskin newt (*Taricha granulosa*), ensatina (*Ensatina eschscholtzii*), western redbacked salamander (*Plethodon vehiculum*), Pacific treefrog (*Pseudacris regilla*), and northwestern salamander (*Ambystoma gracile*). While there are few streams at NAS Whidbey Island, red alder stands do occur near aquatic areas such as ponds and wetlands and are generally presumed to support these species. In both red alder stands and Douglas-fir forests, capture rates of roughskin newts were found to be positively associated with the length of downed logs, the number of stumps in the area, amount of evergreen shrub cover, and deciduous tree basal area (McComb et al. 1993). As indicated by the habitat descriptions presented in Chapter 2.5.3.2, similar associations extend to other amphibians, as well as to reptiles and small mammals.

Studies of small vertebrate habitat preferences indicate a need for resource managers at NAS Whidbey Island to focus attention on red alder stands and on increasing snag and downed log occurrence in this habitat type, as well as in the more prevalent coniferous forest areas. Additional habitat features such as temporary ponds, seeps, and rock outcrops are probably equally important to many amphibian species. An emphasis should be placed on protecting and enhancing aquatic breeding sites of amphibians and adjacent terrestrial habitat. The buffer zones around ponds, wetlands, and streams should also be protected to provide adequate terrestrial habitat for amphibians.

2.5.7.6 Birds

Over 200 species of birds are known to frequent a variety of habitats at NAS Whidbey Island. A comprehensive list of bird species observed at the station was compiled by the Whidbey Island Chapter of the National Audubon Society and is presented in Appendix F. All major taxonomic groups are represented on this list.

<u>Neotropical Migratory Birds</u>

Neotropical migrants are bird species that migrate from summer breeding areas in North America to wintering areas in the tropics. Many of these migratory bird species have experienced alarming declines in abundance in recent years, largely because of fragmentation and destruction of their habitats in North America and the Neotropics. Many of the bird species listed in Appendix F are neotropical migratory species.

The Migratory Bird Treaty Act applies to all species of waterfowl, shorebirds, raptors, and nearly all songbirds. Thus migratory neotropical bird species have become a major focus of resource management at military installations that must comply with federal environmental regulations. DoD has a Memorandum of Agreement (MOA) with other federal agencies regarding neotropical migratory birds in recognition of the need to manage DoD lands and to maintain or enhance summer breeding habitat for these species when compatible with mission objectives. The emphasis in this INRMP is on protecting or maintaining natural habitats in unimproved areas on NAS Whidbey Island and on managing multiple use areas to maintain as much wildlife habitat as possible. One of

The killdeer (*Charadrius vociferus*) is commonly found in fields at NAS Whidbey.

the goals of resource managers at NAS Whidbey Island is to maintain and enhance breeding habitats for a variety of neotropical migrants.

Habitat protection and enhancement should be geared towards those species that are known to be in decline in Washington or at NAS Whidbey Island, or for which very little information exists. Habitat types occurring at NAS Whidbey Island that have projected moderate rates of loss and/or conversion in Washington State include fresh water marshes and ponds, westside young coniferous forest, and westside old growth/mature coniferous forest (Andelman and Stock 1994). These are habitats that are predicted to be moderately vulnerable to conversion over the next fifty years. Efforts at the station should focus on protecting and enhancing these habitats.

2.5.7.7 Mammals

Marine Mammals
Mammal species that commonly occur on beaches, in adjacent waters, and at the station include the harbor seal, gray whale and California sea lion. These species feed in the waters near Ault Field, Seaplane Base, and Lake Hancock, and use beaches and rocks on the station as haulout sites. Other marine mammal species listed in Appendix F are occasional or rare visitors to the subtidal areas adjacent to the station.

Terrestrial Mammals
Observations by station personnel indicate that the following terrestrial mammal groups are represented at NAS Whidbey Island: deer, foxes, coyotes, weasels, rabbits, squirrels, chipmunks, opossums, mice, rats, voles, moles, shrews, and bats. A complete list of mammal species potentially occurring at the station and the habitat types they frequent is presented in Appendix F. The only large terrestrial mammal that occurs on Whidbey Island is the black-tailed deer (*Odocoileus hemionus columbianus*). This species occurs commonly in the mixed forest, alder forest, and freshwater marsh habitat types, as well as in adjacent grasslands. Cottontail rabbit (*Sylvilagus floridanus*), European rabbit (*Oryctolagus cuniculus*), mink *(Mustella vison*), opossum (*Didelphis virginianus*), raccoon (*Procyon lotor*), Douglas squirrel (*Tamiasciurus douglasii*), Townsend's vole *(Microtus townsendii*), masked shrew (*Sorex cinereus*), and deer mouse (*Peromyscus maniculatus*) are some of the most common mammals occurring on station lands. Results from a 1989 small

mammal study conducted in the runway ditch complex at Ault Field indicate that the most commonly trapped mammals were the Townsend's vole, masked shrew, and deer mouse (TIWET 1995). The runway ditch complex is the only area at NAS Whidbey Island in which small mammal trapping studies have been conducted.

2.5.7.8 Nuisance Animal Species

A number of nuisance animal species known to occur at the station have either been introduced or have expanded their range onto Whidbey Island. Table 2-22 lists these species and indicates which ones have been controlled under the pest and predator control program in the past. The remainder of the species on this list are considered nuisance species, but were never actively controlled.

Table 2-22. Nuisance Wildlife Species Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Historically Controlled Pest Species (Y/N)
Birds		
European starling	*Sturnus vulgaris*	Y
Brown-headed cowbird	*Molothrus ater*	N
Pigeon or rock dove	*Columba livia*	Y
Mammals		
Eastern cottontail rabbit	*Sylvilagus floridanus*	N
European rabbit	*Oryctolagus cuniculus*	N
eastern gray squirrel	*Sciurus carolinensis*	N
Norway rat	*Rattus norvegicus*	Y
coyote	*Canis latrans*	Y
feral cat	*Felis libyea domestica*	Y

European Starlings

A large population of European starlings (*Sturnus vulgaris*) has established under the fuel pier at Seaplane Base. At one time, it was estimated that thousands of starlings use this site as a nighttime roost (Klope 1995). In addition, smaller groups of starlings nest in the hangars, the exchange building, and other buildings at Ault Field and Seaplane Base.

Starlings are not native to the United States and are generally considered an invasive nuisance species throughout North America. The species is known for aggressively claiming nest sites that could be used by native bird species. The starling is particularly competitive with flickers, flycatchers, and bluebirds for nest sites. In some instances, starlings have been known to take over nest sites that have already been established by other bird species. They are an extremely adaptable species that shows rapid population growth. Starlings migrate and roost in large flocks. They are incessantly noisy, often occupying building roofs and bridges. At NAS Whidbey Island starlings present a significant bird-air strike hazard and also compete with native bird species for nesting sites.

Pigeons

Pigeons, or rock doves (*Columba livia*) are primarily a problem in the hangars and other open operational buildings on the air field at Ault Field. They nest on beams and ledges under the roof and drop waste and feathers onto planes and plane engines under repair, causing a serious risk of in-flight malfunctions.

Coyotes

Coyotes (*Canis latrans*) are opportunistic feeders, preying on rabbits, mice, pocket gophers, other small mammals, birds, frogs, toads, snakes, insects, domestic cats, and small dogs (Whitaker 1980). At NAS Whidbey Island their primary source of food appears to be meadow voles, but they are known to have killed black-tailed deer and many of the pheasants released by the WDFW for hunting (Klope 1995). By hunting in packs they can bring down larger mammals, including grazing livestock (Whitaker 1980). Coyotes are believed to be the main cause of the depletion of the native red fox population on Whidbey Island (Goodman 1995). They also pose a safety hazard in runway areas at NAS Whidbey Island where pilots risk hitting the animals or being distracted by trying to avoid them during takeoff and landing. Coyotes historically are not native to Whidbey Island and are believed to have expanded their range over time and colonized Whidbey Island (Milner 2012).

Coyotes (*Canis latrans*) are problematic predators

Feral Cats

A feral cat (*Felis libyea domestica*) population has become established near residential areas on Seaplane Base. This is believed to have occurred by departing personnel releasing pet cats into outdoor areas near the housing units. As the house cats reproduced, their offspring became more feral.

The cats are excellent hunters, preying on small mammals such as the Douglas squirrel and on native bird species. In general, feral cat because of their hunting instinct are thought to pose a particular threat to threatened and endangered wildlife and migratory bird species (see figure 4-2, Navy feral dog and cat policy). In addition to depleting native animal populations, feral cats are a health and safety problem at NAS Whidbey Island as they are suspected of spreading disease to pet animals and humans and are known to spread garbage around containers.

Rodents
Norway rats occasionally become a problem around areas of human habitation, especially near food sources. Rodents are controlled in these areas by trapping and poisoning.

Insects
Major insect infestations have not been a significant problem at the station. Most pest insect problems reported at the station occur within built structures and are associated with carpenter ants, yellow jackets, silverfish, and roaches. Buildings are inspected regularly by the weed and pest control subcontractor, and insect infestations are treated as needed.

2.5.7.9 Ault Field Resources

Biological Diversity
Overall, biological diversity at Ault Field is relatively low when compared to that of Seaplane Base and Lake Hancock. This is due primarily to the extensive areas of grassland that dominate the landscape at Ault Field. Grasslands have little structural diversity and so provide a low number of habitat niches for relatively few wildlife species. Wetland habitats at Ault Field tend to be wet meadows that also lack structural complexity and the hydrologic regime to provide ponded water year-round. Fewer species are known to use wet meadows than more complex mosaic wetlands, which have deeper marsh and open water habitats. Riparian corridors are lacking at Ault Field due to the straightened, incised form of the stormwater ditches. The ditches have little forest canopy, no floodplain, and few associated wetlands. The greatest diversity in wildlife species at Ault Field probably is likely to occur in the vicinity of Rocky Point where there are stands of mature forest with relatively high structural complexity, coastal bluffs, beach strand, native dune vegetation, and a large freshwater marsh. Figure 2-34 shows significant fish and wildlife habitats and resources on Ault Field.

Habitat Types
A total of 20 different habitat types have been identified as occurring at Ault Field. Figure 2-35 shows the wildlife habitat types on Ault Field. These habitats support a wide variety of wildlife species, as indicated in Table 2-23.

Table 2-23. Acreage of Habitat Types at Ault Field.

Habitat Type	Habitat Type No.	Number of Wildlife Species Potentially Occurring in Habitat Type				Acreage at Ault Field
		Birds	Reptiles Amphibians	Mammals	Marine Species	
Structurally Complex Forest	1	68	10	25	0	174.9
Closed Canopy Forest	3	66	11	23	0	70.1
Dense Pole Forest	4	42	10	22	0	95.2
Regeneration Forest	5	36	10	22	0	181.4

Habitat Type	Habitat Type No.	Number of Wildlife Species Potentially Occurring in Habitat Type				Acreage at Ault Field
		Birds	Reptiles Amphibians	Mammals	Marine Species	
Young Deciduous Forest	7	62	9	27	0	121.6
Scrub-shrub	8	36	7	17	0	338.0
Freshwater Marsh	9	69	10	9	0	92.0
Wet Meadow	10	8	6	5	0	166.5
Drainage Ditch/Slough	11	35	9	8	8	0/19.78
Pond	12	48	7	6	1	19.7
Salt Marsh	14	49	0	2	30	0.4
Cobble/ Sand Beach	19	33	0	2	39	15.7
Gravel/ Sand Beach	20	38	0	3	57	23.5
Dune Natives	22	24	0	0	0	9.2
Bluff	23	24	0	11	0	0/2.3
Grassland and Cultivated Fields	24	72	4	18	0	1,956.5
Orchard	25	33	0	6	0	1.8
Disturbed Area	26	6	2	9	0	21.2
Landscaped Area	27	41	3	24	0	361.0

Marine Habitats and Resources

Marine habitats at Ault Field include marine intertidal and subtidal areas. A total of six marine habitats were identified at Ault Field. Table 2-24 summarizes the locations of these habitats. These habitats were simplified for the previous discussion of biodiversity and habitat type and for Appendix F, relying on the substrate type to characterize the habitat: rock/sand, cobble/sand, and gravel/sand.

Marine habitats at Ault Field are used by a wide variety of marine fishes, terrestrial and aquatic mammals, birds, and invertebrates. The common species that occur in these habitats are listed in Appendix F.

Among the marine fishes, all five species of North Pacific salmon (Oncorhynchus spp.), as well as the sea-run cutthroat trout, utilize the nearshore and offshore areas adjacent to Ault Field during juvenile and adult migration periods of their lifecycle. During their marine occupancy lifestage, these species contribute to a substantial recreational and commercial fishery. A very productive

Table 2-24. Marine Habitats Occurring at Ault Field.

Location	Habitat Type					
	Marine Intertidal Rock: Partially Exposed	Marine Intertidal Gravel: Partially Exposed	Marine Intertidal Sand: Exposed and Partially Exposed	Marine Intertidal Mixed-Coarse Sediment: Semi-Protected to Protected	Marine Subtidal Mixed-Fines: Moderate to High Energy, Shallow	Marine Subtidal Mixed-Fines: Moderate to Low Energy, Deep
West Beach			X		X	X
Between Rocky Point and West Beach		X		X	X	X
Rocky Point	X			X	X	X
South of Rocky Point			X		X	X

Sources: Dethier 1990, NOAA undated, Smith 1996.

commercial fishery exists off West Beach, which is also an important sport fishing site. In addition to salmonids, resident bottom fish are also found in the waters adjacent to Ault Field.

Marine mammal species that commonly occur on beaches and in adjacent waters at Ault Field include the harbor seal, gray whale, and California sea lion. These species feed in the waters near Ault Field, and occasionally use beaches on the installation as haulout sites.

The intertidal and subtidal areas of Ault Field are inhabited by a variety of coelenterates, crustaceans, mollusks, echinoderms, and other groups.

Fish and Aquatic Invertebrates

Freshwater Fish

In the Clover Valley drainages there is a remnant resident fish population which exists in the lower channel complex. Historical records (Washington State and Bonneville Power Administration 1994) lead to speculation that this population is native in origin but has also received some historical stocking. No estimate of the population dynamic structure is available or even if it is self-sustaining. However, species composition is believed to be rainbow trout (*Oncorhynchus mykiss*) and coastal cutthroat trout (*Oncorhynchus clarki clarki*). One juvenile (approximately 4 cm) was observed under the field overflow ice during the December 1995 survey (Smith 1996). This population receives little or no fishing pressure and is believe to be insufficient to support a recreational fishery. No anadromous fish population exists within this drainage channel complex due to habitat limitations and lack of suitable access through the downstream sections near Dugualla Bay. Additionally, anadromous fish access is blocked by the dike and tide gate system that was constructed severing access with Dugualla Bay.

Prior agricultural use, vegetative management, and channel drainage maintenance on the airfield proper has led to loss of supportive instream habitat and a reduced riparian vegetation cover (Smith 1996). This has led to subsequent erosion and habitat quality problems. The overall habitat ranking is low (Washington State and Bonneville Power Administration 1994). The primary issues are silt loading of streambeds and a lack of thermal protection.

Soil erosion and the deposition in the channel habitat can be controlled by maintenance of an adequate channel vegetative zone. The removal of deposited silts within this drainage complex is somewhat problematic. Due to the low gradient and subsequent low flow velocity occurring naturally, it is doubtful that the system has the capability to establish a stream bed composed of hard substrate material through natural bedload movement or erosive processes. Management for reducing the soil input to the channels should be a focus of stream management.

Thermal loading in the channels is occurring due to lack of adequate vegetation height to shade the water during low flow periods (Smith 1996). This leads to temperature related stress on the resident fish populations. Higher temperatures lead to an oxygen depletion condition causing die-offs or reduced vigor within the stream community. Vegetation management for reducing thermal loading should also be a focus of overall stream management.

The Cranberry Lake Outlet near the North Gate is a marine influenced beach tributary. The upper reach limit is the end of the open channel access into the marsh located on private land and beyond to Cranberry Lake. There is no access for anadromous species to freshwater spawning and rearing habitats, nor does sufficient habitat exist to support marine species.

Reptiles and Amphibians
At Ault Field, the main areas in which amphibian habitat occurs include the drainage ditches in Clover Valley, the large freshwater marshes in Clover Valley, the larger of the golf course ponds, the large freshwater marsh near the southern boundary of Ault Field to the west of the golf course, and Pond 473 near the fire training area. Other, smaller wetlands scattered about Ault Field may also support amphibians. All of the amphibian species listed in Appendix F may potentially occur at Ault Field based on the presence of habitat.

Reptiles may utilize the freshwater wetlands at Ault Field, the agricultural fields, the forested areas, and grassy areas including residential lawns and gardens. The only habitat present at Ault Field that could potentially support the Pacific pond turtle is Pond 473.

Birds
Most of the bird species listed in Appendix F have been observed at Ault Field. The bird groups discussed below are of particular significance in managing bird habitats.

Neotropical Migratory Birds
Significant freshwater habitat for neotropical migratory birds was identified by WDNR in the area south of Rocky Point (WDNR 1995). This wetland is approximately 30 acres in size. It does not qualify as a high-quality element occurrence wetland ecosystem because it has been significantly altered from a natural state by filling and invasion of non-native species (WDNR 1995). The vegetation in this marsh is comprised of a mosaic of community types: (1) cattail, (2) hard-stem bulrush, (3) slough sedge-Pacific silverweed, and (4) common mare's tail (*Hippuris vulgaris*). Nesting neotropical migratory birds will primarily use the cattail and bulrush. Reed canarygrass, which has the potential to displace native vegetation, is invading this marsh. This species has much less habitat value for neotropical migratory birds than for native species.

Species that potentially breed in this marsh include Virginia rail (*Rallus limicola*), sora (*Porzana carolina*), marsh wren (*Cistothorus palustris*), common yellowthroat (*Geothlypis trichas*), Savannah sparrow (*Passerculus sandwichensis*), and red-winged blackbird (*Agelaius phoeniceus*) (WDNR 1995).

Great Blue Heron
A great blue heron rookery is located at Ault Field. Herons are commonly observed foraging in the drainage ditches, wetlands, and nearshore areas at Ault Field, as well as in the salt marshes and bays at Seaplane Base and Lake Hancock. The herons that nest at Ault Field are known to forage for fish and small mammals in the runway ditches (TIWET 1995). The heron is not a federal or state listed TES species, but it is protected under MBTA. Due to the species' state status and the size and rarity of the rookery, the great blue heron population at NAS Whidbey Island is monitored and protected by analyzing requirements during project reviews.

A small heron rookery is located at the Fire Fighting School Pond at Ault Field. It is in a mature red alder stand consisting of trees averaging approximately 50 feet (15m) in height. The understory consists of yellow skunk cabbage, salmonberry, stinging nettle, and lady fern. The area is considered off-limits to the public and all naval personnel except for those receiving authorization from the installation environmental division. The birds appear to have habituated to the noise and disturbance from the nearby road and the overflying jets.

Northern Harrier
The northern harrier is not listed as a sensitive species in Washington State, but records of nesting harriers in western Washington are scarce. Limited nesting is probably the result of agricultural development of prior grassland and marsh habitat (TIWET 1995). They nest primarily in the uncultivated grassland and marsh habitats at the station. An average of 3 fledglings were produced from each nest (TIWET 1995).

NAS Whidbey Island provides a large area of optimum habitat for the northern harrier. Harrier nests have been located and monitored on an annual basis at the station since 1991. NAS Whidbey Island is involved in a cooperative effort with the Falcon Research Group to collect population data on northern harriers occurring at the station. Over a dozen harrier nests are typically constructed each year.

Most of the harrier nests at Ault Field are located on the ground in the vicinity of tall willows. Northern harriers do not typically nest in more open areas of low-lying grasses but appear to choose sites with shrubs or tall herbaceous forms, particularly in wet areas (Brown and Amadon 1989, Simmons and Smith 1985). Females in the nesting areas at NAS Whidbey Island space their nests at least several hundred feet apart, presumably to allow for adequate foraging range for the males. A clutch size of five eggs is typical, although this commonly varies from four to six. Potential predators on northern harrier nestlings and eggs at NAS Whidbey Island include crow, raven, raccoon, mink, coyote, and feral cat.

Mammals
All of the marine and terrestrial mammal species listed in Appendix F may potentially occur at Ault Field. Areas of habitat for terrestrial mammals include the forests along the shoreline area, other large forested blocks along the east boundary of Ault Field, uncultivated grasslands, and shrub lands. The drainage ditches and freshwater marsh habitat in the airfield area is important to the Pacific water shrew, Townsend's vole, muskrat, long tailed weasel, and mink.

Introduced Species
All of the introduced species listed in Table 2-22 are known to occur on Ault Field. General management guidelines and recommendations proposed in this chapter should be followed.

NAS Whidbey Island INRMP
Ault Field

Figure 2-34
Significant Fish and Wildlife Habitats and Resources

LEGEND

Installation Boundary
Roads
Buildings
Great Blue Heron Rookery
Significant Migratory Bird Areas
Wetland Neotropical Habitat
Known Marine Vegetation Beds
Eelgrass
Kelp
Known Forage Fish Spawning Areas
Surf Smelt Spawning Beaches

SCALE 1:28,000

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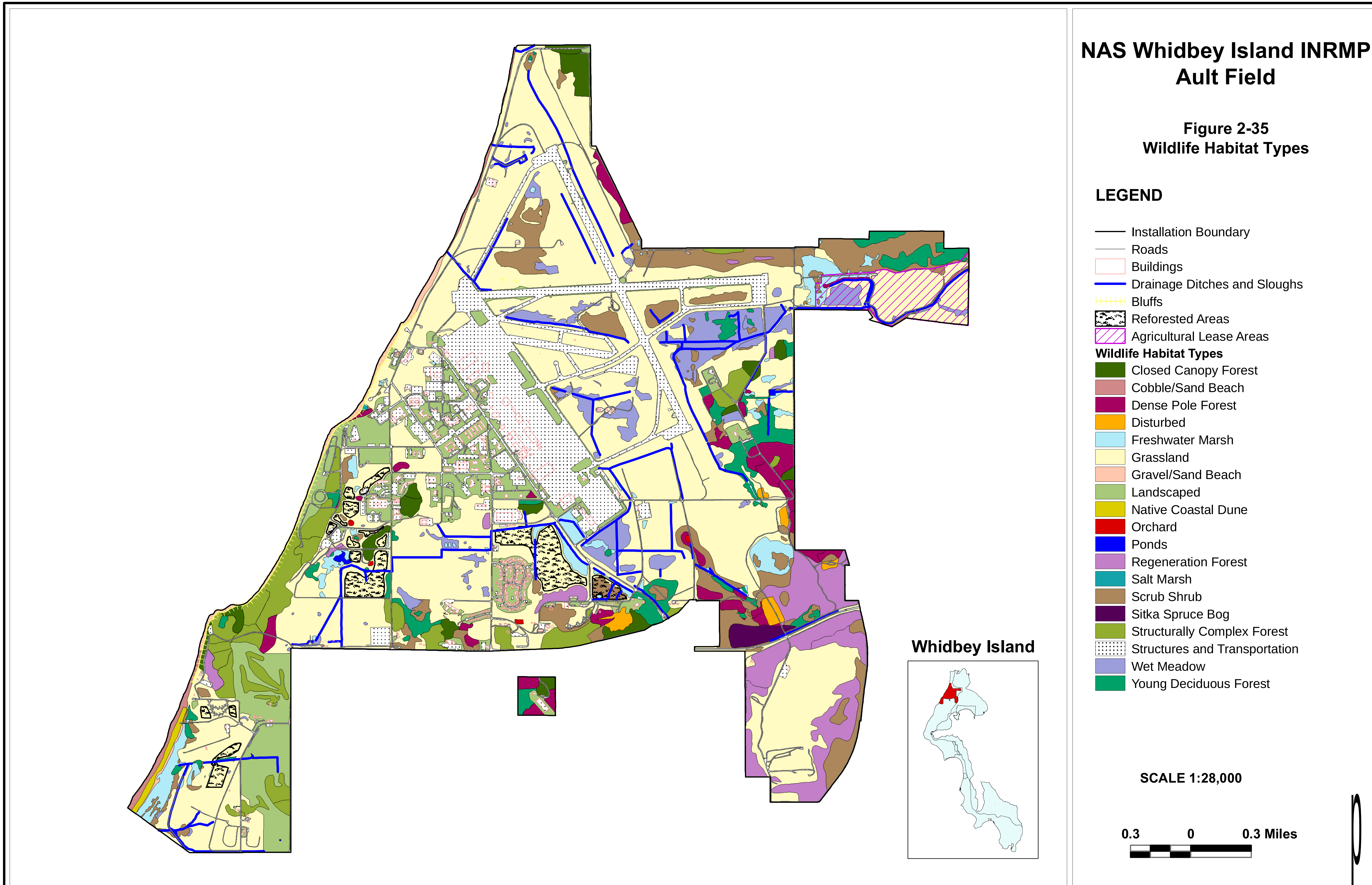
NAS Whidbey Island INRMP
Ault Field
Figure 2-35
Wildlife Habitat Types
LEGEND
Installation Boundary
Roads
Buildings
Drainage Ditches and Sloughs
Bluffs
Reforested Areas
Agricultural Lease Areas
Wildlife Habitat Types
Closed Canopy Forest
Cobble/Sand Beach
Dense Pole Forest
Disturbed
Freshwater Marsh
Grassland
Gravel/Sand Beach
Landscaped
Native Coastal Dune
Orchard
Ponds
Regeneration Forest
Salt Marsh
Scrub Shrub
Sitka Spruce Bog
Structurally Complex Forest
Structures and Transportation
Wet Meadow
Young Deciduous Forest
Whidbey Island
SCALE 1:28,000
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2.5.7.10 Seaplane Base Resources

Biological Diversity

Biological diversity at Seaplane Base is high relative to the other lands that comprise NAS Whidbey Island. Grasslands at Seaplane Base comprise only 25 percent of the area, as opposed to almost 50 percent of the area at Ault Field. Forested areas at Seaplane Base are more extensive and they include large stands of structurally complex forest and fully functional older forest. These more mature forests provide a significantly greater number of habitat niches for a wider variety of species than do younger forests. The greatest diversity in plant and wildlife species in forested areas at Seaplane Base probably occurs within the Survival Area where stands of fully functional older forests form a mosaic with structurally complex and closed canopy forest stages. Figure 2-36 shows significant fish and wildlife habitats and resources on the Seaplane Base.

Wetland habitats at Seaplane Base are more varied and show more structural complexity than those of Ault Field. Both Crescent Harbor Marsh and Maylor's Marsh are complex wetland ecosystems with mosaics of salt marsh, tidal channel, freshwater ditch, freshwater marsh, and scrub-shrub wetland. These areas provide habitat for a wide variety of marine fishes, marine invertebrates, waterfowl, raptors, neotropical migratory birds, small mammals, reptiles, and amphibians. Penfold Pond contributes a small, but significant area of open water to the variety of habitat niches available for wildlife. The beach habitats at Seaplane Base also contribute significantly to the overall biological diversity of the installation.

Habitat Types

A total of 24 habitat types have been identified as occurring at Seaplane Base. Figure 2-37 shows the wildlife habitat types on the Seaplane Base. These habitats support a wide variety of wildlife species, as indicated in Table 2-25.

Grasslands and closed canopy forest constitute the major habitat types at Seaplane Base in terms of area occupied. The landscaped areas in the vicinity of family housing also occupy significant area. Presumably, wildlife species that are well-adapted to urban habitats (e.g., raccoon, swallows, garter snakes) are abundant at Seaplane Base, as well as those better adapted to more isolated areas such as the mature forest in the Survival Area.

Table 2-25 Acreage/Mileage of Habitat Types at Seaplane Base.

Habitat Type	Habitat Type No.	No. of Species Potentially Occurring in Habitat				Acres/Miles at Seaplane Base
		Birds	Mammals	Reptile Animals	Marine Species	
Structurally Complex Forest	1	68	25	10	0	204.1
Fully Functional Older Forest	2	67	24	10	0	48.1
Closed Canopy Forest	3	63	23	11	0	436.4
Dense Pole Forest	4	42	22	10	0	56.8

Habitat Type	Habitat Type No.	No. of Species Potentially Occurring in Habitat				Acres/Miles at Seaplane Base
		Birds	Mammals	Reptile Animals	Marine Species	
Regeneration Forest	5	36	17	10	0	103.2 ac
Mature Deciduous Forest	6	76	25	8	0	28.9
Young Deciduous Forest	7	62	27	9	0	48.2
Scrub-shrub	8	36	17	7	0	28.9
Freshwater Marsh	9	69	9	10	0	133.1
Wet Meadow	10	8	5	6	0	7.7
Drainage Ditch/Slough	11	35	8	9	8	0/3.08
Pond	12	48	6	7	1	29.2
Salt Marsh	14	49	2	0	30	85.5
Mud Flat	16	24	1	0	22	11.5
Rocky/ Cobble Beach	17	30	1	0	78	6.4
Rocky/ Sand Beach	18	29	2	0	52	2.2
Cobble/ Sand Beach	19	33	2	0	39	45.7
Gravel/ Sand Beach	20	38	3	0	57	32.1
Marine Subtidal	21	68	0	0	139	0/4.8
Bluff	23	24	11	0	0	0/4.8
Grassland	24	72	18	4	0	726.4
Orchard	25	33	6	0	0	1.7
Disturbed Area	26	6	9	2	0	9.5
Landscaped Area	27	41	24	3	0	372.9

Marine Habitats and Resources

Marine habitats at Seaplane Base include estuarine intertidal and subtidal areas. A total of six estuarine habitats were identified at Seaplane Base. Table 2-26 summarizes the locations of these habitats. These habitats rely on the substrate type to characterize the habitat: rocky/cobble beach, rocky/sand beach, cobble/sand beach, gravel/sand beach.

Table 2-26. Estuarine Habitats Occurring at Seaplane Base.

Location	Habitat Type					
	Estuarine Intertidal Bedrock: Open	Estuarine Intertidal Mixed-Coarse: Open	Estuarine Intertidal Mud: Partly Enclosed	Estuarine Intertidal Mixed-Fines: Partly Enclosed	Estuarine Subtidal Mixed-Fines: open, shallow	Estuarine Subtidal Mud: Partly Enclosed, Shallow
Maylor's Point	X				X	
Forbes Point	X				X	
Oak Harbor shoreline			X			X
Crescent Harbor shoreline		X		X	X	
Polnell Point	X				X	

The predominant beach habitat at Seaplane Base is coarse sand and cobble beach. Mud and fine sand beaches and rocky shore habitats are also present. A wide variety of marine invertebrates, birds, and terrestrial mammals use these intertidal habitats. The common species that occur in these areas are listed in Appendix F. Two off-shore rocks along the east end of Crescent Bay are used as haulout sites by harbor seals. Harbor seals and sea lions use haulout sites throughout the inland and coastal waters of Washington to rest and sun themselves and to conduct social interactions.

Fish and Aquatic Invertebrates

Freshwater Fish

In the drainages flowing into Crescent Harbor Marsh, there is no record and little evidence of a potential resident or anadromous fishery resource. There is not sufficient freshwater spawning or rearing habitat to support the development of a fishery (Smith 1996).

Active agricultural use, vegetative management, and drainage channel construction has led to loss of supportive instream habitat and a reduced riparian vegetation cover (Smith 1996). This has resulted in subsequent erosion and degradation of fish habitat quality. The primary issues are stream loading of silt along with lack of thermal and visual protection. The redevelopment of a riparian zone along the lower channel complex would also provide higher quality habitat for avian and terrestrial mammal species.

Reptiles and Amphibians

At Seaplane Base, the majority of amphibian habitat occurs in the vicinity of Penfold Pond and Crescent Harbor Marsh. Penfold Pond, the channel that feeds and drains the pond, and small nearby wetlands serve as high quality habitat for frogs. Pacific treefrog adults were found in Penfold Pond, and tadpoles of this species were collected from seasonally ponded areas in the adjacent wetlands. No other amphibian species were observed in the area but habitat exists for the northern red-legged frog, bullfrog, northwestern salamander, western long-toed salamander, and rough-skinned newt. The western long-toed salamander may also be found in grassy areas wherever temporary ponds form at Seaplane Base.

Reptiles that may potentially occur in the Penfold Pond area include northwestern pond turtle, wandering garter snake, Puget Sound garter snake, and northwestern garter snake. These three garter snakes may also occur in moist areas in the grasslands and maintained turf areas at Seaplane Base. The Puget Sound and northwestern garter snake and the northern alligator lizard may be found in areas of thick brush and along forest edges.

The large marsh at Seaplane Base probably once provided extensive habitat for amphibians and some reptile species prior to the reopening of the tide gate in 1994. Amphibian and reptile species of the Pacific Northwest cannot tolerate saline or brackish conditions. These species are likely now limited to the northernmost extent of this marsh and to the areas on either end of the marsh where freshwater occurs.

Birds

Most of the bird species listed in Appendix F have been observed at Seaplane Base. The salt marshes at Seaplane Base provide very valuable habitat for a variety of raptors, waterfowl, and songbirds. Migratory waterfowl such as shovelers and gadwalls can be seen feeding in the marsh throughout the spring months. The extensive shrub lands provide excellent habitat for perching birds, and beach and mud flat areas support a variety of shorebirds. The bird groups discussed below are of particular significance in managing bird habitats.

Neotropical Migratory Birds

Significant forest and wetland habitat for neotropical migratory birds exists at Seaplane Base. Approximately 420 acres (1.5 km^2) of conifer and broadleaf forest habitat for forest-nesting birds occurs in the Survival Area. The vegetation is dominated by 60 to 100 year old Douglas-fir trees. Co-dominants are western hemlock, western redcedar, grand fir, bigleaf maple, and red alder. A number of neotropical migratory birds breed primarily in conifer forest such as that occurring in the Survival Area, and winter to the south: olive-sided flycatcher (*Contopus borealis*), solitary vireo (*Vireo solitarius*), Townsend's warbler (*Dendroica townsendi*), and western tanager (*Piranga ludoviciana*) (WDNR 1995). Those that are more likely to breed in broadleaf forests include black-headed grosbeak (*Pheucticus melanocephalus*), black-throated gray warbler (*Dendroica nigrescens*), and warbling vireo (*Vireo gilvus*) (WDNR 1995). Species that may breed in either forested habitat include rufous hummingbird (*Selasphorus rufus*), Pacific-slope flycatcher (*Empidonax difficilis*), Swainson's thrush (*Catharus swainsonii*), house wren (*Troglodytes aedon*), orange-crowned warbler (*Vermivora celata*), and Wilson's warbler (*Wilsonia pusilla*) (WDNR 1995).

The forested habitat at NAS Whidbey Island is significant because of the extent of forest clearing in the Puget Trough (WDNR 1995). The Survival Area at Seaplane Base is believed to be one of the larger blocks of relatively unfragmented forest on Whidbey Island (WDNR 1995).

Approximately 110 acres (0.4 km^2) of significant freshwater marsh habitat for neotropical migratory birds occurs in Crescent Harbor Marsh. This marsh area supports four primary plant community types: (1) cattail, (2) hard-stem bulrush, (3) slough sedge-Pacific silverweed, and (4) common mare's tail (WDNR 1995). Neotropical migratory birds are most likely to nest in the cattail and bulrush communities. Migratory birds that commonly breed in this type of marsh habitat include northern harrier, Virginia rail, sora, marsh wren, common yellowthroat, Savannah sparrow, and red-winged blackbird (WDNR 1995).

Grassland habitats at Seaplane Base are not considered especially significant for neotropical migratory birds; however, the northern harrier and Oregon vesper sparrow (*Pooecetes gramineus affinis*) are two species that may utilize these areas (WDNR 1995). The Oregon vesper sparrow is a state listed monitor species for which habitat should be protected.

Great Blue Heron

Two small heron rookeries are located on the Seaplane Base. One is located on the Maylor Point peninsula just north of Forbes Point and east of the housing area. The second is located northeast of Crescent Harbor marsh near Penfold Pond. They are in mixed deciduous stands of willow and alder. The birds appear to have habituated to the noise and disturbance from the nearby housing areas.

Northern Harrier

Each year, northern harriers typically establish three nests in the tall grass areas of Crescent Harbor Marsh. The adult males can be observed foraging throughout the marsh and nearby grassland areas. After capturing prey, the males can be seen flying over the nest area and transferring the food to the females mid-flight. The females then typically dive straight down to the nests, thus enabling observers to pinpoint nest locations. The extensive marsh habitat at Seaplane Base provides rare and valuable nesting habitat for northern harriers as NAS Whidbey Island is known to support more than half of the recorded northern harrier nesting sites in western Washington.

Mammals

Potential habitat exists at Seaplane Base for the mammal species listed in Appendix F. General management guidelines and recommendations should be followed.

Areas of habitat for terrestrial mammals include the forests of the Survival Area, uncultivated grasslands, other large forested blocks in the northwest corner of Seaplane Base and on Maylor's Peninsula, and shrub lands. The freshwater marsh habitat in Crescent Harbor Marsh and Penfold Pond is important to the Pacific water shrew, Townsend's vole, muskrat, long-tailed weasel, and mink. The Oregon white oak woodland could potentially support the western gray squirrel and other nut-foraging, tree-dwelling mammals.

Introduced Species

All of the introduced species listed in Table 2-22 are known to occur on Seaplane Base. General management guidelines and recommendations proposed in this chapter should be followed.

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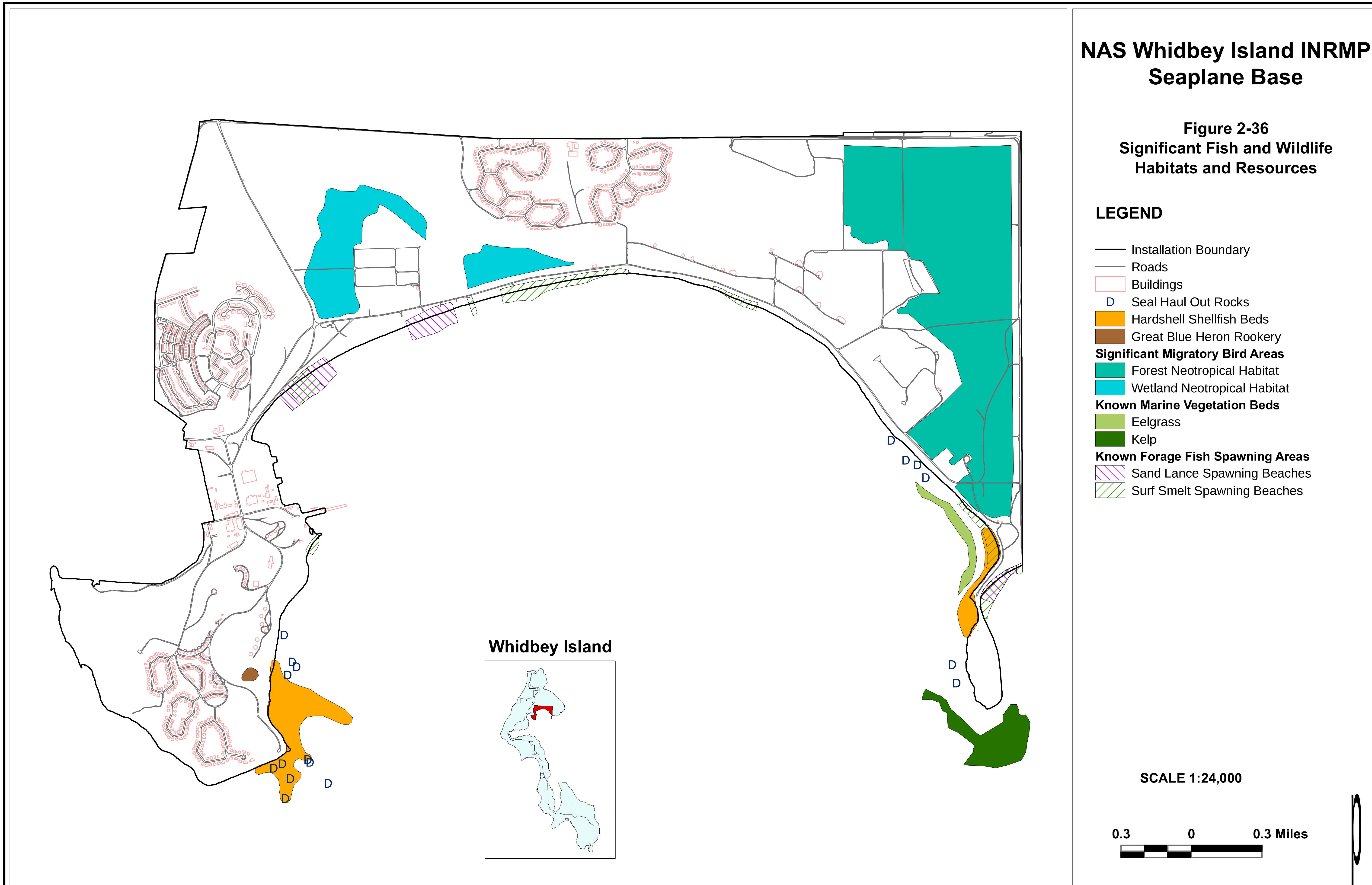
NAS Whidbey Island INRMP
Seaplane Base
Figure 2-36
Significant Fish and Wildlife
Habitats and Resources
LEGEND
Installation Boundary
Roads
Buildings
D Seal Haul Out Rocks
Hardshell Shellfish Beds
Great Blue Heron Rookery
Significant Migratory Bird Areas
Forest Neotropical Habitat
Wetland Neotropical Habitat
Known Marine Vegetation Beds
Eelgrass
Kelp
Known Forage Fish Spawning Areas
Sand Lance Spawning Beaches
Surf Smelt Spawning Beaches
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Whidbey Island

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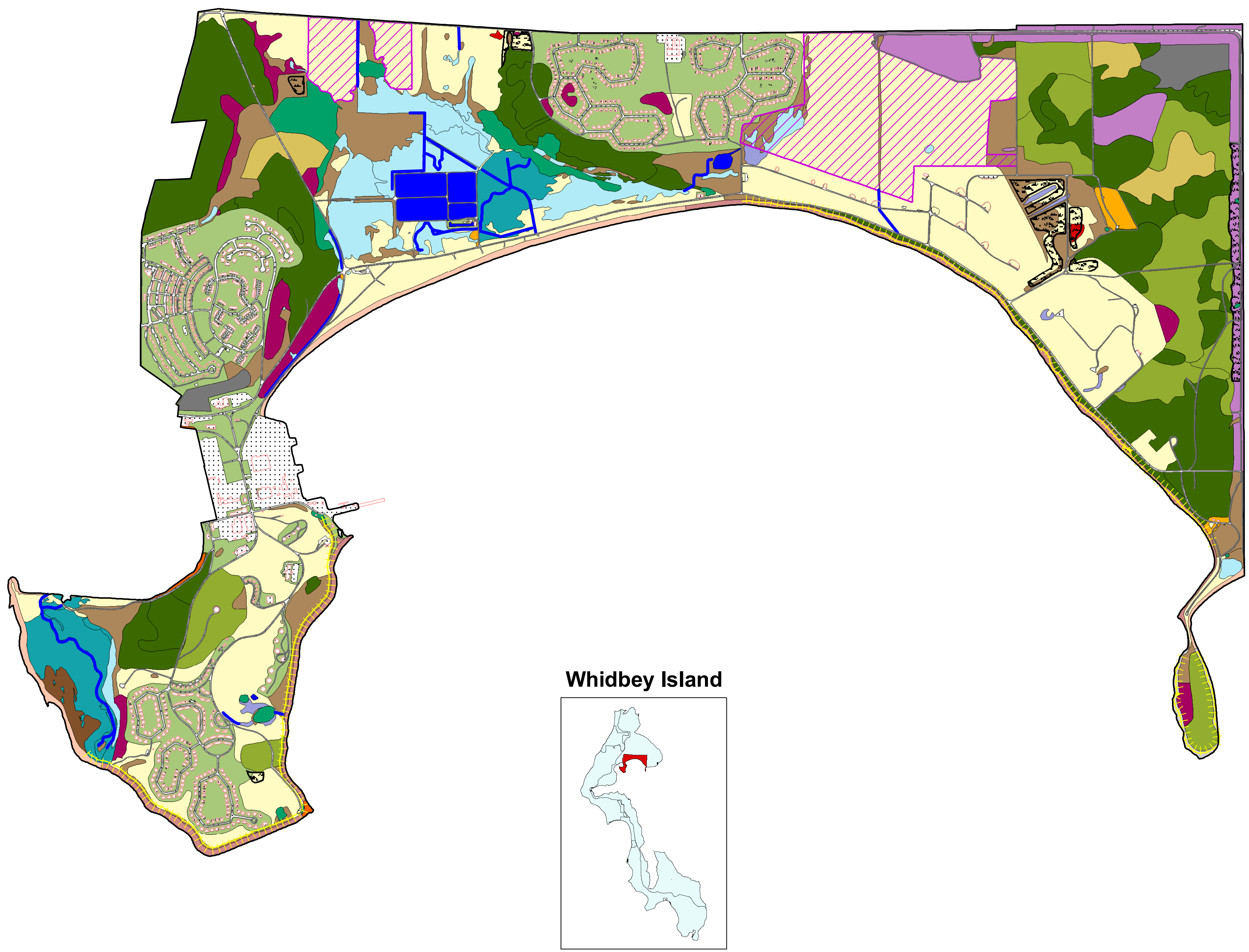

NAS Whidbey Island INRMP
Seaplane Base

Figure 2-37
Wildlife Habitat Types

LEGEND

- Installation Boundary
- Roads
- Buildings
- Drainage Ditches and Sloughs
- Bluffs
- Reforested Areas
- Agricultural Lease Areas

Wildlife Habitat Types

- Closed Canopy Forest
- Cobble/Sand Beach
- Dense Pole Forest
- Disturbed
- Freshwater Marsh
- Fully Functional Older Forest
- Grassland
- Gravel/Sand Beach
- Landscaped
- Mature Deciduous Forest
- Mud Flat
- Orchard
- Ponds
- Regeneration Forest
- Rocky/Cobble Beach
- Rocky/Sand Beach
- Salt Marsh
- Scrub Shrub
- Structurally Complex Forest
- Structures and Transportation
- Wet Meadow
- Young Deciduous Forest

SCALE 1:24,000

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2.5.7.11 OLF Coupeville Resources

Biological Diversity

Biological diversity at OLF Coupeville is considered quite low in comparison to other lands that comprise NAS Whidbey Island. This is due primarily to the extensive areas of grassland that dominate the landscape at OLF Coupeville. Grasslands have little structural diversity and provide a low number of habitat niches for relatively few wildlife species. Actively cultivated fields offer even less habitat due to the frequent disturbance of the surface soils and vegetation. The lack of significant surface water or wetlands on the installation also limits the number of wildlife species. This is the only site at NAS Whidbey Island that has no shoreline or marine habitats. Figure 2-38 shows significant fish and wildlife habitats and resources on OLF Coupeville.

Habitat Types

A total of 10 habitat types have been identified as occurring OLF Coupeville. Figure 2-39 shows the wildlife habitat types on OLF Coupeville. These habitats support a number of birds, mammals, and reptiles as shown in Table 2-27.

Table 2-27. Acreage of Habitat Types at OLF Coupeville.

Habitat Type	Hab. Type No.	Number of Wildlife Species Potentially Occurring in Habitat Type				Acres/ Miles at OLF Coupeville
		Birds	Reptiles/ Amphibs	Mammals	Marine	
Structurally Complex Forest	1	68	10	19	0	43.7
Closed Canopy Forest	2	67	10	18	0	23.3
Dense Pole Forest	3	66	11	18	0	10.7
Regeneration Forest	5	36	1 0	17	0	1.1
Young Deciduous Forest	7	62	9	20	0	25.5
Scrub-shrub	8	36	7	15	0	46.6
Drainage Ditch/Slough	11	35	9	10	0	0/0.82
Grassland	24	72	4	19	0	453.6
Landscaped Area	27	41	3	23	0	3.7
Structures and Transportation	28	43	0	6	0	68.6

Reptiles and Amphibians

There is very little suitable habitat for amphibians at OLF Coupeville. Species that require standing water for breeding will not occur here due to the lack of streams, ponds, or marshes. Most of the forested stands at the site are exceptionally dry, and there appears to be no breeding habitat for amphibians. Moist forest habitats are not extensive, but potential habitat exists for the western long-toed salamander and ensatina.

Reptile species that may occur in the forested areas and agricultural fields include the northern alligator lizard, Puget Sound garter snake, and the northwestern garter snake.

Birds

Due to the absence of wetlands, ponds, streams, and shoreline areas, most of the water-dependent birds that frequent Whidbey Island will not be found at OLF Coupeville. One northern harrier nest was identified in an open field in 1995.

Neotropical Migratory Birds

Significant conifer forest habitat for neotropical migratory birds was identified by WDNR at the north end of OLF Coupeville (WDNR 1995). This area is about 35 acres and is dominated by Douglas-fir, western hemlock, Pacific rhododendron, evergreen huckleberry, and salal.

A number of neotropical migratory birds breed primarily in conifer forest such as that occurring at OLF Coupeville: olive-sided flycatcher, Cassin’s vireo, Townsend’s warbler, and western tanager (WDNR 1995). Species that may breed in conifer forests as well as broadleaf forests include rufous hummingbird, Pacific-slope flycatcher, Swainson’s thrush, house wren, orange-crowned warbler, and Wilson’s warbler (WDNR 1995).

Mammals

Black-tailed deer is the primary large mammal that occurs on this site. Other mammals that potentially occur at OLF Coupeville include coyote, least weasel, European rabbit, cottontail rabbit, Douglas squirrel, mice, rats, voles, and moles.

Introduced Species

The following introduced species are likely to occur at OLF Coupeville: brown-headed cowbird, coyote, Norway rat, European rabbit, and the eastern cottontail rabbit.


Whidbey Island
NAS Whidbey Island INRMP
Outlying Field - Coupeville
Figure 2-38
Significant Fish and Wildlife
Habitats and Resources
LEGEND
Installation Boundary
Roads
Buildings
Significant Migratory Bird Areas
Forest Neotropical Habitat
SCALE 1:18,000
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0.3 Miles

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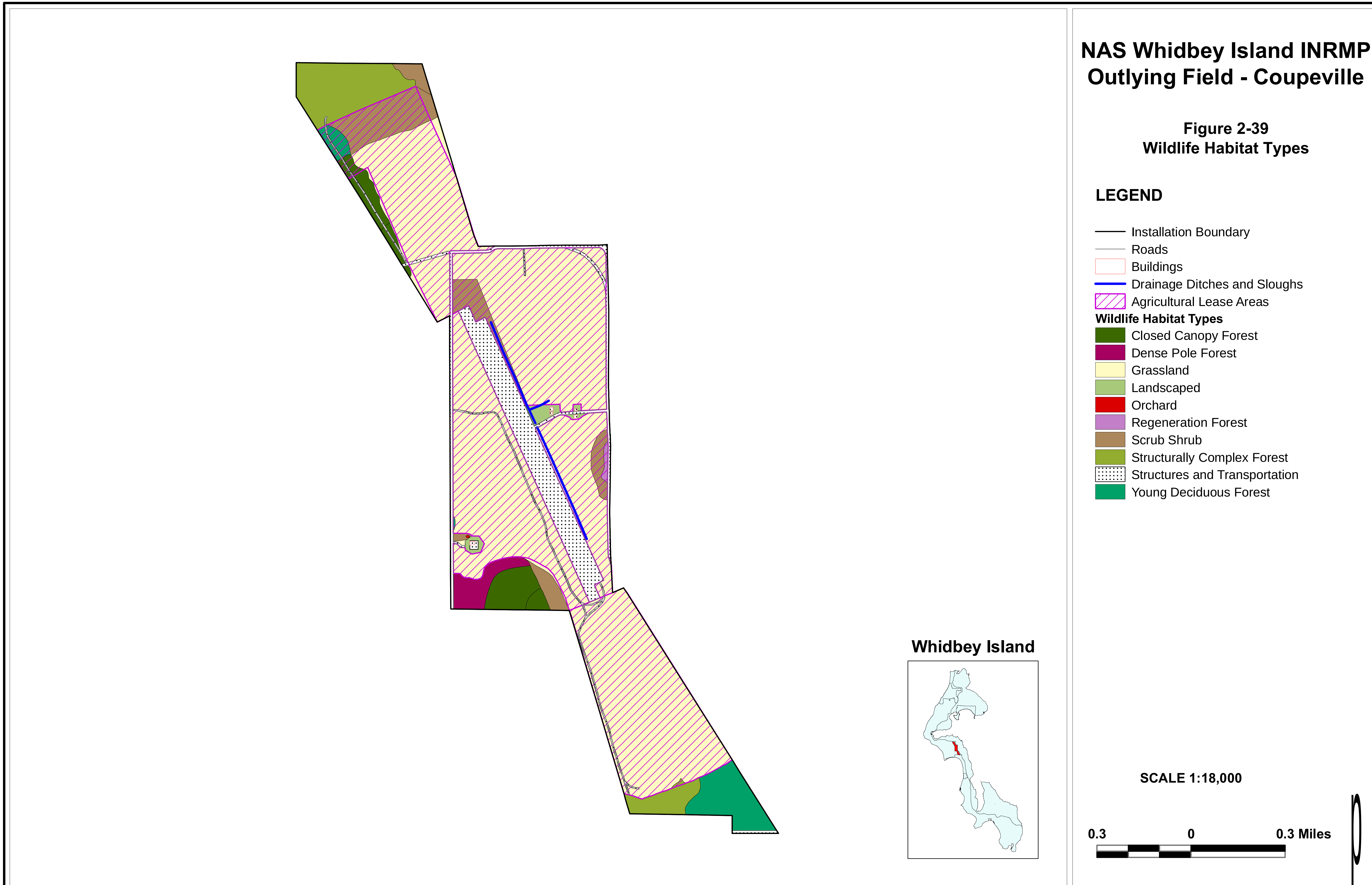
NAS Whidbey Island INRMP
Outlying Field - Coupeville
Figure 2-39
Wildlife Habitat Types
LEGEND
Installation Boundary
Roads
Buildings
Drainage Ditches and Sloughs
Agricultural Lease Areas
Wildlife Habitat Types
Closed Canopy Forest
Dense Pole Forest
Grassland
Landscaped
Orchard
Regeneration Forest
Scrub Shrub
Structurally Complex Forest
Structures and Transportation
Young Deciduous Forest
Whidbey Island
SCALE 1:18,000
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0.3 Miles

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2.5.7.12 Lake Hancock Resources

Biological Diversity

Biological diversity at Lake Hancock is relatively high in terms of the number and quality of habitat types represented at the installation, and the variety of wildlife species supported. The rarity and complexity of the wetland ecosystem that includes saltwater lagoon, mud flats, high and low salt marsh, freshwater marsh, scrub-shrub area, and forested bog are critical features in the high diversity of habitat niches at this site. The adjacent forested areas to the north and south extend for some distance off-site, providing large blocks of relatively unfragmented habitat. Figure 2-40 shows significant fish and wildlife habitats and resources on Lake Hancock.

Habitat Types

A total of 17 habitat types have been identified as occurring at Lake Hancock. Figure 2-41 shows the wildlife habitat types on Lake Hancock. These habitats support a wide variety of wildlife species, as indicated in Table 2-28.

Table 2-28. Acreage of Habitat Types at Lake Hancock.

Habitat Type	Hab. Type No.	Number of Wildlife Species Potentially Occurring in Habitat Type				Acreage at Lake Hancock
		Birds	Reptiles/ Amphibs	Mammals	Marine	
Structurally Complex Forest	1	68	10	19	0	22.1
Closed Canopy Forest	3	66	11	17	0	18.9
Dense Pole Forest	4	42	10	17	0	100.6
Regeneration Forest	5	36	10	17	0	10.8
Young Deciduous Forest	7	62	9	20	0	9.2
Scrub-shrub	8	36	7	15	0	19.1
Freshwater Marsh	9	69	10	10	0	4.7
Drainage Ditch/Slough	11	35	9	10	0	7.0/0.78
Sitka Spruce Bog	13	13	1	3	1	2.6
Salt Marsh	14	30	0	3	30	114.2
Coastal Lagoon	15	59	0	21	3	39.8
Mud Flat	16	24	0	2	22	27.6
Cobble/ Sand Beach	19	33	0	2	43	11.3

Habitat Type	Hab. Type No.	Number of Wildlife Species Potentially Occurring in Habitat Type				Acreage at Lake Hancock
		Birds	Reptiles/ Amphibs	Mammals	Marine	
Marine Subtidal	21	68	0	0	139	NA
Bluff	23	24	0	10	0	0/0.4
Grassland	24	77	4	19	0	26.8
Landscaped Area	27	41	3	23	0	3.0
Structures and Transportation	28	43	0	6	0	5.0

Marine Habitats and Resources

Marine habitats at Lake Hancock include marine and estuarine intertidal and subtidal areas. The coastal lagoon, tidal sloughs, and nearshore areas of Lake Hancock support common coastal juvenile and adult vertebrate and invertebrate species. The lagoon is used by salmonids for rearing and refugia. During sampling by Washington Trout, Chinook salmon, coho salmon, bull trout and steelhead have been caught in the lagoon and/or entrance channel (Wait 2006). It is a significant site due to the limited estuarine saltmarsh habitat that exists on the island. It is unknown to what extent this site contributes to foraging by predator species moving into the salt pond during tidal cycles.

Reptiles and Amphibians

The majority of aquatic areas at Lake Hancock are saline or brackish and are therefore not suitable habitat for amphibians and reptiles. Small areas of freshwater marsh may support some amphibian species, but most of the amphibian habitat at Lake Hancock occurs in two large areas of moist coniferous forest on the south and north ends of the site that include some small temporary freshwater pools. These areas may support the following amphibian species: western long-toed salamander, western red-backed salamander, ensatina, western toad, Pacific treefrog.

Among the reptile species that may potentially occur at Lake Hancock are the northern alligator lizard, the Puget Sound garter snake, and the northwestern garter snake. These species would most likely occur in the dense coniferous forest at the south and north ends of the site, in the thick brush around the edges of the forest, and in the grassy area in the eastern portions near Highway 525.

Birds

Salt marshes are critical to the needs of migratory waterfowl, and Lake Hancock is used throughout the year by many of these species. The open marshland, lagoon, and intertidal areas serve as prime foraging grounds for hawks and eagles. Migrating shorebirds feed and rest on the beaches and mudflats. The grasslands and forested areas provide forage, cover, and nesting habitat for a wide variety of songbirds. Many of the bird species listed in Appendix F have been observed at Lake Hancock.

Neotropical Migratory Birds

Significant conifer forest habitat for neotropical migratory birds is found surrounding Lake Hancock. This area is dominated by Douglas-fir, western hemlock, Pacific rhododendron, evergreen huckleberry, and salal.

A number of neotropical migratory birds breed primarily in conifer forest such as that occurring at OLF Coupeville: olive-sided flycatcher, Cassin's vireo, Townsend's warbler, and western tanager. Species that may breed in conifer forests as well as broadleaf forests include rufous hummingbird, Pacific-slope flycatcher, Swainson's thrush, house wren, orange-crowned warbler, and Wilson's warbler.

Mammals

Most of the mammal species listed in Appendix F potentially occur at Lake Hancock.

Introduced Species

Of the species listed in Table 2-22, the brown-headed cowbird, eastern cottontail rabbit, eastern gray squirrel, Norway rat, and coyote are likely to occur at Lake Hancock.

2.5.7.13 Project Recommendations – Fauna and Fish and Wildlife Resources

See Appendix A for a detailed list of projects for NAS Whidbey Island fish and wildlife resources management.

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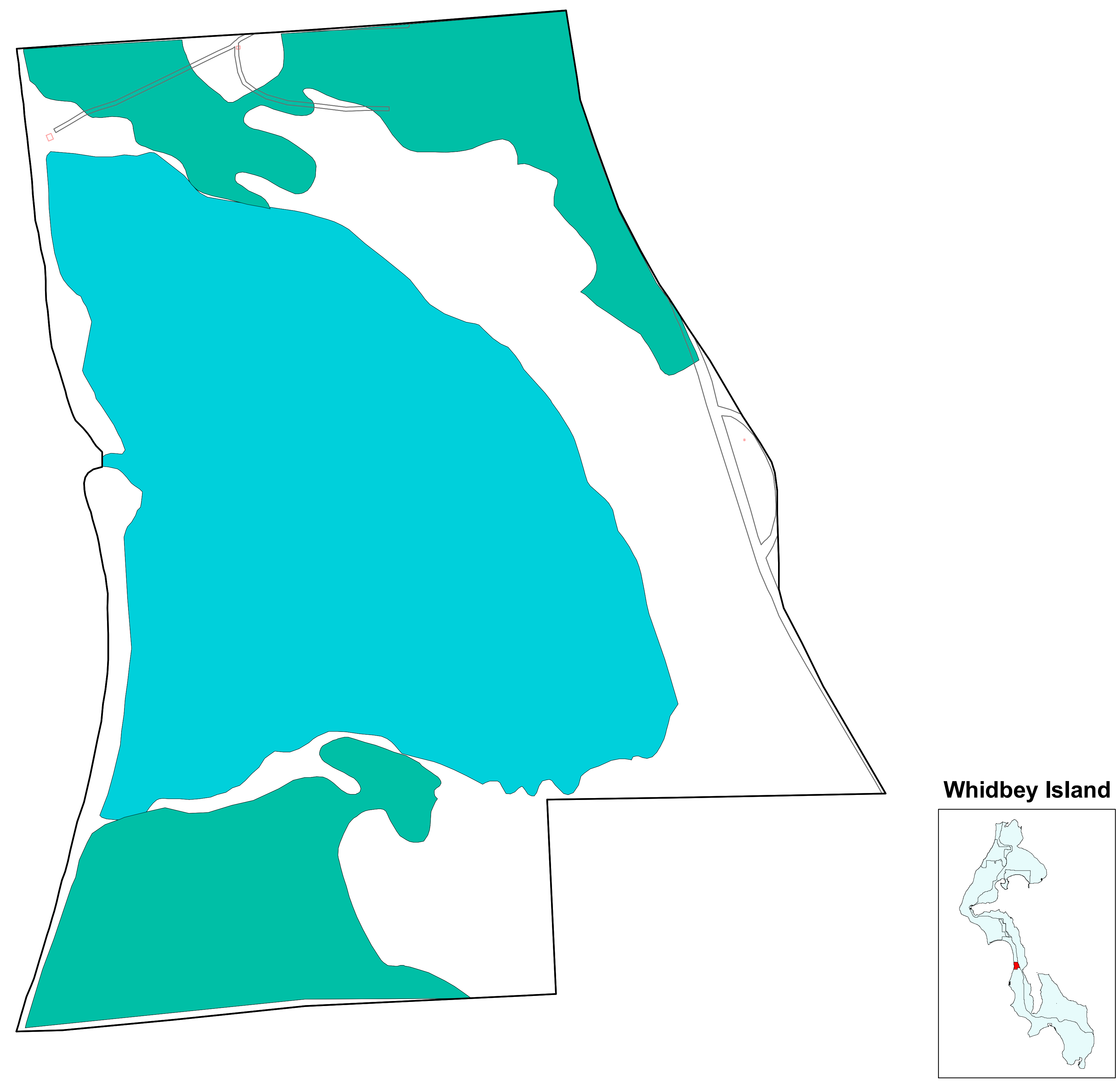

NAS Whidbey Island INRMP
Lake Hancock

Figure 2-40
Significant Fish and Wildlife Habitats and Resources

LEGEND

Installation Boundary
Roads
Buildings
Significant Migratory Bird Areas
Forest Neotropical Habitat
Wetland Neotropical Habitat

SCALE 1:8,000

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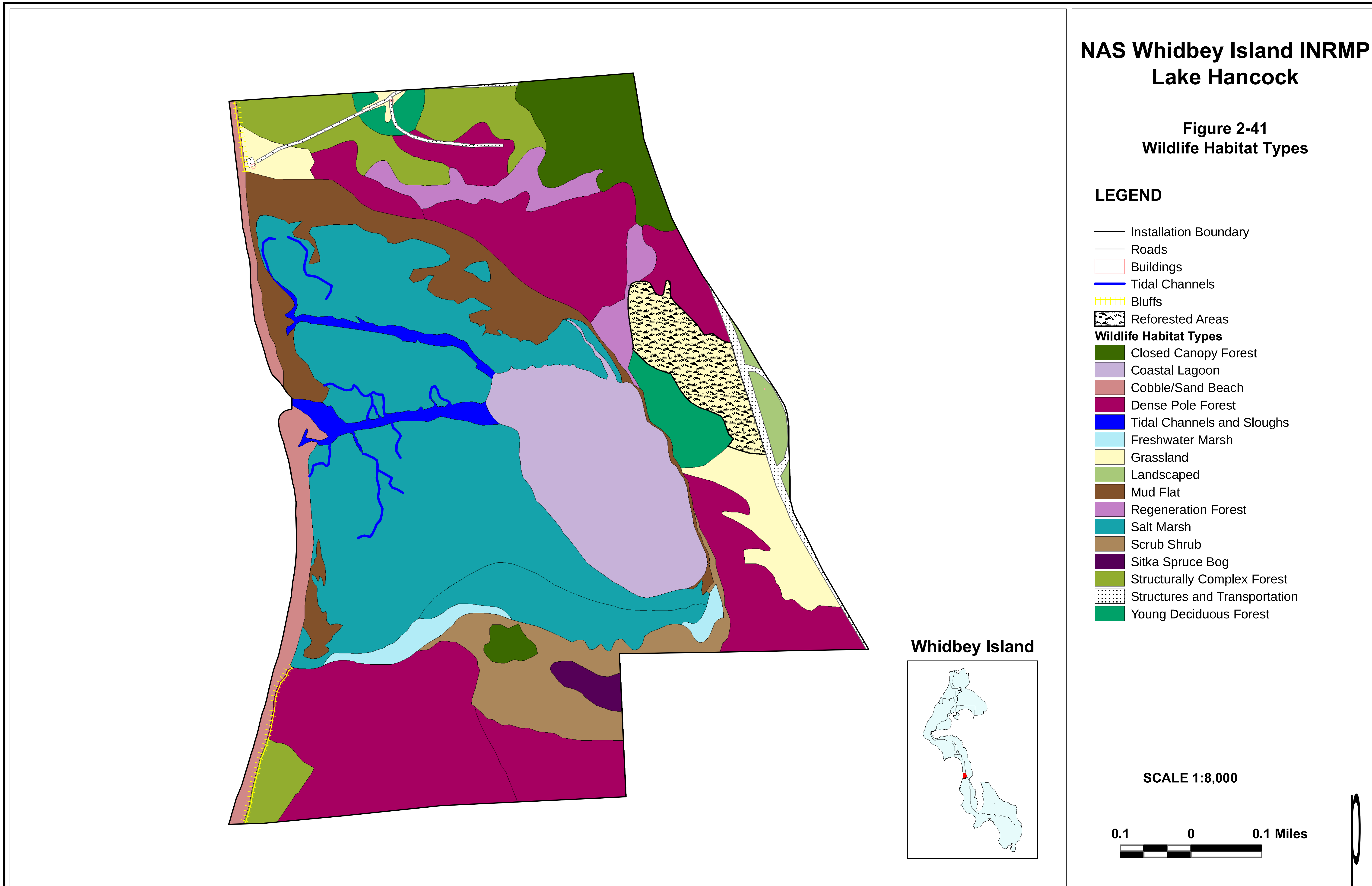
NAS Whidbey Island INRMP
Lake Hancock
Figure 2-41
Wildlife Habitat Types
LEGEND
Installation Boundary
Roads
Buildings
Tidal Channels
Bluffs
Reforested Areas
Wildlife Habitat Types
Closed Canopy Forest
Coastal Lagoon
Cobble/Sand Beach
Dense Pole Forest
Tidal Channels and Sloughs
Freshwater Marsh
Grassland
Landscaped
Mud Flat
Regeneration Forest
Salt Marsh
Scrub Shrub
Sitka Spruce Bog
Structurally Complex Forest
Structures and Transportation
Young Deciduous Forest
Whidbey Island
SCALE 1:8,000
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3.0 ENVIRONMENTAL MANAGEMENT STRATEGY & MISSION SUSTAINABILITY

3.1 Supporting Sustainability of the Military Mission and the Natural Environment

The fundamental components of natural resources management are personnel and funding. OPNAVINST 5090.1C requires each installation to have, in writing, a designated Natural Resources Manager (NRM). This individual is to be a professional knowledgeable and trained in the particular natural resources issues for that installation. The NRM for NAS Whidbey Island is a permanent, funded position located at NAS Whidbey Island. This position reports both to the Installation Environmental Program Director (IEPD) of NAS Whidbey Island and to the Commanding Officer of NAS Whidbey Island. The NRM can call upon other environmental professionals within the Navy Region Northwest, as well as the Naval Facilities Engineering Command Northwest, to assist in the management of natural resources on NAS Whidbey Island. The NRM will integrate environmental protection, conservation, enhancement/restoration, and outdoor recreation within the constraints of NAS Whidbey Island's military mission. At the same time, the NRM will identify risks to the environment that may result from military activities and report these potential risks to the Command so that alternatives may be developed that reduce or eliminate the potential impacts.

This document is designed to support the military mission by meeting natural resource compliance requirements and by maintaining training lands for realistic training scenarios that can sustain impacts from those training activities. The document incorporates natural resources goals and objectives to provide mission support that should be integrated with military mission planning. Successful implementation of this INRMP requires close coordination between the installation natural resources manager, military operators and facilities planners that use and maintain the facility. This document has been reviewed by the military operators and facilities planners that manage NAS Whidbey Island. All natural resource future projects and actions will be coordinated with installation operations and facilities sustainment planners.

3.2 Compliance with Federal Requirements

3.2.1 Threatened and Endangered Species Consultation

Federal agencies are required by Section 7(a)(1) of the Endangered Species Act (ESA) to manage federally listed threatened and endangered (T&E) species and their habitat in a manner that promotes conservation of T&E species and is consistent with plans for recovery of such species. Section 7(a)(2) of the ESA requires all federal agencies to enter into consultation with the USFWS and NOAA Fisheries (also known as National Marine Fisheries Service, or NMFS) whenever proposed actions "may effect" listed T&E species of plants and animals.

Special management and protection is a term originating in the definition of Occupied Critical Habitat (OCH) in Section 3 of the Endangered Species Act. For Occupied Critical Habitat, it is necessary to determine if:

a. The area contains the physical and biological features essential to the conservation of the species, and

b. The area has or needs additional special management or protection.

Additional special management is not required if adequate management or protection is already in place.

This INRMP is meant to be used as a tool to identify the potential impacts of current or planned Navy actions on endangered or threatened species at an early stage and to provide a basis for analyzing and altering the course of action to prevent or minimize those impacts.

The FY 2004 National Defense Authorization Act (NDAA) modified the critical habitat provision in the ESA to allow an approved INRMP to be used by the Department of the Interior in lieu of a critical habitat designation which can be more effective than the critical habitat designation because they provide a more holistic approach to species conservation while maintaining coordination with the FWS and all interested stakeholders.

3.2.2 Essential Fish Habitat Consultation

The Magnuson-Stevens Fishery Conservation and Management Act, as amended in October 1996, requires that federal agencies consult with the U.S. Secretary of Commerce (which has been delegated to NMFS) on any action proposed to be undertaken that may adversely affect essential fish habitat (EFH). The objective of this EFH assessment is to determine whether or not the proposed project may adversely affect designated EFH for relevant commercial, federally managed fish species within the proposed action area. It also describes conservation measures proposed to avoid, minimize, or otherwise offset potential adverse effects to designated EFH resulting from the proposed project. Subsection 50 CFR 600.920(f) specifies that EFH consultation should be consolidated with existing environmental review procedures required by other statutes, such as ESA, when appropriate.

Consultations for EFH will be conducted by NAS Whidbey Island in consistent with the CNO issued Navy Policy Regarding Essential Fish Habitat Assessments and Consultations issued 22 March 2001 (enclosure 1 or Ser N456M/11U1588080). The NAS Whidbey Island NRM will review all proposed projects, operations, and training plans for possible impacts to EFH (this process is described the above referenced policy). This INRMP is meant to be used as a tool to identify the potential impacts of current or planned Navy actions on EFH at an early stage and to provide a basis for analyzing and altering the course of action to prevent or minimize those impacts.

3.2.3 Planning for National Environmental Policy Act (NEPA) Compliance

The National Environmental Policy Act (NEPA) of 1969 (42 USC § 4321 et seq.) requires federal agencies to evaluate the impacts of their proposed actions on the quality of the human environment. The Navy's policies regarding NEPA, OPNAVINST 5090.1C, Chapter 2, dated 30 October 2007, Procedures for Implementing the National Environmental Policy Act (NEPA), SECNAVINST 5090.6A (SECNAV Instruction 5090.6A, Environmental Planning for Department of the Navy Actions, dated April 26, 2004), and Navy's Supplemental Environmental Planning Policy, dated 23 September 2004, echo NEPA and emphasizes environmental planning at the earliest stages of projects. The Navy recognizes that the NEPA process includes the systematic examination of the likely environmental consequences of implementing a proposed action. To be an effective decision-making tool, the Navy integrates the process with project planning at the earliest possible time. This ensures that planning and decision-making reflect environmental values, avoid delays, and avoid potential conflicts. The Navy is able to achieve its mission at home, at sea, and abroad more efficiently when environmental planning is properly integrated into Navy decision-making for those Navy actions that have the potential for adverse environmental consequences.

NEPA and Navy policy require early review and coordination for environmental considerations. This is achieved at NAS Whidbey Island by its environmental review process, which requires all new projects, programs, and operations, or changes to existing projects, programs, and operations, to be reviewed by the NRM for potential impacts to the environment, including potential impacts to natural resources. The NRM review planned actions, identifies the risks to natural resources, and provides

comments and/or alternatives to the action proponents that will minimize or eliminate the risks, if possible. The early review process also allows the NRM an opportunity to identify the appropriate NEPA documents that will be generated based on the proposed action and the alternatives.
NAS Whidbey Island natural resources projects and operations are not exempt from the review process, nor from the requirements of NEPA. Natural resource actions, must all be reviewed for environmental risks and impacts, the same as if the proposed action is a building project or a new training operation. Alternatives to proposed actions must be identified and investigated for projects. It is imperative that the Command initiate early environmental/natural resources review of proposed actions to assess risks, develop alternatives, and correctly identify costs.

Per Navy and DoD policy, INRMPs are planning documents subject to NEPA review and coordination. An environmental assessment was determined to be the appropriate level of NEPA documentation for this INRMP and the natural resources management actions proposed within it. The EA and signed Finding of No Significant Impact is attached in Appendix B and coordinating correspondence is attached in Appendix C.

3.2.4 Sikes Act/Sikes Act Improvement Act

The Sikes Act of 1960 initially authorized each DoD installation to develop a plan to manage and maintain wildlife, fish, and game conservation and rehabilitation. In 1997, Congress passed amendments to the original Sikes Act requiring DoD to prepare and implement an INRMP for each installation in the United States with “significant natural resources.” The SAIA requires DoD facilities to manage their natural resources so as to provide multiple uses and public access to the extent that it is consistent with the military mission. The SAIA also requires that all INRMPs and natural resources management actions are developed to ensure “no net loss” to the military mission and training activities. The Act provides a mechanism whereby DoD, the Department of Interior, and the state cooperate to manage fish and wildlife on military installations. A tripartite cooperative agreement, under the Sikes Act, for the management of natural resources and implementation of the integrated natural resources management plan on NAS Whidbey Island was developed and signed with the USFWS and WDFW in 1996. This current cooperative agreement is attached in Appendix D. Currently, the installation collects a $10 Sikes Act hunting permit fee to support the hunting program and natural resources management. Morale, Welfare and Recreation (MWR) acts as the cash collection agent for Sikes Act fee collection and is the general issuing office for a hunting permit. MWR charges an additional $3 administrative fee per hunting permit for this service. No Sikes Act permit fees are collected for fishing on the installation.

3.2.5 Bald and Golden Eagle Protection Act (PL 76-567), as Amended 16 USC 668 Et. Seq.

The Bald Eagle Protection Act was enacted in 1940; in 1962, Congress extended the Bald Eagle Protection Act to cover golden eagles. This Act prohibits the take, possession, sale, purchase, barter, offer to sell, purchase, or barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. “Take” is defined as to “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb” a bald or golden eagle. The term “disturb” under the Eagle Act was defined via a rule published in the *Federal Register* on June 5, 2007. “Disturb” means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. In 2009, the USFWS published a rule in the *Federal Register* (74 FR 46877) that issued regulations under the Act requiring a permit to “take” eagles. Part C of 50 CFR 22 lays out the requirements for eagle “take” permits. The Navy requires a permit if it takes any action that could intentionally or unintentionally disturb bald eagles as defined above. Adhering to the bald eagle management requirements of this INRMP is design to avoid disturbance for most actions. Actions that cannot adhere to those requirements must be evaluated for the potential to disturb and meet any determined permit requirements.

3.2.6 Migratory Bird Treaty Act (MBTA), USC § 703 Et. Seq.

The MBTA is a federal statute that implements US treaties with several countries for conserving and protecting migratory birds. The number of bird species covered by the MBTA is extensive and is listed at 50 CFR § 10.13. Further, the regulatory definition of "migratory bird" is broad and includes any mutation or hybrid of a listed species, as well as any part, egg, or nest of such bird (50 CFR § 10.12). Migratory birds are not necessarily federally listed endangered or threatened birds under the ESA. The MBTA, which is enforced by the USFWS, makes it unlawful "by any means or manner, to pursue, hunt, take, capture [or] kill" any migratory bird, except as permitted by regulation. "Take" is defined under the implementing regulations as "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture or collect". In July 2006, the DoD and the US Fish and Wildlife Service signed and entered into a Memorandum of Understanding (MOU) to promote the conservation of migratory birds in accordance with EO 13186 (see below). This MOU describes specific actions that should be taken by DoD to advance migratory bird conservation; avoid or minimize the take of migratory birds; ensure DoD operations – other than military readiness activities – are consistent with the Migratory Bird Treaty Act. The final rule, Migratory Bird Permits: Take of Migratory Birds by the Armed Forces, was published as 50 CFR Part 21, in the February 21, 2007 Federal Register, pages 8931-8950 and applies to military readiness activities that occur on the installation.

3.2.7 Federal Water Pollution Control Act (aka: Clean Water Act (CWA)), PL 92-500, 33 USC §§ 1251-1387

The primary objective of the Clean Water Act (CWA) is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251. The CWA regulates the discharge of pollutants into the navigable waters of the United States through several programs, including the National Pollutant Discharge and Elimination System (NPDES) permit program, encouraging States to address nonpoint source pollution, and pretreatment standards for discharges to wastewater treatment plants. Section 404 of the CWA establishes the Federal regulatory program that governs dredge and fill activities. In addition, section 404 is used as the primary means of protecting wetlands. Pursuant to section 301 of the Act, discharges of dredged or fill material into waters of the U.S., including adjacent wetlands, are illegal unless permitted or exempted from the permit requirement, pursuant to regulation issued under Section 404.

3.2.8 Tribal Treaty Rights and Tribal Coordination

NAS Whidbey Island properties lie within the lands ceded to the United States by the several federally recognized Tribes in the 1855 Treaties between the Tribes and the United States (12 Stat. 945). Article 1 of the Treaties reserves for the signatory Tribes certain rights within the ceded lands. It states:

> Provided, also, That the exclusive right of taking fish in the streams running through and bordering said reservation is hereby secured to said Indians, and at all other usual and accustomed stations in common with citizens of the United States, and of erecting suitable buildings for curing the same; the privilege of hunting, gathering roots and berries and pasturing their stock on unclaimed lands in common with citizens, is also secured to them.

The Navy manages NAS Whidbey Island natural resources subject to the rights of the signatory Tribes reserved in the Treaties of 1855, as well as those established by statutes, regulations, executive orders, court decisions, and other authorities. The Department of the Navy Policy for Consultation With Federally Recognized Tribes, dated October 11, 2005, provides that the Navy will "[c]onsult with representatives of federally recognized Tribal Governments as provided by law on all issues impacting Indian lands, protected tribal resources or rights under treaties, and issues of concern to Tribal Governments on DON lands[.]" Pursuant to this consultation policy, federally recognized Tribes with affiliation to NAS Whidbey Island properties or "usual and accustomed" fishing areas in waters adjacent to the installation were contacted regarding the development of the INRMP. Consultation will continue with those Tribes regarding the potential impacts of management activities on treaty reserved resources, historic and cultural properties, as well as other issues of concern. The Navy has an ongoing responsibility to consult with the Tribes on a government to government basis in recognition of tribal rights and tribal sovereignty.

This INRMP and management strategy, as well as proposed yearly funded natural resources management actions or projects, will be reviewed annually by the Sikes Act management partners and INRMP signatories. It is the Navy's intent to consult with and solicit input from federally recognized Tribes with affiliation to NAS Whidbey Island properties or "usual and accustomed" fishing areas in waters adjacent to the installation concerning these reviews each year prior to them being held.

3.3 Executive Orders (EO)

In addition to the laws discussed above, there are a number of other laws and regulations that must be considered in natural resources management.

3.3.1 EO 11990 – Protection of Wetlands

This EO states that federal agencies will avoid the destruction or modification of wetlands when there is a practicable alternative. Wetlands are defined in this EO as "…those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does (sic) or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and production. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds."

3.3.2 EO 11644 – Use of Off-Road Vehicles on Public Lands

This EO requires federal agencies to establish policies and provide for procedures to ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands. The EO clarifies agency authority to define zones of use by off-road vehicles on public lands by exempting fire, military, emergency, law enforcement, or combat/combat support vehicles.

3.3.3 EO 11987 – Exotic Species

To the extent permitted by law, federal agencies will restrict the introduction of exotic species into the natural ecosystems on lands and waters that they own, lease, or hold for purposes of administration, and they will encourage the states, local governments, and private citizens to prevent the introduction of exotic species into natural ecosystems of the United States.

3.3.4 EO 13112 – Invasive Species

To the extent permitted by law, federal agencies will prevent the introduction of invasive species, will detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner, will monitor such populations accurately and reliably, will provide for restoration of native species and habitat conditions in ecosystems that have been invaded, will conduct research on invasive species, and will promote public education on invasive species and the means to address them.

3.3.5 EO 13186 – Protection of Migratory Birds

Requires that federal executive agencies implement a memorandum of understanding (MOU) with the USFWS to avoid or minimize the negative impacts of agency actions on migratory birds and to take steps to protect migratory birds and their habitats. The DoD and USFWS have developed and signed (July 2006) an MOU to promote the conservation of migratory birds.

3.4 Public Access and Outreach

Persons authorized to use recreation areas on NAS Whidbey Island are all military and civilian employees of DoD and their dependents, relatives and guests, and retired military and their dependents, relatives, and guests. Sponsors must accompany dependents, relatives, and guests. General civilian use is allowed only on the Seaplane Base as part of the pheasant hunting program operated under WDFW regulations and requirements.

Public outreach regarding natural resources is typically through combined efforts of the NAS Whidbey Island Public Affairs Office and the natural resources program. Outreach activities include participation, when available, with Earth Day events and invited presentations to local officials, schools and newspapers.

3.5 Encroachment Issues and Potential Encroachment Partnering

Much of NAS Whidbey Island properties are currently bordered by rural development and agricultural lands except for the western Seaplane Base which abuts the City of Oak Harbor. NAS Whidbey Island's natural resources management program attempts to coordinate with other adjacent land management agencies such as the Whidbey/Camano Land Trust, The Nature Conservancy and Washington Department of Natural Resources to help address regional resource issues to address regional management issues.

Agricultural development immediately adjacent to NAS Whidbey Island's boundaries can be consistent with military operations because of the low density nature of the use and the lack of noise receptors. However, in recent years there have been many incompatible development proposals that have occurred in and around NAS Whidbey Island, especially near Ault Field. Incompatible development adjacent to the main airfield at Ault Field and near the auxiliary landing strip at OLF Coupeville can have direct impacts to military training by causing air space constraints around the installation and on nearby low level aircraft routes.

Navy personnel will continue to partner and work with the local community to prevent incompatible development proposals on and around NWSTF Boardman to maintain a viable military training asset for current and future missions. The Encroachment Partnering program can be used to acquire restrictive use easements off-range to mitigate for external developments that could impact military mission uses of the range. The objective of encroachment partnering is to eliminate or relieve current or anticipated environmental restrictions that would or might otherwise restrict, impede, or otherwise interfere, whether directly or indirectly, with current or anticipated military training, testing, or operations on the installation (10 USC 2684a(a)(2)(B)). Encroachment Partnering is specifically the authority granted by OPNAVINST 11010.40 through 10 USC 2684a to acquire easements to resolve encroachment issues or acquire habitat conservation easements to conserve sensitive species or habitat off of military training ranges. The Navy has acquired off-site conservation easements in the past and will continue to identify additional beneficial easement acquisition. The main purpose of this INRMP is to manage natural resources on Navy owned lands at NAS Whidbey Island. Natural resources personnel will continue to work with Navy encroachment planners to identify natural resource based encroachment issues and potential off-site conservation easements that could benefit management of regional species and habitat.

3.6 State Threatened, Endangered, and Sensitive Species Coordination

The Sikes Act requires that the Navy partner with state fish and wildlife agencies to manage resources on each installation. At NAS Whidbey Island, the Natural Resources Manager will inform the appropriate Washington Department of Fish and Wildlife manager about Navy actions that may affect fish and wildlife on the installation. This informational mechanism is more informal than the federal process, but yields the same results: identification of potential impacts of planned Navy actions on fish and wildlife, including state listed species, and provides an opportunity for an information exchange with state fish and wildlife experts that can provide a basis for altering the action to prevent or minimize those impacts.

3.7 State Comprehensive Wildlife Conservation Strategy (CWCS)

WDFW developed its CWCS in September 2005. A goal of this INRMP is to support the objectives of and to help advance the Washington CWCS as much as possible. NAS Whidbey Island's natural resources management strategies, as described in this INRMP, do not conflict with the Washington's conservation strategies and incorporate the locally specific Conservation Actions that are applicable to NAS Whidbey Island habitats and species (as identified in Table 3-1). The priority habitats of the Puget Trough Ecoregion found on NAS Whidbey Island include: marine nearshore, westside grasslands, westside oak woodlands, westside riparian-wetlands, herbaceous wetlands and westside lowland conifer-hardwood forest. As a stakeholder in the management of natural resources on the installation, WDFW works closely with NAS Whidbey Island on various fish and wildlife conservation issues, ranging from on-site habitat protection to invasive species control, and also cooperates with the installation on developing and conducting wildlife and habitat research and surveys.

Table 3-1. Conservation Actions Identified in the 2005 Comprehensive Wildlife Conservation Strategy.

Puget Trough Ecoregion Actions
Assess and map important habitats and areas of high biodiversity in the ecoregion using ecoregional assessments, Interagency Vegetation Mapping Project, and other habitat inventories and plans. Update Ecoregional Assessments every five years.
Identify and assess key connectivity areas and wildlife corridors between fragmented habitats and between protected areas. Restore habitat connectivity and wildlife corridors where appropriate on both public and private lands.
Conduct hydrologic studies that include water quantity and chemical budgets at wetlands known to be supporting rare and endangered species. Use this information to inform management.
Identify important habitats for restoration and assess the feasibility of successfully restoring these sites.
Inventory of important grassy and herbaceous balds. Work with land management agencies and private landowners to protect these habitats from disturbance and development.
Monitor the population trends of marbled murrelet and bull trout.
Conduct periodic surveys of sensitive species including common loon and great blue heron.

Puget Trough Ecoregion Actions
Complete a systematic inventory of all shoreline areas to document existing surfsmelt and Pacific sand lance spawning areas.
Complete mapping of all kelp and eelgrass beds.
Identify roosting sites for Pacific Townsend's big-eared bat and limit access to these areas. Protect and conserve preferred roost and hibernacula sites.
Protect land around large great blue heron colonies.
Preserve all naturally occurring surfsmelt spawning sites by protecting overhanging, shading canopies from marine-riparian zone forests bordering the beaches.
Maintain healthy Pacific sand lance spawning habitat by preserving erosional sediment inputs and preventing shoreline armoring.
Encourage reforestation of degraded marine shorelines where possible to restore surfsmelt spawning habitat.
Rehabilitate and restore stream channels, floodplain functions, riparian habitat and connectivity where streams have been diverted, fragmented, or degraded.
Identify and protect all remaining high quality prairie/woodland mosaic and low elevation mature conifer-hardwood forest.
Protect and restore oak and oak/conifer woodlands, oak savannah and oak/grassland Ecotones.
Continue programs to control and eradicate *Spartina* spp. to protect habitat value for wildlife.
In semi-native grasslands, control habitat-modifying invasive species such as Scot's broom, pasture grasses and blackberries.
Avoid introduction of non-native fish in fishless lakes and where species of conservation concern occur such as bull trout, native amphibians, and reptiles. Avoid introduction of non-native trout to protect bull trout from hybridization, competition, and predation.
Protect Townsend's big-eared bats and nesting areas of peregrine falcon, great blue heron, and bald eagle through use and access restrictions on public lands as needed,
Work with other agencies to reduce and remediate sources of contaminants entering Puget Sound to protect southern resident killer whale, Pacific harbor porpoise, greater scaup, brant, long-tailed duck, scoters, bald eagle, peregrine falcon, copper rockfish, and quillback rockfish.
Protect nesting bald eagle by maintaining buffer zones during nesting.
Manage wetland areas on public land for both high water quality and habitat value. Ensure that the water quality of inflow does not lead to deterioration of the wetland habitat.
Develop education program targeted to minimizing disturbance of great blue heron colonies during breeding period.
Develop education program targeted to reduce disturbance of southern resident killer whale, common loon, bald eagle, black oystercatcher, common murre, Cassin's auklet, brant, scaup, and western grebe by boaters, kayakers, fishermen, and low flying aircraft.
Engage and involve local and tribal governments, state and federal agencies, organizations, and citizens in efforts to protect and restore priority habitats and species through a variety of outreach projects, programs, and education efforts.

4.0 MANAGEMENT OF NATURAL RESOURCES ELEMENTS

4.1 Personnel

The fundamental components of natural resources management are personnel and funding. OPNAVINST 5090.1C requires each Installation Commanding Officer (ICO) to designate in writing a Natural Resources Manager (NRM). This individual is to be educated, knowledgeable, and trained in the particular resource issues for the installation. The NRM for NAS Whidbey Island is a permanently funded position, assigned to the NAVFAC Northwest Public Works Department, Environmental Division located at NAS Whidbey Island. The NRM reports to the Installation Environmental Program Director of NASWI as well as the ICO. The NRM can call upon other environmental professionals within the Navy Region Northwest, as well as the Naval Facilities Engineering Command Northwest, to assist in the management of natural resources on NAS Whidbey Island.

4.2 Climate Change and the Management of Natural Resources

The timeframe for potential future climate changes described in Section 2.3.1.1 is past the general duration of this management plan. However, it can be expected that those changes will incrementally happen over time. Therefore, some changes in climate and the physical environment will occur during the duration of this INRMP, but likely less than predicted in Section 2.3.1.1. Those changes will alter the conditions that the current natural resource assemblages face today which could force changes in the current habitats and species distributions around Puget Sound and on NAS Whidbey Island properties. Increased temperatures, altered precipitation rates, and sea level rise will likely lead to drier summers, reduced snowfall, more frequent and severe weather events, increased frequency and severity of wildfires, and increased severity and frequency of coastal flooding (WDOE 2012). Also, sea level rise and storm surge will increase the frequency and severity of flooding, erosion, and seawater intrusion; thus increasing risks to coastal ecosystems. Increased ocean acidity will affect marine ecosystems (especially shellfish) and warmer marine temperatures could alter the magnitude, frequency, and duration of harmful algal blooms that cause harmful effects to animals (WDOE 2012).

Climate change and the above affects will likely increase the stress on species that are already sensitive or vulnerable and will reduce the potential for their recovery and protection. Climate change is expected to affect ecosystems, species, and habitats by causing degradation and loss of current habitat types, increase in major ecosystem disturbances, shifts in geographical ranges of some native plants and animals, change in timing of life history events for plants and animals, declines in current species populations and some colonizing of new species with and overall loss of biodiversity, and spread of invasive species and disease (WDOE 2012).

The recommended management actions within this plan are based on current and near-term foreseeable conditions. One of the tenants of this INRMP is adaptive management. As changes occur and emergent issues develop, current management actions will be reevaluated and additional management changes will be incorporated into this plan during annual updates.

Management within this INRMP is designed to support and restore habitat quality on the installation and to maintain connections between habitats within and adjacent to the installation. This will help to maintain habitat migratory corridors which will assist the movement of species that will need to occur as habitats change. This plan is designed to integrate with other regional initiatives to address climate change. The Navy will monitor, coordinate with, and integrate actions and recommendations from regional climate change initiatives such as the Pacific Northwest Vulnerability Assessment.

4.3 Threatened and Endangered Species Management

The Endangered Species Act (ESA) requires federal agencies to manage federally listed threatened and endangered (T&E) species and their habitat in a manner that promotes conservation of T&E species and is consistent with plans for recovery of such species. Section 7 of the ESA requires all federal agencies to enter into consultation with the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) whenever actions are proposed that may affect listed and proposed T&E species of plants and animals. The FY 2004 National Defense Authorization Act (NDAA) modified the critical habitat provision in the ESA to allow an approved INRMP to be used by the Department of the Interior in lieu of a critical habitat designation.

This INRMP will be used as a tool to identify at an early stage the potential impacts of planned Navy actions on endangered or threatened species and their habitats and to provide a basis for altering the action to prevent or minimize those impacts.

Special Management and Protection of T&E Species

Adequate special management or protection is provided by a legally operative plan (the Navy uses the term "Integrated Natural Resources Management Plan", or INRMP) that addresses the maintenance and improvement of the primary constituent elements important to the species and manages for the long-term conservation of the species. This management section of the INRMP is developed following the intent of the FY 2004 NDAA to meet the management needs of federally listed species on NAS Whidbey Island providing the basis for exempting critical habitat designations on NAS Whidbey Island owned properties. The scope of this INRMP covers all lands and adjacent tide lands (down to the extreme low tide line) owned, controlled and managed by NAS Whidbey Island. The Navy uses the following three criteria to determine if a plan provides adequate special management or protection:

Criteria 1. Conservation Benefit

The plan provides a conservation benefit to the species: The 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 conservation of the species]. A conservation benefit may result from reducing fragmentation of habitat, maintaining or increasing populations, insuring against catastrophic events, enhancing and restoring habitats, buffering protected areas, or testing and implementing new conservation strategies.

Criteria 2. Implementation of the Plan

The plan provides assurances that the management plan will be implemented: Persons charged with plan implementation are capable of accomplishing the 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 the necessary authorizations or approvals. The plan provides a conservation effort implementation schedule, including completion dates.

Criteria 3. Management Effectiveness

The plan provides assurances that the conservation effort will be effective: The following criteria will be considered when determining the effectiveness of the conservation 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 conservation effort. This goal will be accomplished at the annual INRMP review and update in coordination with the appropriate federal and state agencies; and (5) a duration sufficient to implement the plan and achieve the benefits of its goals and objectives. The INRMP for Naval Air Station Whidbey Island is a five-year plan, beginning with FY 2013, but may be extended further than five years if installation mission or natural resources do not change, or changes are minimal and the plan is annually reviewed and updated. This is a time period long enough to seek funding for projects, implement those projects, and monitor and report progress. At the end of the five-year period the INRMP will be reviewed and updated or rewritten, as necessary, to continue protection and enhancement for T&E species and habitats.

4.3.1 Golden Paintbrush

On June 11, 1997, the USFWS designated golden paintbrush as threatened under the ESA (FR 62[112]: 31740-31748; effective date July 11, 1997). On NAS Whidbey Island, Golden paintbrush is found only on Forbes Point of the Seaplane Base. The primary management objectives are to conserve the known existing population of golden paintbrush and to monitor for additional occurrences of the plant species.

The installation will continue to maintain an approximately 10-acre management area for golden paintbrush on Forbes Point of the Seaplane Base (see Figure 2-26). The area is on Forbes Point, south and east of the Maylor Point housing area and extends to the east to the road that runs along the east bluff and extends to the south to the buff edge. Ongoing management efforts include maintaining a fence around the population, mowing and hand-cutting competing shrubs from the area, and outplanting nursery grown plants from seeds previously collected onsite. Figure 4-1 shows recent golden paintbrush management actions and the plant population extent on Forbes Point.

Critical Habitat

No critical habitat has been evaluated or designated for golden paintbrush.

Golden Paintbrush Habitat Special Management and Protection Requirements

Criteria 1. Conservation Benefit

Maintain and protect the existing golden paintbrush management area on Forbes Point at the Seaplane Base. This will be accomplished by:

- maintaining and improving the fence that surrounds the golden paintbrush area, to exclude both people (potential to trample or pick plants) and animals, such as seed-eating rodents;
- changing the wording of the signs that that are posted around the perimeter to "authorized personnel only";
- annually, or more frequently, inspect the golden paintbrush area for competing plants such as Nootka rose, Himalayan blackberry, Scotch broom, or other plants that may compete for nutrients and shade out the paintbrush;
- maintaining a mowing regime for the paintbrush management area to control competing vegetation. Mow twice a year to control vegetation. Mow once in the fall after paintbrush seed dispersal (around September) and again in the early spring before paintbrush emergence (around February or early March). Mowing needs to be accomplished both inside on outside the fenced enclosure. If needed, the enclosure fence should be modified to allow access for a small tractor and brush hog.

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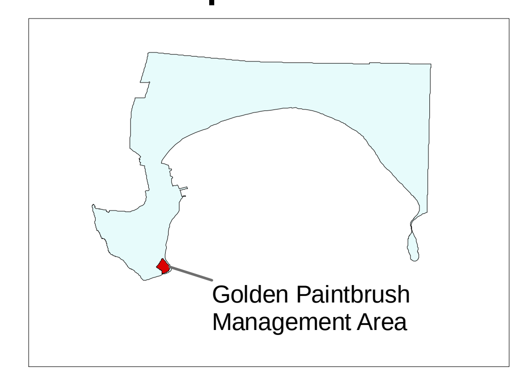
NAS Whidbey Island INRMP
Seaplane Base

Figure 4-1
Golden Paintbrush Management

LEGEND

- Installation Boundary
- Roads
- 2004 External Plant Locations
- Exclosure Compound Fence
- TNC Planting Areas
- UW Planting/Study Areas
- 2004 Population Area Perimeter
- 1992 Population Area Perimeter

Seaplane Base



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- implementing additional augmentation outplantings. Augmentation planting should occur after competing vegetation is controlled and should use local genetic stock grown from Forbes Point seeds.
- preventing the use of herbicides inside the established 10-acre management area, except for specific golden paintbrush management actions;
- providing access to the site to qualified researchers, Washington Department of Natural Resources (WDNR) and USFWS personnel;
- ensuring that all proposed actions that potentially affect (including beneficially affect) golden paintbrush comply with Section 7 of the Endangered Species Act which requires, at a minimum, informal consultation with USFWS;
- implementing additional habitat management actions that are identified in the future to enhance the golden paintbrush population (such as control burns, scarifying the soil, herbicide control of competing vegetation, etc.). A previous control burn of the management area showed a positive response to plant numbers the following year. If plant number continue to remain low or competing vegetation isn't controlled well by mowing alone, an additional control burn would be needed to increase numbers and help control competing vegetation;
- cooperating with USFWS to implement the Recovery Plan for the Golden Paintbrush (USFWS 2000).

Criteria 2. Implementation of the Plan

Implement management goals and protection. This will be accomplished by:

- the NAS Whidbey Island Environmental Division funds and staffs a permanent, full-time ecologist position that is charged with implementing the above management criteria for golden paintbrush;
- the NAS Whidbey Island Environmental Division has the authority to implement maintenance and protection plans and obtain all the necessary authorizations or approvals for proposed management actions;
- the Navy will continue to seek annual funding for protection and maintenance of golden paintbrush habitat (see Appendix A for specific projects);
- the NAS Whidbey Island Environmental Division will regularly meet with the station command and departments to ensure that proposed new missions, or changes to existing missions, use alternate locations away from Forbes Point.

Criteria 3. Management Effectiveness

Evaluate effectiveness of the management goals and protection. This will be accomplished by:

- annually monitoring the health of individual plants and/or the site as a whole;
- in cooperation with WDNR, annually monitoring the growth and areal spread or reduction of golden paintbrush at the Forbes Point site: this will be accomplished by mapping the boundaries of the paintbrush area, counting individual plant in the known occupied area, and searching for plants outside the fenced area.

4.3.2 Puget Sound Chinook Salmon

On March 24, 1999, NMFS listed the Puget Sound Chinook salmon as Threatened, including native Chinook populations as well as naturally spawned populations within the boundaries of Puget Sound that originated from hatchery stock. This status was reaffirmed on June 28, 2005 (FR 70 [123]: 37160-37204; effective date August 29, 2005).

Critical Habitat

Critical habitat for Chinook salmon was designated, on September 2, 2005 (NOAA 2005b). Critical habitat extends to -30' MLLW. Designated critical habitat included current freshwater and estuarine range, certain marine areas, and all waterways, substrate, and adjacent riparian zones below longstanding, impassible, natural barriers. Critical habitat designation was excluded on NAS Whidbey Island owned, controlled and management lands and tide lands (down to the extreme low tide line, -4.5' MLLW) based on implementation of an existing INRMP. Critical habitat designation was also excluded from water-restricted areas off Ault Field, military training waters off Lake Hancock, and Crescent Harbor off the Seaplane Base based on probable national security impacts.

Chinook Salmon Special Management and Protection Requirements

Criteria 1. Conservation Benefit

NAS Whidbey Island will ensure that all proposed actions that potentially affect (including beneficially affect) Puget Sound Chinook salmon comply with Section 7 of the Endangered Species Act which requires, at a minimum, informal consultation with NOAA Fisheries; this includes emergency repairs to structures and other activities that are required by the installation's mission.

NAS Whidbey Island will ensure that all proposed routine construction and repair activities that will take place below the MHHW line be restricted to the approved in-water work time for salmon and bull trout (July 16 through February 15) for Tidal Reference Area 8.

The NRM will identify operations and infrastructure that could affect water quality (example: storm drains that release directly to marine waters; pesticide applications near intermittent streams) and coordinate with the command and NAS Whidbey Island departments to minimize or eliminate releases to marine waters. The NRM, under the direction of the IEPD, will provide assistance if required to the development of spill prevention, control, and countermeasures for the facility and for operations. The NRM or designated staff will regularly inspect any structures that extend below the MHHW line and keep the structures free of debris or other materials that could hinder juvenile salmon movement along the shoreline.

NAS Whidbey Island and/or WDFW annually conduct forage fish spawning surveys along the shorelines of the installation. Identification of these important habitat areas allows for better management and protection, thus benefiting salmon that feed on these species.

NAS Whidbey Island annually conducts beach cleanups that remove debris and contaminant sources, benefiting migrating and foraging Puget Sound Chinook salmon. These clean-up projects utilize volunteer Navy personnel that have the added benefit of promoting pride and environmental stewardship amongst the sailors.

NAS Whidbey Island, with Washington Department of Agriculture and Washington Department of Fish and Wildlife, annually conducts spartina (invasive non-native species) eradication in tidal areas, as needed; this benefits salmon by removing the tight clumps of vegetation and allowing the natural vegetative conditions to return, which salmon use as foraging and refuge habitat.

Criteria 2. Implementation of the Plan
NAS Whidbey Island annually funds and staffs the NRM position. The NRM is responsible for implementation of the INRMP. The NRM may call upon environmental planners and specialists within NAVFAC NW to assist in conservation and environmental compliance requirements. The NRM has the authority to implement maintenance and protection plans and obtain all the necessary authorizations or approvals for proposed management actions.

The NRM annually develops projects and seeks funding for natural resources management issues, including habitat enhancement projects and special projects to assist in the recovery of T&E species, as circumstances require. The NRM will regularly meet with the installation's command and departments to ensure that proposed new or changed operations and missions consider Puget Sound Chinook salmon protection measures.

Criteria 3. Management Effectiveness
The NRM or designated staff will do the following as needed: coordinate with WDFW and NMFS to conduct at least two surveys along NAS Whidbey Island's shorelines for Puget Sound Chinook salmon presence; conduct one survey in FY 2014 and one survey in FY 2016 to determine change over time (see Appendix A, T&E-1 project), which will assist managers in assessing the effectiveness of the plan (surveys can be performed more frequently if necessary); during the annual review of the INRMP, consult with WDFW and NMFS staff to identify necessary changes to the plan that would benefit Puget Sound Chinook salmon.

4.3.3 Bull Trout
On November 1, 1999, the USFWS designated bull trout in the Coastal-Puget Sound region as threatened under the ESA (FR 64[210]: 58910-58933; effective date December 1, 1999).

Since the habitat used by bull trout on NAS Whidbey Island (marine intertidal zone from MHHW to the extreme low tide line) is identical to Chinook salmon at NAS Whidbey Island, the special management and protection measures are the same as for Chinook salmon.

Critical Habitat
On October 18, 2010, USFWS published a revised Critical Habitat designation for bull trout that includes certain marine waters within Washington State (75 FR 63898-64070). Critical habitat for bull trout has been designated in the Deception Pass area of Whidbey Island to the north and down through Saratoga Passage along the east side of Whidbey Island. Critical habitat designation was excluded on NAS Whidbey Island owned, controlled and management lands and tide lands (down to the extreme low tide line, -4.5' MLLW) based on implementation of an existing INRMP. Critical habitat designation was also excluded from Crescent Harbor off the Seaplane Base based on probable national security impacts.

Bull Trout Special Management and Protection Requirements

Criteria 1. Conservation Benefit
NAS Whidbey Island will ensure that all proposed routine construction and repair activities that will take place below the MHHW line be restricted to the approved in-water work time for bull trout and salmon (July 16 - February 15) in Tidal Reference Area 8.

This is the same as the Criteria 1 section for Puget Sound Chinook salmon, described in Section 4.3.2.

Criteria 2. Implementation of the Plan
This is the same as the Criteria 2 section for Puget Sound Chinook salmon, described in Section 4.3.2.

Criteria 3. Management Effectiveness
This is the same as the Criteria 3 section for Puget Sound Chinook salmon, described in Section 4.3.2 with the inclusion of bull trout in the proposed nearshore fish surveys (see Appendix A, T&E-1 survey project).

4.3.4 Puget Sound Steelhead
The Puget Sound Distinct Population Segment (DPS) of steelhead was listed as threatened on May 11, 2007 (72 FR 26722).

Since the habitat used by steelhead on NAS Whidbey Island (marine intertidal zone from MHHW to the extreme low tide line) is identical to Chinook salmon at NAS Whidbey Island, the special management and protection measures are the same as for Chinook salmon.

Critical Habitat
Critical habitat for Puget Sound steelhead was proposed on January 15, 2013 (Federal Register 75[9]: 2725-2796). NMFS considered marine areas in Puget Sound for potential steelhead critical habitat, but concluded the best available information suggests there are no marine areas, which meet the ESA definition of critical habitat. The proposed ruling designated occupied riverine habitat as Puget Sound steelhead critical habitat, but no major streams occur on NAS Whidbey Island. NMFS determined only three DoD installations overlap with streams occupied by Puget Sound steelhead and NAS Whidbey Island was not one of them.

Steelhead Special Management and Protection Requirements

Criteria 1. Conservation Benefit
NAS Whidbey Island will ensure that all proposed routine construction and repair activities that will take place below the MHHW line be restricted to the approved in-water work time for bull trout and salmon (July 16 - February 15) in Tidal Reference Area 8.

This is the same as the Criteria 1 section for Puget Sound Chinook salmon, described in Section 4.3.2.

Criteria 2. Implementation of the Plan
This is the same as the Criteria 2 section for Puget Sound Chinook salmon, described in Section 4.3.2.

Criteria 3. Management Effectiveness
This is the same as the Criteria 3 section for Puget Sound Chinook salmon, described in Section 4.3.2 with the inclusion of steelhead in the proposed nearshore fish surveys (see Appendix A, T&E-1 survey project).

4.3.5 Southern DPS of North American Green Sturgeon
The Southern DPS of North American green sturgeon was listed as threatened on April 7, 2006.

Since the habitat used by green sturgeon on NAS Whidbey Island (marine intertidal zone from MHHW to the extreme low tide line) is likely identical to Chinook salmon at NAS Whidbey Island, the special management and protection measures are the same as for Chinook salmon.

Critical Habitat

On October 9, 2009, NMFS designated critical habitat for the green sturgeon in the following specific areas, known to be presently occupied by the listed species: coastal U.S. marine waters from MLLW to 60 fathoms (fm) depth from Monterey Bay, California (including Monterey Bay), north to Cape Flattery, Washington, including the Strait of Juan de Fuca to its United States boundary. This includes the Westside of Whidbey Island along Ault Field. Critical habitat designation was exempted in the designated military restricted areas along Ault Field based on probable national security impacts.

Green Sturgeon Special Management and Protection Requirements

Criteria 1. Conservation Benefit

NAS Whidbey Island will ensure that all proposed routine construction and repair activities that will take place below the MHHW line be restricted to the approved in-water work time for bull trout and salmon (July 16 - February 15) in Tidal Reference Area 8.

This is the same as the Criteria 1 section for Puget Sound Chinook salmon, described in Section 4.3.2.

Criteria 2. Implementation of the Plan

This is the same as the Criteria 2 section for Puget Sound Chinook salmon, described in Section 4.3.2.

Criteria 3. Management Effectiveness

This is the same as the Criteria 3 section for Puget Sound Chinook salmon, described in Section 4.3.2 with the inclusion of green sturgeon in the proposed nearshore fish surveys (see Appendix A, T&E-1 survey project).

4.3.6 Rockfish

NOAA NMFS formed a Biological Review Team in response to a petition and letter submitted in 2007 to list DPSs of bocaccio (*Sebastes paucispinis*), canary rockfish (*S. pinniger*), yelloweye rockfish (*S. ruberrimus*), greenstriped rockfish (*S. elongatus*), and redstripe rockfish (*S. proriger*) in Puget Sound as endangered or threatened species under the ESA and to designate critical habitat (70 FR 18516). After a review, three of the five Puget Sound rockfish (bocaccio, canary rockfish and yelloweye rockfish) were federally listed under the ESA. Threats to bocaccio, yelloweye rockfish, and canary rockfish include areas of low DO, mortality associated with fishery bycatch, the reduction of kelp habitat necessary for juvenile recruitment, habitat disruption, derelict gear, climate changes, species interactions (including predation and competition), diseases, and genetic changes. The combination of these factors, in addition to the rockfish's particular life history traits, has contributed to declines in the species within Georgia Basin and Puget Sound (75 FR 22276).

Since the habitat used by rockfish on NAS Whidbey Island (marine intertidal zone from MHHW to the extreme low tide line) is likely similar to Chinook salmon at NAS Whidbey Island, the special management and protection measures are the same as for Chinook salmon.

4.3.6.1 Bocaccio

The Puget Sound/Georgia Basin Distinct Population Segment (DPS) of bocaccio was listed as endangered on April 28, 2010 (75 FR 22276). The designation area of Puget Sound/Georgia Basin encompasses the inland marine waters east of the central Strait of Juan de Fuca and south of the northern Strait of Georgia.

Critical Habitat

Critical habitat designation for the bocaccio of the Puget Sound Georgia Basin was proposed on August 6, 2013 (Federal Register 78[151]: 47635-47669). The proposed language excludes DoD installations with current INRMPs from the proposed designation. The NAS Whidbey Island INRMP has been reviewed by NMFS, who determined the conservation measures provide adequate protection to the bocaccio species.

4.3.6.2 Canary Rockfish

The Puget Sound/Georgia Basin Distinct Population Segment (DPS) of canary rockfish was listed as threatened on April 28, 2010 (75 FR 22276). The designation area of Puget Sound/Georgia Basin encompasses the inland marine waters east of the central Strait of Juan de Fuca and south of the northern Strait of Georgia.

Critical Habitat

Critical habitat designation for canary rockfish of the Puget Sound Georgia Basin was proposed on August 6, 2013 (Federal Register 78[151]: 47635-47669). The proposed language excludes DoD installations with current INRMPs from the proposed designation. The NAS Whidbey Island INRMP has been reviewed by NMFS, who determined the conservation measures provide adequate protection to the canary rockfish species.

4.3.6.3 Yelloweye Rockfish

The Puget Sound/Georgia Basin Distinct Population Segment (DPS) of yelloweye rockfish was listed as threatened on April 28, 2010 (75 FR 22276). The designation area of Puget Sound/Georgia Basin encompasses the inland marine waters east of the central Strait of Juan de Fuca and south of the northern Strait of Georgia.

Critical Habitat

Critical habitat designation for yelloweye rockfish of the Puget Sound Georgia Basin was proposed on August 6, 2013 (Federal Register 78[151]: 47635-47669). The proposed language excludes DoD installations with current INRMPs from the proposed designation. The NAS Whidbey Island INRMP has been reviewed by NMFS, who determined the conservation measures provide adequate protection to the yelloweye rockfish species.

Rockfish Special Management and Protection Requirements

Criteria 1. Conservation Benefit

NAS Whidbey Island will ensure that all proposed routine construction and repair activities that will take place below the MHHW line be restricted to the approved in-water work time for to protect juvenile rockfish which would be determined in consultation with NMFS on a project by project basis.

With the exception of the different construction window, the additional action are the same as the Criteria 1 section for Puget Sound Chinook salmon, described in Section 4.3.2.

Criteria 2. Implementation of the Plan
This is the same as the Criteria 2 section for Puget Sound Chinook salmon, described in Section 4.3.2.

Criteria 3. Management Effectiveness
This is the same as the Criteria 3 section for Puget Sound Chinook salmon, described in Section 4.3.2 with the inclusion of rockfish in the proposed nearshore fish surveys (see Appendix A, T&E-1 survey project).

4.3.7 Southern Resident Killer Whale

Southern Resident Killer Whales (SRKW), a subpopulation of *Orcinus orca*, are listed as endangered under the ESA. Factors that are thought to contribute to the decline of the SRKW population include prey availability, human-generated noise, vessel presence/harassment, and chemical contamination (NMFS 2005b, c).

Critical Habitat
On November 29, 2006, Critical Habitat for SRKW was designated, with the exclusion of the waters within the boundaries of Department of Defense managed lands and waters (FR 71[229]: 69054-69070; effective date December 29, 2006).

Southern Resident Killer Whale Special Management and Protection Requirements

Criteria 1. Conservation Benefit
The NAS Whidbey Island Command will ensure that all proposed actions at the installation that potentially affect (including beneficially affect) Southern Resident Killer Whales comply with Section 7 of the Endangered Species Act which requires, at a minimum, informal consultation with NOAA Fisheries.

Criteria 2. Implementation of the Plan
This is the same as the Criteria 2 section for Puget Sound Chinook salmon, described in Section 4.2.2.

Criteria 3. Management Effectiveness
The NRM or designated staff will do the following: record areas of use in the waters surrounding NAS Whidbey Island by killer whales and use the information to update the INRMP and also provide management guidance to NAS Whidbey Island's command and departments.

4.3.8 Humpback Whale

Humpback whales have been protected since 1965, and are currently listed as Endangered under the ESA.

Critical Habitat
Critical habitat has not been designated for the humpback whale.

Humpback Whale Special Management and Protection Requirements

Criteria 1. Conservation Benefit
The NAS Whidbey Island Command will ensure that all proposed actions at the installation that potentially affect (including beneficially affect) humpback whales comply with Section 7 of the Endangered Species Act which requires, at a minimum, informal consultation with NOAA Fisheries.

Criteria 2. Implementation of the Plan
This is the same as the Criteria 2 section for Puget Sound Chinook salmon, described in Section 4.2.2.

Criteria 3. Management Effectiveness
The NRM or designated staff will do the following: record areas of use in the waters surrounding NAS Whidbey Island by humpback whales and use the information to update the INRMP and also provide management guidance to NAS Whidbey Island's command and departments.

4.3.9 Marbled Murrelet

Marbled murrelets were listed as threatened under the ESA on October 1, 1992 (FR 57[19]: 45328-45337; effective date September 28, 1992).

Critical Habitat
Critical habitat has been designated for marbled murrelets but there is no designated Critical Habitat on or near NAS Whidbey Island property.

Marbled Murrelet Special Management and Protection Requirements

Criteria 1. Conservation Benefit
The NAS Whidbey Island Command will ensure that all proposed actions at the installation that potentially affect (including beneficially affect) marbled murrelets comply with Section 7 of the Endangered Species Act. This requires, at a minimum, informal consultation with USFWS. This includes emergency repairs to structures and other activities that are required by the installation's mission.

The NRM will identify operations and infrastructure that could affect water quality (example: storm drains that release directly to marine waters; pesticide applications near intermittent streams) and coordinate with the command and NAS Whidbey Island departments to minimize or eliminate releases to marine waters. The NRM, under the direction of the IEPD, will provide assistance if required to the development of spill prevention, control, and countermeasures for the facility and for operations.

NAS Whidbey Island annually conducts beach cleanups that remove debris and contaminant sources, which would benefit foraging marbled murrelets. These clean-up projects utilize volunteer Navy personnel that have the added benefit of promoting pride and environmental stewardship amongst the sailors.

NAS Whidbey Island, with Washington Department of Agriculture and Washington Department of Fish and Wildlife, annually conducts spartina (invasive non-native species) eradication in tidal areas, as needed.

Criteria 2. Implementation of the Plan
NAS Whidbey Island annually funds and staffs the NRM position. The NRM is responsible for implementation of the INRMP. The NRM may call upon environmental planners and specialists within NAVFAC NW to assist in conservation and environmental compliance requirements. The NRM has the authority to implement maintenance and protection plans and obtain all the necessary authorizations or approvals for proposed management actions.

The NRM annually develops projects and seeks funding for natural resources management issues, including habitat enhancement projects and special projects to assist in the recovery of T&E species, as circumstances require. The NRM will regularly meet with the installation's command and departments to ensure that proposed new or changed operations and missions consider marbled murrelet protection measures.

Criteria 3. Management Effectiveness

The NRM or designated staff will do the following: survey for and record areas of use by marbled murrelets, such as foraging areas along the shore, that may overlap with human activities, and use the information to update the INRMP and also provide management guidance to NAS Whidbey Island's command for planning military training activities at the installation and adjacent training areas (especially in Crescent Harbor).

4.3.10 Leatherback Sea Turtle

Leatherback sea turtles have been protected since 1970, and are currently listed as Endangered under the ESA.

Critical Habitat

Critical habitat for leatherback sea turtles has not been designated in Washington State.

Leatherback Sea Turtle Special Management and Protection Requirements

Because of their rarity in Puget Sound, no special management or protection measures are prescribed for leatherback sea turtle.

4.3.11 Taylor's Checkerspot Butterfly

Taylor's checkerspot butterfly was listed as endangered under the ESA on October 3, 2013 (FR 78[192]: 61452-61503; effective date November 4, 2013)

Critical Habitat

Critical habitat for Taylor's checkerspot butterfly has been designated on October 3, 2013 (FR 78[192]: 61506-61589) and includes three unoccupied areas on NAS Whidbey Island that contains Primary Constituent Elements for the species. These areas have been identified for re-establishment of the species as part of the recovery effort.

Taylor's Checkerspot Butterfly Special Management and Protection Requirements

Criteria 1. Conservation Benefit

The NAS Whidbey Island Command will ensure that all proposed actions at the installation that potentially affect (including potential PCE's for) Taylor's checkerspot butterfly comply with Section 7 of the Endangered Species Act which requires, at a minimum, informal consultation with US Fish and Wildlife Service.

Criteria 2. Implementation of the Plan

NAS Whidbey Island annually funds and staffs the NRM position. The NRM is responsible for implementation of the INRMP. The NRM will regularly review development and operation actions on the installation for potential impacts to Taylor 's checkerspot butterfly and potential PCEs for the species. The installation will monitor and cooperate with (when feasible) the adjacent prairie habitat restoration and future butterfly re-establishment efforts. Additional monitoring and management measures will be evaluated as re-establishment progresses. The NRM has the authority to implement maintenance and protection plans and obtain all the necessary authorizations or approvals for proposed management actions. This includes developing projects and seeking funding for natural resources management issues, including habitat enhancement projects and special projects to assist in the recovery of T&E species, as circumstances require.

Criteria 3. Management Effectiveness

The NRM or designated staff will work with re-establishment stakeholders to survey for and record future areas of use for Taylor's checkerspot butterfly following re-establishment efforts. This will include surveying for species PCEs and adult use during nectar foraging. The information will be used to guide the future development of suitable management actions and update the INRMP and also provide management guidance to NAS Whidbey Island's command for planning military training activities at the installation and on the adjacent runway to avoid conflicts with the adjacent re-establishment efforts.

4.4 Other TES Species Management

It is the goal of the installation natural resources program to fully protect and conserve all federal and state threatened, endangered, candidate, and sensitive wildlife (TES) species identified on NAS Whidbey Island.

Potential habitat exists on the installation for seven rare and sensitive plant species (see Section 2.5.1). Since these species have not been documented on the installation, management will focus on monitoring potential habitat for species occurrence and general habitat management (such as conserving existing habitats, noxious weed control, erosion prevention and control and restoring disturbed and degraded areas).

Seven rare and sensitive animal species are known to occur on the installation and there is potential habitat for five others (see Section 2.5.1). Since these species do not have identified concentrated use areas or have not been documented on the installation, management will focus on monitoring potential habitat for species occurrence and general habitat management (such as conserving existing habitats, snag and roost tree retention, noxious weed control, erosion prevention and control and restoring disturbed and degraded areas).

Two other federally protected species, under the Bald and Golden Eagle Protection Act (BGEPA), on the installation are the bald and golden eagle. Golden eagles are a transient species at NAS Whidbey Island and don't have any identified nesting or concentrated use areas. Because of this, management will focus on monitoring potential habitat for species occurrence and general habitat management (such as conserving existing foraging habitats, noxious weed control, erosion prevention and control and restoring disturbed and degraded areas). Bald eagles nest on the installation (with as many as 5-7 nesting territories) and have known foraging and roosting concentration areas. Specific bald eagle management actions are warranted on the installation to effectively conserve the species, meet federal and state delisting objectives, avoid unauthorized "takes" under the BGEPA, and reduce potential conflicts with the military mission of the installation. Specific management requirements are listed below.

4.4.1 Bald Eagles

Bald eagles are protected federally under the Bald and Golden Eagle Protection Act (16 USC 668) and the Migratory Bird Treaty Act (16 USC 703), and within Washington State by the Bald Eagle Protection Rules Washington Code [(WAC) 232-12-292] and enabling legislation Revised Code of Washington (RCW 77.12.655).

A bald eagle management plan (BEMP) was completed for the installation in September 1996 (US Navy 1996). The management requirements in this section of the INRMP updates and replaces the previous BEMP. These guidelines are derived from the "Bald Eagle protection in Washington State" guidelines (WDFW 2002) and "Washington Department of Fish and Wildlife Priority Habitat and Species Management Recommendations, Volume IV: Birds, Bald Eagle" (WDFW 2001).

The following management recommendations are based on the worked done for the BEMP and adapted and updated for current issues and requirements. Habitats on NAS Whidbey Island have been assessed for current and potential bald eagle activities and they have been categorized by functional use (i.e., nesting/roosting, perching, upland foraging, wetland foraging, marine foraging, reforestation areas and operation zone) with management measure recommended for each functional habitat type and potential disturbance risks or hazards. Management actions for bald eagles on Ault Field consist of protecting the nesting locations and reducing BASH risk from eagles around the runways. Figure 4-2 shows bald eagle habitat management recommendations for Ault Field.

Management actions for bald eagles on the Seaplane Base consist of protecting the nesting locations, providing foraging areas and maintaining roosting locations. Figure 4-3 shows bald eagle habitat management recommendations for the Seaplane Base. Management actions for bald eagles on the Lake Hancock consist of protecting potential nesting locations, maintaining or providing foraging areas and maintaining roosting locations. Figure 4-4 shows bald eagle habitat management recommendations for Lake Hancock. Bald eagle use of OLF Coupeville is minimal and transient in nature. Because of this, no bald eagle concentrated use areas have been identified and no management objectives were developed for the habitats of OLF.

Specific recommendations for each management area, for reducing conflicts with Navy activities and for bald eagle monitoring is specified below:

Nesting and Roosting Habitat

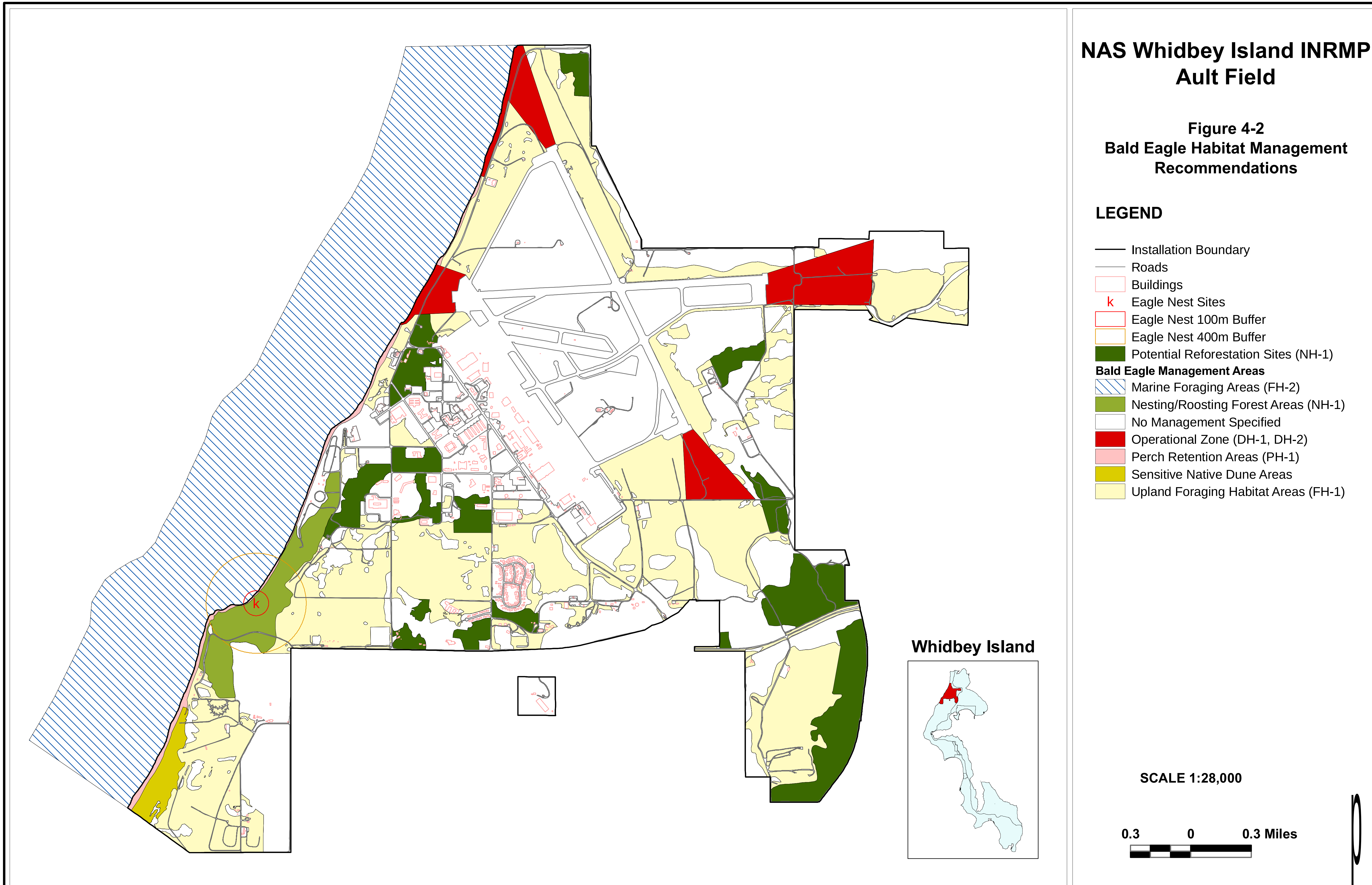
Measure NH-1:

- Stress the long-term maintenance of bald eagle habitat through retention of all existing patches of conifer forest, and specifically all stands with mature Douglas-fir, grand fir, or Sitka spruce trees as these are the most heavily used species for nesting, roosting, and perching;
- Implement forest management actions that benefit long-term bald eagle nesting and perching habitat (e.g., planting conifers in stands where there is little conifer regeneration, selectively logging overstocked stands to achieve uneven-aged structure, etc.);
- Leave dying, dead, and fallen trees in forest stands;
- Prohibit clearcut logging and time all forestry activities to avoid disturbing nesting eagles (see DS-1 and DS-2); and
- Continue to reforest areas at Ault Field and the Seaplane Base with Douglas-fir, western redcedar, grand fir, and Sitka spruce. Sites that should be planted first include those that meet the following criteria:

    - Area adjacent to currently occupied stands;
    - Area within 2,000 feet (610 m) of the shoreline;
    - Would enlarge unoccupied conifer stands;
    - Connect smaller solitary stands; or
    - Would increase the buffer between NASWI activities and active nests.

Perching Habitat

Measure PH-1:
Maintain all trees, poles, pilings, large driftwood, and other perching features within 500 feet (152 m) of the shoreline or near bald eagle nests. All perch sites identified during the 1994-1996 censuses and monitoring will be maintained, regardless of distance from the shoreline. The only exception is that all perching structures near the Ault Field runways that are not necessary for operations should be removed or modified to eliminate perching and minimize conflicts with aircraft operations (see Measure DH-1).


NAS Whidbey Island INRMP
Ault Field
Figure 4-2
Bald Eagle Habitat Management Recommendations
LEGEND
Installation Boundary
Roads
Buildings
Eagle Nest Sites
Eagle Nest 100m Buffer
Eagle Nest 400m Buffer
Potential Reforestation Sites (NH-1)
Bald Eagle Management Areas
Marine Foraging Areas (FH-2)
Nesting/Roosting Forest Areas (NH-1)
No Management Specified
Operational Zone (DH-1, DH-2)
Perch Retention Areas (PH-1)
Sensitive Native Dune Areas
Upland Foraging Habitat Areas (FH-1)
Whidbey Island
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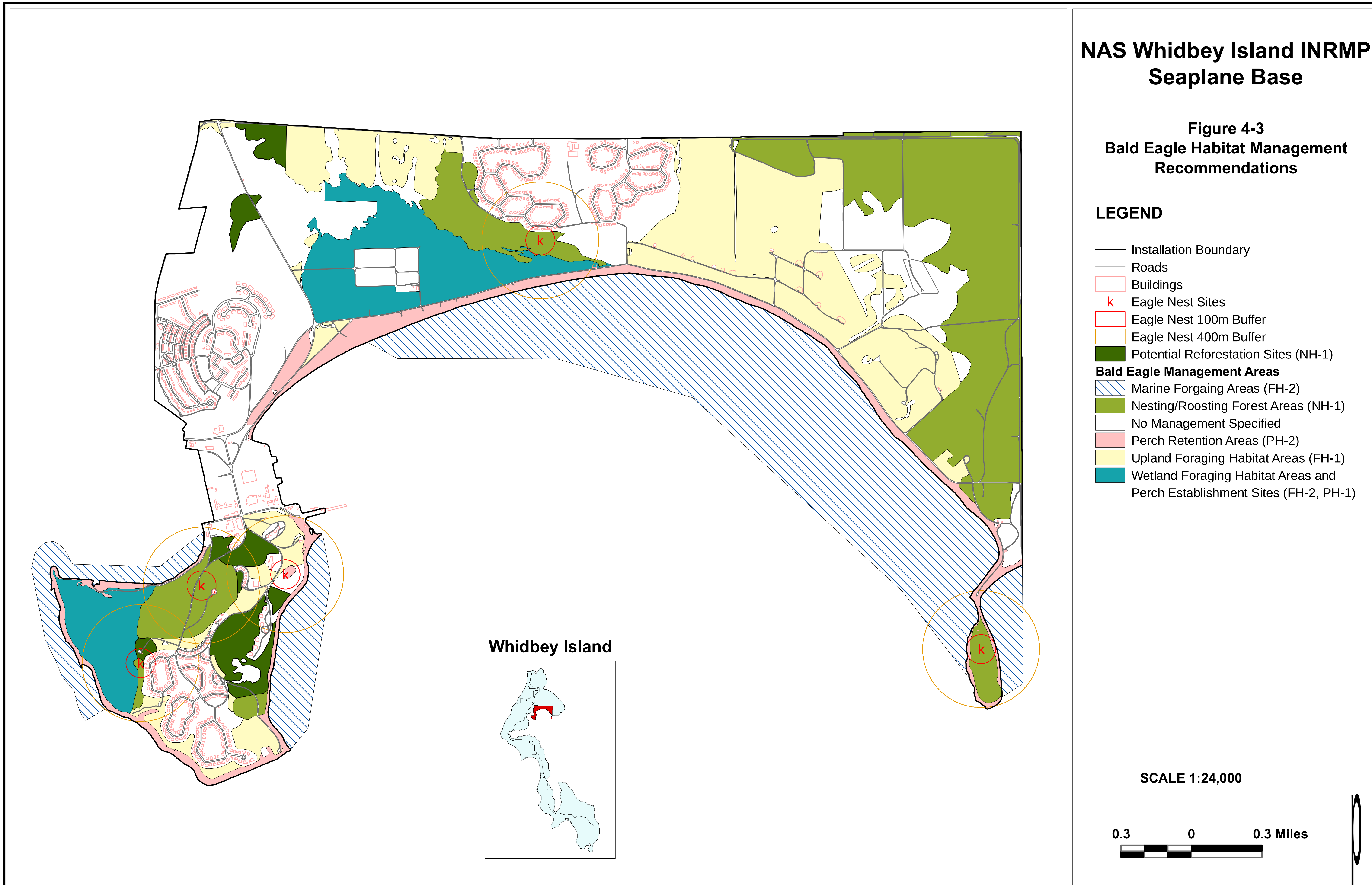
NAS Whidbey Island INRMP
Seaplane Base
Figure 4-3
Bald Eagle Habitat Management Recommendations
LEGEND
Installation Boundary
Roads
Buildings
k Eagle Nest Sites
Eagle Nest 100m Buffer
Eagle Nest 400m Buffer
Potential Reforestation Sites (NH-1)
Bald Eagle Management Areas
Marine Forging Areas (FH-2)
Nesting/Roosting Forest Areas (NH-1)
No Management Specified
Perch Retention Areas (PH-2)
Upland Foraging Habitat Areas (FH-1)
Wetland Foraging Habitat Areas and Perch Establishment Sites (FH-2, PH-1)
Whidbey Island
SCALE 1:24,000
0.3 0 0.3 Miles

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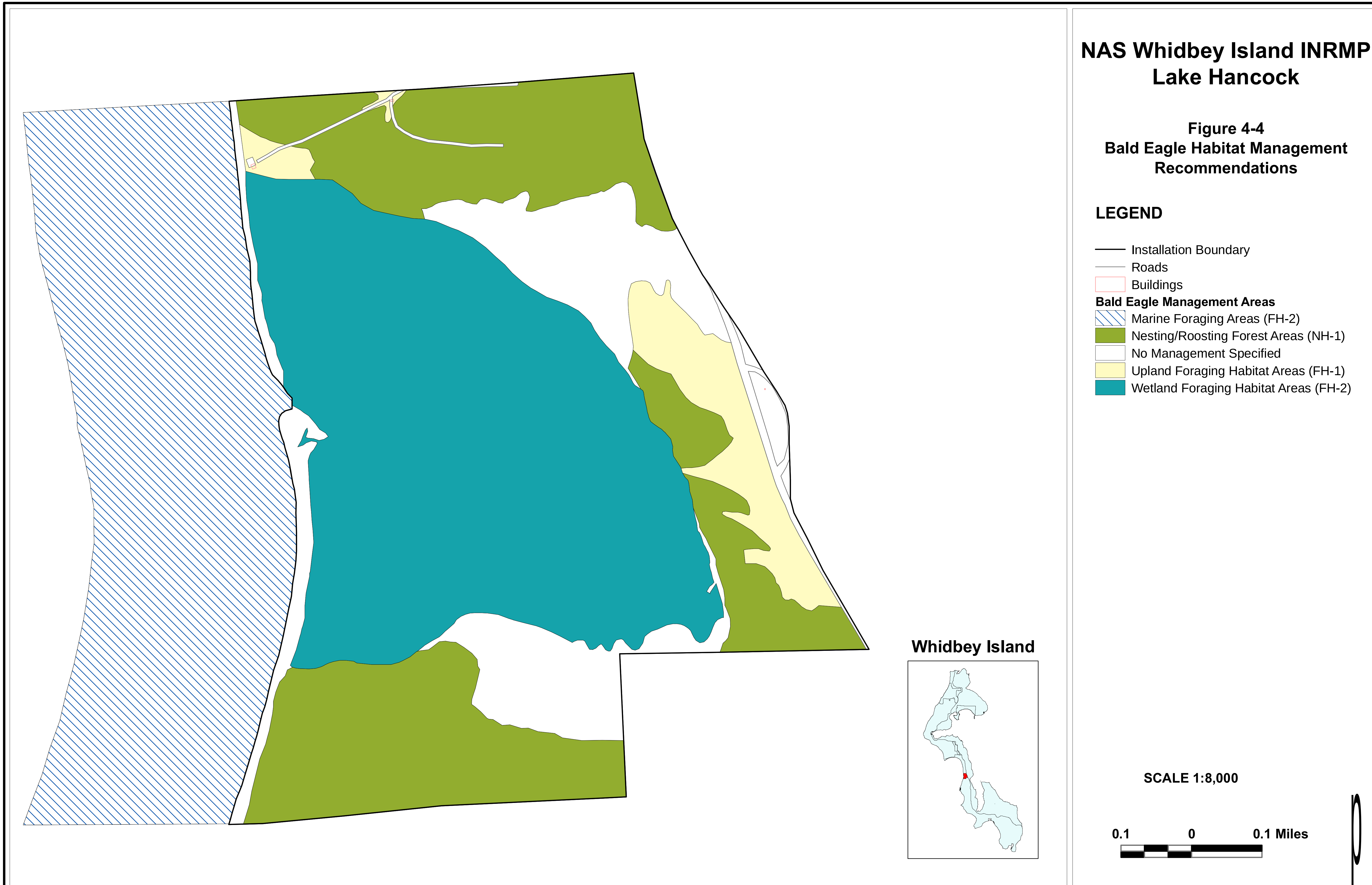
NAS Whidbey Island INRMP
Lake Hancock
Figure 4-4
Bald Eagle Habitat Management Recommendations
LEGEND
Installation Boundary
Roads
Buildings
Bald Eagle Management Areas
Marine Foraging Areas (FH-2)
Nesting/Roosting Forest Areas (NH-1)
No Management Specified
Upland Foraging Habitat Areas (FH-1)
Wetland Foraging Habitat Areas (FH-2)
Whidbey Island
SCALE 1:8,000
0.1
0
0.1 Miles

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Measure PH-2:
Plant trees at suitable locations near shorelines on the Seaplane Base that currently lack perch sites. Where possible, the trees should be planted in strips at least 164 feet (50 m) wide. In other areas, small patches of trees will be sufficient. The tree species planted will depend on soil conditions but should be native species commonly used by perching eagles. Although perch sites are currently limited along the Ault Field shoreline, no trees will be planted there to avoid increasing BASH hazards of attracting eagle perching along the approach ends of the runway.

Foraging Habitat

Measure FH-1:
Maintain open grassland habitat as potential upland foraging.

Measure FH-2:
Restore degraded blocks of wetland habitat and shorelines to increase the quality of potential wetland and marine foraging areas.

Minimizing Disturbance

Measure DS-1:
Prohibit all access and human activities on a year-round basis within a 328-foot (100-m) primary buffer zone surrounding each nest (USFWS 1986, Stalmaster 1987). This will reduce chances of nesting area disturbance and maintain a protected zone around the nest tree.

Measure DS-2:
Prohibit all human activity and loud noise sources, including but not limited to recreation, timber harvest, firewood cutting, heavy equipment operation, blasting, firearm use, and low level aircraft operations within each of the identified 1,312-foot (400-m) nesting season secondary buffer zones between 1 January and 31 August. Visits to the nest zones to monitor the nest or actions necessary to maintain suitable nesting habitat may be allowed after coordination with the NRM and will be timed to minimize disturbance.

Measure DS-3:
Control the use of the Rocky Point Archery Range with the following requirements, which is an intermittent concentrated use facility within the primary nesting zone for the Rocky Point nest:

- Maintain the current alignment of the Rocky Point Archery Range so that no targets or trails are located any closer to the nest tree than they are currently (250 feet [76 m]). Each February-March, the NRM will assess the nest site and determine if alterations in the Rocky Point Archery Range are necessary.
- Limit the number of archers to no more than 40 on the range at events between 1 January and 31 August.
- Monitor archery events at least once during the breeding season to document eagles' reactions to archers.
- Cease activity in the area and immediately consult with the USFWS if monitoring indicates that human activity is disturbing the Rocky Point nest with the potential to cause nest abandonment.

Measure DS-4:
For flight operations, maintain at least a 1,000 feet (305 m) AGL and 0.25 mile (0.4 km) clearance from all bald eagle nest sites on NAS Whidbey Island.

Measure DS-5:
Limit human activity under the forest canopy in known concentrated perching areas, especially near nesting sites, by keeping activities to existing developed facilities, roads and developed trails. Specific locations would be to: keep campground activities within the developed site of Cliffside Park and avoid any activities within the forest blocks to the east of the campground; keep use of the forest area south of Cliffside Park to the developed fitness trail; keep all human activities on the existing road around the water tower on Maylor Point; and keep all human activities on the existing access roads in the forest area east of Rockhill Terrace housing and north of East Pioneer Way on the Seaplane Base.

Measure DS-6:
Analyze all proposed operations and facilities projects at NAS Whidbey Island with the potential for negative effects to bald eagles or their habitat using the Environmental Project Review and NEPA process. All proposed projects determined to have negative effects will include suitable mitigation measures to avoid nest abandonment or "take" under the BGEPA. If this cannot be achieved, then the project or action will acquire a permit from the USFWS under the BGEPA to authorize the "take".

Minimizing Direct Hazards

Measure DH-1:
Remove or structurally modify all structures near the ends of the runways at Ault Field that could be used by eagles for perching and conduct follow-up monitoring of eagle use of the area. This primarily includes old pilings and approach lights no longer needed for air operations.

Measure DH-2:
Implement the installation BASH plan to discourage bald eagle use near the ends of the runways and in other high-hazard zones on the airfield. To avoid nest failure and abandonment of the Rocky Point nest and other nearby North Whidbey Island nesting territories, all bald eagle trapping and relocation should focus on juvenile eagles or adults outside the nesting season (1 September – 31 December).

Monitoring

Measure M-1:
Annually, monitor bald eagle productivity. Each year, the Navy will work with the WDFW and USFWS to monitor territory occupancy, nest success, and number of fledglings. If nests abnormally fail or are abandoned, the Navy will consult with the WDFW and USFWS to determine if management changes are warranted for specific nests.

Measure M-2:
Periodically census NAS Whidbey Island properties to document any changes in habitat use, population sizes, or interactions with human activity that might have resulted from habitat alteration (removal or enhancement actions). If additional eagle use areas are identified during these censuses that are not already addressed by management measures, the Navy will coordinate additional management measures with the WDFW and USFWS.

Measure M-3:
Monitor use of the Rocky Point Archery Range for negative effects to the Rocky Point nest.

Measure M-4:
Periodically monitor eagle behavior near the EOD surface detonation training area for negative effects to the Polnell Point and Ice House nests.

Measure M-5:
Periodically monitor the nest tree and forest stand conditions to determine if habitat enhancement actions are needed. This assessment should be made between 1 September and 1 January.

4.5 Wetland Management

According to Executive Order (EO) 11990 (1977), the term "wetlands" means those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds. EO 11990 requires Federal agencies to minimize the loss or degradation of wetlands and to enhance their natural values. Section 404 of the Clean Water Act (CWA) prohibits discharges of dredged or filled material into waters of the U.S., including wetlands, without first obtaining a permit from the USACE. According to OPNAVINST 5090.1C, the Navy will comply with the national goal of no net loss of wetlands, and will avoid loss of size, function and value of wetlands.

In addition, the Navy will preserve and enhance the natural and beneficial values of wetlands in carrying out its activities. In order to comply with the "No Net Loss of Wetlands Policy", Navy commands with land management responsibilities shall ensure the following:

- That the Navy plan all construction and operational actions to avoid adverse impacts to or destruction of wetlands. Any construction requirement that cannot be sited to avoid wetlands shall be designed to minimize wetlands degradation and shall include compensatory mitigation as required by wetlands regulatory agencies in all phases of the project's planning, programming, and budgeting process. Within this policy, use of Navy lands and lands of other entities are permissible for mitigation purposes for Navy projects when consistent with EPA and USACE guidelines or permit provisions. Requests by non-Navy entities to mitigate the effects of non-Navy projects on Navy property should be reviewed on a case-by-case basis for their effect on Navy mission, the environment, and appropriateness of economic compensation to the Navy for the long-term use of the site. All such projects need to be approved by the chain of command;
- That any action significantly affecting wetlands is addressed by the environmental review and public notification process (NEPA);
- That boundaries of legally defined wetlands, on all Navy lands, are identified and mapped with sufficient accuracy to protect them from potential unplanned impacts, and that the maps are distributed to all potential users, including facilities planners, operational units, and tenant commands. Jurisdictional wetland maps may be required prior to actual construction if there is any potential of wetlands present in the vicinity of the project. Field verification and jurisdictional determinations are required for all ground disturbing projects;
- That adequate expertise is available to installation commanding officers (COs) for the protection, management, identification, and mapping of wetlands;

- That implementation of wetlands creation or enhancement projects and wetlands banking, where compatible with the installation mission, is encouraged. Natural resources managers should identify potential wetland mitigation sites.

The wetland delineations portrayed in Figure 2-15 through 2-18 are not field delineations. Therefore, they should be considered rough estimates. This information should be used in the planning phase of proposed projects or operations. If a project is planned in the proximity of a wetland system, the wetlands in the immediate area should be flagged and surveyed to adequately show the boundaries.

Wetlands on Federal lands are protected under Section 404 of the Federal Water Pollution Control Act (Clean Water Act, P.L. 92-500, as amended), Executive Order 11990 (1977), Section 10 of the Rivers and Harbors Act of 1899, and the Fish and Wildlife Coordination Act. In addition to federal laws, Navy policy permits no net loss of wetlands on Navy lands (OPNAVINST 5090.1C) and requires avoidance of wetland impacts wherever possible. This policy requires the creation, restoration, or enhancement of wetlands as mitigation for wetland losses.

In adhering to the policy of no net loss, NAS Whidbey Island has established the following wetland management goals:

- Avoid impacts to wetlands whenever possible by designing projects or training operations to avoid wetlands.
- When avoidance is not possible, minimize the amount and extent of impacts on wetlands.
- Compensate for loss of wetland acreage or functional value by restoring or enhancing degraded natural wetlands. Creation of new wetlands is considered only if restoration or enhancement alternatives are not feasible.

Every reasonable effort will be made to avoid destruction of wetlands. Wetland maps will be reviewed during the initial stages of project planning to allow maximum opportunity to avoid impacts to wetlands. Mission actions will be planned to minimize impacts on wetlands, and to compensate for such impacts whenever complete avoidance is not possible. Site inspections will be incorporated into the planning process for any construction activity that may affect wetlands. When a determination is made that it is necessary for a construction project to occur in a location that may impact a wetland, appropriate mitigation will be analyzed and developed for the action. The USACE is consulted before initiating any actions that might result in discharge of fill material into wetlands. NAS Whidbey Island regularly obtains Section 404 permits when necessary and complies with all permit requirements.

4.6 Habitat Management

There are many habitat types on NAS Whidbey Island properties. For this discussion, the habitats are grouped into general functional classes (developed areas, riparian and wetlands, shorelines, grasslands, brushlands and shrub scrub, and forests) with management goals, objectives and management measures described for each functional class. Habitat loss has a direct correlation to a decline or loss of fish and wildlife populations. This INRMP is to be used in NAS Whidbey Island's operational, training, and construction planning endeavors to minimize or prevent loss of habitat, thus preserving species diversity and populations at the installation. The following management criteria will ensure that NAS Whidbey Island provides a wise stewardship ethic in managing the fish and wildlife resources found there:

4.6.1 Program and Project Review

The NAS Whidbey Island natural resources manager (NRM) is part of the planning team that reviews all proposed projects, operations, and training plans for possible impacts to habitat and fish and wildlife. If impacts to habitat or fish and wildlife are identified, the NRM provides recommendations to the program/project managers so that changes or mitigation can be considered early in the planning process. The recommendations may include, but are not limited to, construction best management practices (BMPs) for erosion control, changing the aspect or placement of a new building to protect trees, identifying wetlands and wetland buffers that must be protected, or other recommendations that will help NAS Whidbey Island preserve its fish and wildlife habitats. The NRM is also available to help decide on the best mitigation designs if habitat loss is unavoidable.

4.6.2 Habitat Enhancement and Restoration

Habitat restoration and enhancement will focus on controlling noxious weeds and preventing mechanical habitat degradation. Natural habitat recovery of any disturbed areas will be assessed by repeated monitoring of established vegetation plots and additional pedestrian surveys. Disturbed and degraded areas will be assessed for restoration success and priority ranked for potential restoration measures.

4.6.3 Habitat Management – Developed Areas

The following items will enhance the wildlife habitat on NAS Whidbey Island.

- **Where feasible, reduce the mowed areas**. Reducing areas that are mowed will allow native vegetation and wildflowers to grow, enhancing wildlife habitat, and may also result in a maintenance cost savings for the Navy. A reduction in mowing not only improves the diversity of plant communities, but can also help reduce erosion and control movement of sediment. This has already been done in certain areas to create the “Back to Nature” and “Wildlife Habitat Project Improvement” areas located on Ault Field and Seaplane Base.
- **Use native trees and shrubs for landscaping around buildings**. Native vegetation is well-suited to the conditions of the Pacific Northwest and will require less maintenance to keep healthy. Native vegetation provides better wildlife habitat then exotic, non-native plants and trees.
- **Reduce pesticide/herbicide/fertilizer use.** Reducing the use of chemicals will help protect surface and groundwater quality at the installation, as well as the quality of the surrounding marine waters.

4.6.4 Habitat Management – Riparian/Wetlands

There are no natural streams on NAS Whidbey Island, but there are several channelized drainages and a large number of wetlands on the installation. There are extensive marine shoreline riparian zones along most of the unmodified shorelines of the installation. These areas are very important providing terrestrial habitat and providing cover to regulate temperatures along the upper beaches of the installation.

- **Retain adjacent areas of native marine shoreline riparian vegetation.** Avoid removal of shoreline riparian vegetation during project actions. During the program/project review process, the NRM will look for potential impacts to marine shoreline riparian areas and offer alternatives to minimize or eliminate the impacts.

- **Enhance and restore degrade marine shoreline riparian vegetation.** As part of the bald eagle perch restoration project and other general forest enhancement actions, focus on replanting and restoring degraded marine shoreline riparian vegetation. This should avoid areas near the main runways to avoid compounding BASH issues and focus on known or suitable forage fish spawning areas. Marine riparian shoreline vegetation provides an important function of stabilizing the shoreline and regulating temperatures and enhancing forage fish egg survival.

Crescent Creek Channel

Crescent Creek is a drainage that enters the Seaplane Base running through a culvert under Crescent Harbor Road. This channel intermittently flows during the year with water flow fed by a discharging wetland system to the north of the installation and surface runoff. Flow usually occurs during the late fall, winter and spring, but the drainage is normally dry during the summer and early fall. During the analysis for the Multi-Mission Maritime Aircraft (MMA) homebasing, this channel and a 50 acre area surrounding it was determined to be the best wetland mitigation site on NAS Whidbey Island. This mitigation site is no longer immediately needed for the MMA project. Crescent Creek flows into the Crescent Harbor marsh restoration project through a channelized ditch and then disperses into the wetland complex. During preliminary salmon monitoring for the Crescent Harbor marsh restoration project, juvenile salmon were sampled near where the creek disperses into the wetland and it is likely that they would use and benefit from a restored channel for Crescent Creek flowing into the wetland system. A restored channel would create additional channel microhabitat for juvenile salmon to use. NAS Whidbey Island will work with interested partners (such as the Skagit River System Cooperative) to investigate the option of restoring Crescent Creek into a new at-grade channel that runs through the Seaplane Base in what is known as the lower game range. Restoring Crescent Creek into a new channel would benefit juvenile salmon and augment the existing Crescent Harbor marsh restoration project. Restoring the creek channel would also have the benefit of supporting any future wetland mitigation adjacent to the new creek channel by providing the water source necessary for any successful potential future wetland mitigation project.

Wetland management strategies vary depending primarily on the wetland's classification. A wetland's value is decided by the quality of the functions it provides, including its biomass production, habitat, erosion control, stormwater storage, water quality protection, aquifer recharge potential, and low flow augmentation. Some of the factors used to measure the quality of these functions are the wetland's size, its location in the watershed, the amount of development in the watershed, vegetative structure and composition, rate of water flow through the wetland, the size of natural buffers, and surrounding land uses. Regardless of the habitat value, wetland areas are almost always poor choices for building sites or for most activities, other than providing non-consumptive (passive) enjoyment of the outdoors. The NRM, during the program/project review process, will be diligent about encroachment and impacts to the wetlands found on NAS Whidbey Island, and ensure that program/project managers are aware of the laws and regulations regarding the protection of wetlands.

- **Carefully plan for and control runoff in uplands.** If building is to occur near wetlands, water quality and quantity impacts can be lessened by retention of natural swales, depressions, and areas with permeable soils.
- **Retain adjacent areas of native vegetation, especially if they connect to other wetlands.** Also retain connections to other natural areas via native vegetation. This creates corridors that allow uninhibited movement of wildlife between wetlands and adjacent habitat areas.
- **Use only sound pesticide techniques.** Exclude chemicals from buffers. Don't use chemicals during rainy seasons unless they are registered for aquatic uses.

- **Exclude livestock, vehicles, and foot traffic from wetlands and buffers.** Plant native vegetation around wetlands; don't use fences that would restrict wildlife movement.
- **Assess and prioritize degraded areas for wetland enhancement.** Enhancement of previously degraded wetland site has a higher success rate than creating new wetlands form non-wetlands areas.
- **Restoration of the existing sewage plant in Crescent Harbor Marsh.** If the wastewater treatment plant in the middle for Crescent Harbor marsh is closed and abandoned in the future, the site would have restoration potential for wetlands as well as salmonids. NAS Whidbey Island will work with interested partners (such as the Skagit River System Cooperative) to investigate the option of restoring the area within the current treatment plant boundaries, if the plant is abandoned in the future.

4.6.5 Habitat Management – Shorelines

Shellfish, forage fish, and many other wildlife species use the beaches and shoreline areas of NAS Whidbey Island. The NRM will do the following to protect shoreline habitats:

- **Organize volunteer beach cleanups and inspect the beach areas for man-made debris and derelict fishing gear.** Man-made trash, which often consist of plastic items, wash up on many shorelines in the Puget Sound area. This trash is not only unsightly, but some items may be perceived as a food source by wildlife and cause harm. Accumulations of trash or man-made objects may remove areas of shore from forage fish spawning opportunities or from bird use. NAS Whidbey Island has successfully performed volunteer beach cleanups in the past; these should continue in the future. Derelict fishing gear can continue to kill fish and wildlife species for many years. If any derelict fishing nets are observed near or on Navy properties, they can be reported to the Northwest Straits Initiative by calling 360-428-1084 or 1-855-542-3935 or reported online for removal at **http://www.derelictgeardb.org/reportgear.aspx.**
- **Protect eelgrass areas.** Eelgrass may be found along much of the sub and inter-tidal areas around NAS Whidbey Island. This aquatic plant species is an important habitat for many marine invertebrate and vertebrate species. During the program/project review process, the NRM will look for potential impacts to eelgrass areas and offer alternatives to minimize or eliminate the impacts.
- **Protect kelp areas.** Kelp can be found along some of the rocky shoreline areas in the subtidal zone of the Seaplane Base and Ault Field. Kelp are marine algae that like rocky substrates in moderate to high wave energy or current locations. Kelp produces long blades that are important habitat for many juvenile rockfish species by providing structure for feeding, predation refuge, and reduced currents that enable energy conservation. During the program/project review process, the NRM will look for potential impacts to kelp habitats and offer alternatives to minimize or eliminate the impacts.
- **Avoid future hard shoreline armoring.** Placing bulkheads and rock riprap along shorelines degrades nearshore habitats and tends to deflect erosive energy causing erosion in other areas along the protected shoreline. For projects and actions that need some form of shoreline protection, NAS Whidbey Island will incorporate the use bioengineering techniques as applicable to the specific site conditions (see Section 2.7.1.3 for information on bioengineering guidance and techniques).
- **Explore removal of existing rock armor.** Rock armor or other "hard" armoring techniques have negative affects to the nearshore and degrade fish habitat. Hard

armored locations exist along the Ault Field shoreline adjacent to the runways and on the Seaplane Base from the fuel pier to along Torpedo Road. Existing armor will need repairs and future construction projects will occur adjacent to these armored areas. When these construction actions are needed, NAS Whidbey Island will analyze replacing the hard armor and if suitable replace the hard armor by incorporating the use bioengineering techniques as applicable to the specific site conditions (see Section 2.7.1.3 for information on bioengineering guidance and techniques)

- **Stormwater runoff.** The NRM will review proposed projects and programs for stormwater or other discharges. Project manager will ensure that these discharges do not degrade the water or sediment quality of the waters surrounding NAS Whidbey Island.
- **Military training.** The Navy and other services conduct training operations at NAS Whidbey Island. These operations can require that equipment and personnel utilize beach areas. The NRM will recommend shoreline areas or seasonal timing that will result in minimal impact to shoreline habitats (including eelgrass and kelp).

4.6.6 Habitat Management – Grasslands

Native and non-native grassland communities on NAS Whidbey Island are a function of disturbance. They are there because of poor soil and water conditions or were developed by forest clearing for agriculture or development. Because of their limited nature, they can often provide a unique habitat for native plant and wildlife species. If not managed, they often are over taken by brush and noxious weeds.

Habitat restoration and enhancement will focus on controlling noxious weed, preventing mechanical habitat degradation and controlling brush to prevent encroachment in select areas. Brush encroachment will be monitored by repeated pedestrian surveys. Areas that have significant resource value (golden paintbrush management area, other rare plant locations and significant wildlife habitats will be assessed for restoration success and priority ranked for potential restoration measures. Encroaching vegetation will be controlled by a combination of mowing, burning, or herbicide application.

4.6.7 Habitat Management – Native Brushlands/Shrub Scrub

Native sustaining brushlands or shrub scrub areas around NAS Whidbey Island are normally a function or soil or water conditions. Many of these habitats are considered wetlands and too wet for tree establishment. There is also a large portion of this habitat type that is over grown grasslands, old agriculture fields and cleared forest areas. The native sustaining would be considered high in value for plant and wildlife species because of their unique traits.

Habitat restoration and enhancement will focus on controlling noxious weed and preventing mechanical habitat degradation. Natural habitat recovery of any disturbed areas will be assessed by either repeated monitoring of established vegetation plots and/or pedestrian surveys. Areas that are not recovering naturally back to the pre-disturbance habitat types will be assessed for restoration success and priority ranked for potential restoration measures. Restoration measures would consist of removing non-native plant species and revegetating with native plant species adapted for the specific soil and hydrology type.

4.6.8 Habitat Management – Forests

Forest resources and habitats at NAS Whidbey Island will be managed to restore, enhance, conserve and protect the productivity of those resources on the station. The greatest needs in forestry on NAS Whidbey Island lie in the conservation of relict old growth trees; thinning of dense second growth stands to encourage development of understory vegetation and to enhance structural diversity; restoration of the original coniferous forest cover to areas historically impacted by construction of base facilities; and enhancement of existing forest stands impacted by historical operations and uses. Forest management will address existing second growth stands as well as restoration of the coniferous forest areas impacted by construction and military uses which may have reduced the size and quality of the forest. Second growth areas will be managed to enhance structures typical of late succession forests. Annual increments will be prepared, reviewed with and approved by the installation prior to submittal to assure compatibility with all aspects of this INRMP and with mission requirements. When implemented, the prescriptions of the annual increments will enhance the horizontal and vertical structural diversity of forest stands to create habitat structures and opportunities for biological diversity and to encourage development of late successional forest structures and compositions. The forest management objectives are:

- continue to maintain the forest stands in a healthy productive condition through selective thinning that will increase tree and stand vigor and enhance structural diversity;
- generate forest products and income through forest products sales contracts;
- maintain and enhance wildlife habitat values of forest stands;
- protect significant forest habitats identified by WDNR; and
- support multiple-use of forest habitats consistent with the military mission.

To achieve the above objectives, several silvicultural practices and protect measures will be used. Pre-commercial and commercial thinning will be used in some stands to open up dense second growth trees. Selective cutting will be the system used in both pre-commercial and commercial thinnings for the foreseeable future. Intermediate selective cutting will be used to thin stands for the concentration of growth on leave trees, development of horizontal and vertical structural diversity, increase in value of the residual trees and to salvage mortality losses. Snags, hollow logs, trees deemed unique or of special interest for wildlife (such as advanced second growth specimens), isolated relict old growth, trees with large limbs or cavities, or less prevalent species (yew, cottonwood, bigleaf maple, wild cherry, willow, etc) will be maintained in timber stands during thinning.

Planting trees on former forested sites, areas to be restored for wildlife habitat or disturbed forest sites will be used to reforest certain identified locations. Reforestation will use a mixture of site-adapted native conifer species. Plantings will be 12 foot on center spacing. Hand planting conifer seedlings will be the method used to reforest areas.

Certain identified forest stands will be left untreated to maintain diversity in tree age structure, maintain a diversity of wildlife habitat and to protect identified significant forest habitat resources.

Each of the four NAS Whidbey Island properties has forest resources and habitats. The forests on each property were mapped based on forest tree species, age structure and significant features. Each property is in a different overall local ecosystem setting and therefore the prescriptions for each property was independently developed to best suit the individual property and forest stands.

4.6.8.1 Ault Field

The following stand prescriptions apply to forested management units on the Ault Field component of NAS Whidbey Island. Figure 4-5 shows the mapped forest management units on Ault Field. Forest management units in some portions of the base are identified individually but lumped together for management due to their similar habitat conditions or location relative to controlling mission and operational concerns such as access, security, airfield clearances, etc. The numbering sequence of stands may seem incomplete because areas mapped but not suitable for silvicultural management are not included. Some of these areas are developed sites, airfield clearance zones, and other vegetation or habitat types that are subject to other management, but not available or appropriate for forestry purposes.

Units #1, 2, 3 and 201: Thinning is recommended along with removal of alder and brush and interplanting with conifers to improve stocking levels of conifers and habitat quality. In the mid-1990s, some tall trees were selectively removed from the area on the northeast side of the northern portion of Runway 14-32 because they interfered with the GCA radar.

Unit #5: This is a boggy hillside with forested wetland components. No thinning is recommended to protect the wetland values of the stand. Some taller trees may need to be removed to maintain or restore airfield approach glide slope. Consider expanding the stand north to the property line, but east of the airfield clear zone. Due to soil moisture conditions, Sitka spruce, western redcedar and perhaps Englemann spruce would be the conifers planted.

Units #6, 7, 8, 9, 10, 11, 14 and 15: No thinning is recommended. Some taller trees may need to be removed to maintain or restore airfield operational artificial surface. Interplanting with conifers will improve stocking levels of conifers and habitat quality.

Unit #16: This unit is mostly a forested wetland. No thinning is recommended to protect the wetland values of the stand. Some taller trees may need to be removed to maintain or restore airfield operational artificial surface.

Unit #17: Thin to release conifers and open up the stand to a residual Leave Tree spacing of 20’ on center (o. c.). Interplant with Douglas fir, grand fir and western redcedar where possible.

Unit #18, 19 and 219: These units contain mostly forested wetlands. No thinning is recommended to protect the wetland values of the stand. Some taller trees may need to be removed to maintain or restore airfield operational artificial surface. Much of stand # 19 and #219 are in the airfield clear zone and the trees were removed in 2010.

Units #20: This unit is mostly a forested wetland. No thinning is recommended to protect the wetland values of the stand. Some taller trees may need to be removed to maintain or restore airfield operational artificial surface.

Units #22, 23 and 24: Thin conifers to standard prescription of 20’ o.c. Treat at the same time as Stands #17.

Units #25, 26, 28, 29, 30, 33, 54, 55, 56 and 57: Treat this large area off the south end of runway 32 as a whole. Interplant a mixture of native conifers to establish full stocking. Portions of unit 29 are forested wetlands. Avoid planting boggy areas dominated by hardhack or other plant species indicative of histosols or hydric plant communities.

Units #34, 35, 37, 46, 48, 49, 50, 51 and 248: This aggregation of forest stands surrounds and crosses the old landfill area located south of Ault Field Road. Prescription implementation is dependent upon land use availability subsequent to environmental cleanup actions and is subject to airfield clearance and security requirements. Some portions of this large area may not yet be available for tree planting. The prescription is to selectively remove broadleaved trees and brush competing with conifers; interplant the resultant openings; and plant open and unstocked areas to a density of 302 live trees per acre using native conifers.

Units #58, 59 and 60: These units contain mostly forested wetlands. No thinning is recommended to protect the wetland values of the stand. Some taller trees may need to be removed to maintain or restore airfield operational artificial surface.

Unit #61: Selectively thin to remove alders and conifers to a residual stand spacing of 20' o.c. Interplant openings with native conifers.

Unit #62: This unit is mostly a forested wetland. No thinning is recommended to protect the wetland values of the stand. Some taller trees may need to be removed to maintain or restore airfield operational artificial surface. Stand contained a great blue heron rookery in the past.

Unit #63: Thin to 20' o.c.

Unit #64: Plant this area with native conifers to the maximum extent possible to stabilize the bare soils.

Units #65: This unit is mostly a forested wetland. No thinning is recommended to protect the wetland values of the stand. Some taller trees may need to be removed to maintain or restore airfield operational artificial surface.

Units #102, 103, 104, 117, 204 and 217: Continue to plant native conifers in this large area to achieve full stocking of a minimum of 302 live trees per acre (equals a spacing of 20 feet on center). Planting here has been hampered by mortality caused by an extremely high vole population. Planting may include weed suppression mats for each seedling or sod removal in spots or rows. In Stand #117, focus on planting on the higher ground outside of the wetland areas.

Unit #106: Selectively thin to 20' o.c. Access may be a problem and could best be achieved from the east side.

Units #108, 109, 110 and 209: No thinning is recommended to maintain the wildlife values of the units. Some taller trees may need to be removed to maintain or restore radar clearance.

Units #112, 116, and 121: These stands should be treated as a single unit of forest land. Selectively remove alder and replant all areas with a mix of native conifers. Stands should be thinned to 20' o.c. All open areas in stands to be planted with a mix of native conifers.

Units #114, 212 and 214: These units contain mostly forested wetlands. No thinning is recommended to protect the wetland values of the stand. Some taller trees may need to be removed to maintain or restore airfield operational artificial surface.

Units #119, 120: Units are used for outdoor paintball games through MWR. May want to consider thinning to remove alder and interplant with a mix of native conifers to restock, if consistent with recreational use. Also, there is a potential to expand the stands to the east and south by planting suitable conifer trees.

Units #125, 126, 128, 129 and 130: Since these stands are within the area of golf course influence and concern, they will be managed to compliment recreational purposes. Silvicultural treatments will be kept to a minimum, mainly hazard tree removal, sanitation cuts and tree planting as warranted.

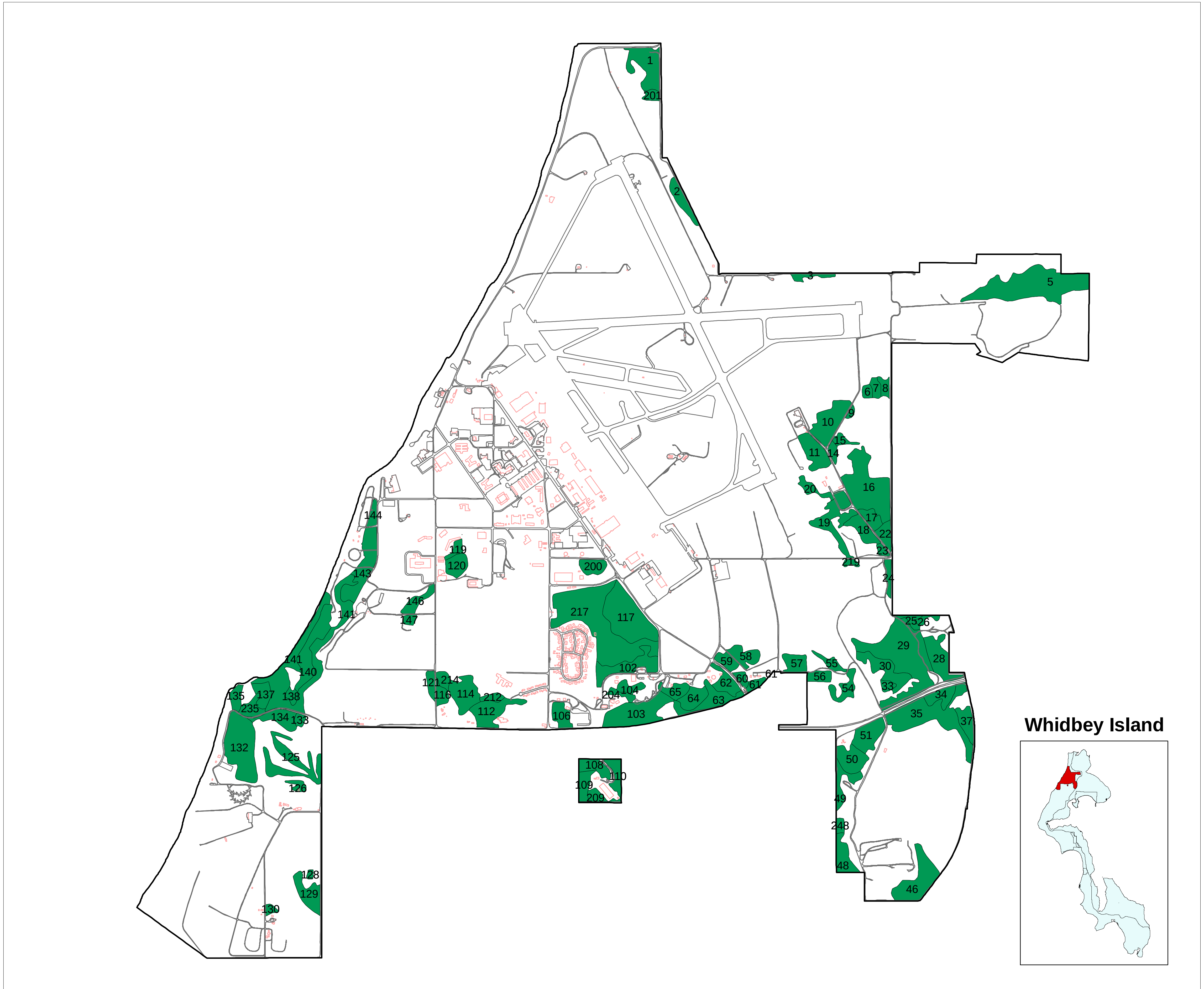
Unit #132 and 134: Selectively thin to 20' o.c. as needed and plant open and understocked areas with a mixture of native conifers. Brush removal and site preparation may include mechanical and chemical means.

Unit #133: This unit is mostly a forested wetland. No thinning is recommended to protect the wetland values of the stand. Some taller trees may need to be removed to maintain or restore airfield operational artificial surface.

Units #135, 137, 138, 140, 141, 143, 144 and 235: The Rocky Point bald eagle nest is located within this forest unit block. This forest block is also the main eagle roosting/perching area between Deception Pass and south of the west beach area. Several recreation uses occur in and adjacent to the unit block. Units #143 and #144 are directly east of the Cliffside Park campground, the recreational jogging trail is located in unit #141 and the archery range is located in units #135, 137, 235 and the very southern part of #141. Because of the above issues, no thinning is recommended to maintain the wildlife and recreational values of the units. Some taller trees may need to be removed to maintain or restore airfield operational artificial surface. Suitable eagle nest, roost and perch trees will be maintained. Plant a mixture of native conifers to expand unit #141 to the east.

Units #146 and 147: Selectively remove alder and plant a mix of native conifers across this large area.

Unit #200: This small stand is located on the south side of the road leading to the fueling station. In about 1997, the alders on the north edge of the stand along the road were cut down as a safety measure. Alders will be selectively removed and any gaps planted with conifers.



NAS Whidbey Island INRMP
Ault Field

Figure 4-5
Forest Management Units

LEGEND

- Installation Boundary
- Roads
- Buildings
- Forest Unit and ID Number

SCALE 1:28,000

0.3 0 0.3 Miles

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4.6.8.2 Seaplane Base

The following stand prescriptions apply to forest management units on the Seaplane Base component of NAS Whidbey Island. Figure 4-6 shows the mapped forest management units on the Seaplane Base. Forest management units in some portions of the base are identified individually but lumped together for management due to their similar habitat conditions or location relative to controlling mission and operational concerns such as access, security, airfield clearances, etc. The numbering sequence of stands may seem incomplete because areas mapped but not suitable for silvicultural management are not included. Some of these areas are developed sites, airfield clearance zones, and other vegetation or habitat types that are subject to other management, but not available or appropriate for forestry purposes.

U.S.S. Constitution Groves: Beginning in 1972, the Department of the Navy embarked on a project to have its foresters identify and designate stands of timber for refitting US Frigate Constitution, commonly called Old Ironsides. This was done as part of the nation's Bicentennial Celebration. At the request of CNO, NAVFACENGCOM undertook to identify appropriate groves of timber that would be called "USS Constitution Groves". These stands of timber are to be managed for the refit of Old Ironsides at Boston. On the Seaplane Base portion of NAS Whidbey Island, two such areas were designated. The first Constitution Grove is comprised of Stands #7 and #11 along the east side of Torpedo Road. The second Grove is the eastern half of Stand #62, situated along the eastern edge of the old SERE Camp area in the Survival Area about 0.5 mile south of the NE corner of the Navy property. These boundaries are of record, and yet can be expanded to meet the requirements of SUPSHIPS for materials. The plan is that suitable timber form these Groves will be felled when needed and railed back to Boston for refitting Old Ironsides. As an alternative, the timber can be cut to cants specified by SUPSHIPS and railed in cut form. It is anticipated that most of Stands #7 and 11 will be cut down; the stands will be replanted for the next refit. Stand #62 will be selectively cut to remove the large trees, leaving smaller trees and saplings as the beginnings of the next crop of trees to be used to refit Old Ironsides.

Unit #1: This stand surrounds a school and was thinned in the early 1970s. The prescription for this stand is to evaluate it for selective thinning to a residual stand of conifers spaced 20' o.c. (100 stems per acre).

Unit #2: This unit is mostly a forested wetland. No thinning is recommended to protect the wetland values of the stand. Some trees may need to be removed or limbed to maintain the adjacent utility line corridor.

Units #3, 5, 6, 203 and 303: These units contain numerous hillside seeps and there are forested wetland patches within them. No thinning is recommended to protect the wetland and wildlife values of the stand. Some trees may need to be removed or limbed to maintain the adjacent utility line corridor.

Unit #4: This is a steep hillside stand. A bald eagle nest was established within this stand in about 2009. Several trees are also intermittently used by bald eagles as perch trees. A large known historic and prehistoric archaeological site is located in the lower portion of this stand along Torpedo Road. Due to the steep slope, bald eagle use and archaeological site, no thinning is recommended to protect these values within the stand. Some trees may need to be removed or limbed immediately adjacent to the road to maintain the road corridor.

Units #7 and 11: These two stands, located along the east side of Torpedo Road, were set aside in 1974 as "USS Constitution Groves" for the Bicentennial Celebration. This was under a Navy program to identify, designate, and manage timber stands for the refit of Old Ironsides. The timber will be cut when needed and shipped back east in log length and form for use in refitting the ship. See also Stand #62 on the eastern side of the Crescent Harbor portion of the Seaplane Base.

Units #8 and 9: These units are mostly forested wetlands. With the opening of the Crescent Harbor marsh restoration project to tidal flow, these two stands are likely going to get even moister in the future. No thinning is recommended to protect the wetland values of the stands.

Units #15, 16 and 17: Thin conifers to 20' o.c.; selectively remove alders; replant with conifers suitable for the site. Suggested species are cedar, shore pine and Sitka spruce for the lower portions of the unit near the salt marsh interface. The stands are regularly used for bald eagle roosting and perching. Bald eagle management timing requirements will need to be met and all large potential roost trees will need to be maintained during any thinning operation.

Units #18 and 19: In 1986, the area around the water tank was thinned leaving conifers on a 20' spacing using draft horses. Unit 18 contains one of Maylor Point's older bald eagle nesting areas. Because of the previous thinning and eagle nesting areas, no thinning is recommended to maintain the wildlife values of the units.

Units #20 and 21: Thin conifers to 20' o.c. and replant/interplant with a mix of native conifers. The stands are regularly used for bald eagle roosting and perching. Bald eagle management timing requirements will need to be met and all large potential roost trees will need to be maintained during any thinning operation.

Units #30, 31, 86, 87, 230, 330 and 371: Units 330 and 371 contain the Ice House bald eagle nest. The stands are also regularly used for bald eagle roosting and perching. The southern and western boundaries of these units are immediately adjacent to the Crescent Harbor marsh restoration project and contain forested wetland patches. No thinning is recommended to maintain the wildlife and wetland values of the units.

Units #35 and 235: This is a rather depauperate forest area. These two stands, bordered by roads, should be treated to remove brush using mechanical and/or chemical means; selectively remove all alder; and replant with native conifers at 435 stems per acre. Monitor to replace seedling mortality and assure establishment of full stocking at a minimum of 302 live stems per acre.

Units #37, 38 and 39: These areas were cleared in about 1987 to eliminate trees that were falling on the boundary patrol road, perimeter security fence and powerlines. Replanting did not establish full stocking of coniferous species. Selectively remove alder through a commercial timber sale, if feasible, or kill all alder using mechanical and/or chemical methods, leave all conifers and replant with Douglas-fir. Monitor to replace seedling mortality and assure establishment of full stocking at a minimum of 302 live stems per acre.

Units #45, 46, 47, 48 and 49: Selectively remove all alder, thin conifers to 20' o.c., and replant/interplant with a mixture of native conifers at 12' o.c. (302 stems/acre). Site preparation may include mechanical, chemical and weed mat methods.

Unit #51: Control brush with mechanical and/or chemical means and plant a mix of native conifers westward to the first road. This will about triple the size of this stand.

Units #52, 56, 57, 58, 59, 60 and 61: These units contain natural heritage element habitats for red alder/swordfern community and Douglas fir-western hemlock/swordfern community as identified by WDNR during a cooperative survey with NAS Whidbey Island. No thinning is recommended to maintain the habitat and wildlife values of the units.

Units #53, 54, 55 and 253: No thinning is recommended to maintain a buffer around the WDNR natural heritage element habitats and to maintain the wildlife values of the units.

Unit #62 (eastern half): This stand, located along the east side the old SERE Camp portion of the Survival Area, was set aside in 1974 as a "USS Constitution Grove" for the Bicentennial Celebration. The timber will be cut when needed and shipped back east in log length and form for use in refitting the ship. See also Stands #7 and 11 on the eastern side Torpedo Road.

Units #62 (western half), 64, 65, 66 and 266: These stands are bordered by roads and make a convenient management unit. Selectively thin to 20' o.c., removing all brush and alder. Where alder is the predominant species, leave all conifers. Replant/interplant resulting understocked areas with native conifers at the rate of 302 stems/acre.

Units #67 and 68: These units are across the same birder road as Units 62, 64 and 65. Treating them at the same as the previous units would provide one larger unit for thinning. Selectively thin to 20' o.c., removing all alder. Where alder is the predominant species, leave all conifers. Replant/interplant resulting understocked areas with native conifers at the rate of 302 stems/acre.

Unit #69: Control brush with chemical or mechanical means, plant with a mix of native conifers at the rate of 302 stems/acre.

Units #70, 71, 72, 270: No thinning is recommended to maintain the wildlife values of the units and to create a mosaic of age classes and forest structures in the Survival Area.

Units #74, 75, 76, 77, 78, 79 and 81: Selectively thin to 20' o.c., removing all alder. Where alder is the predominant species, leave all conifers. Replant/interplant resulting understocked areas with a mix of native conifers at the rate of 302 stems/acre.

Unit #80: This long, cliff top shoreline stand should be left alone to grow and to provide wildlife habitat, especially perch trees. These trees are commonly used as perch trees by bald eagles foraging around Crescent Harbor. No thinning is recommended to maintain the wildlife and wetland values of the unit.

Units #83 and 84: The Polnell Point bald eagle nest was established within these stands. The nest tree blew down in 2009 and a new nest has not been reestablished yet. The site is still a suitable nesting location and a future nest on Polnell Point is very likely. Several trees are intermittently used by bald eagles as perch trees. Because of the previous eagle nesting area, no thinning is recommended to maintain the wildlife values of the units.

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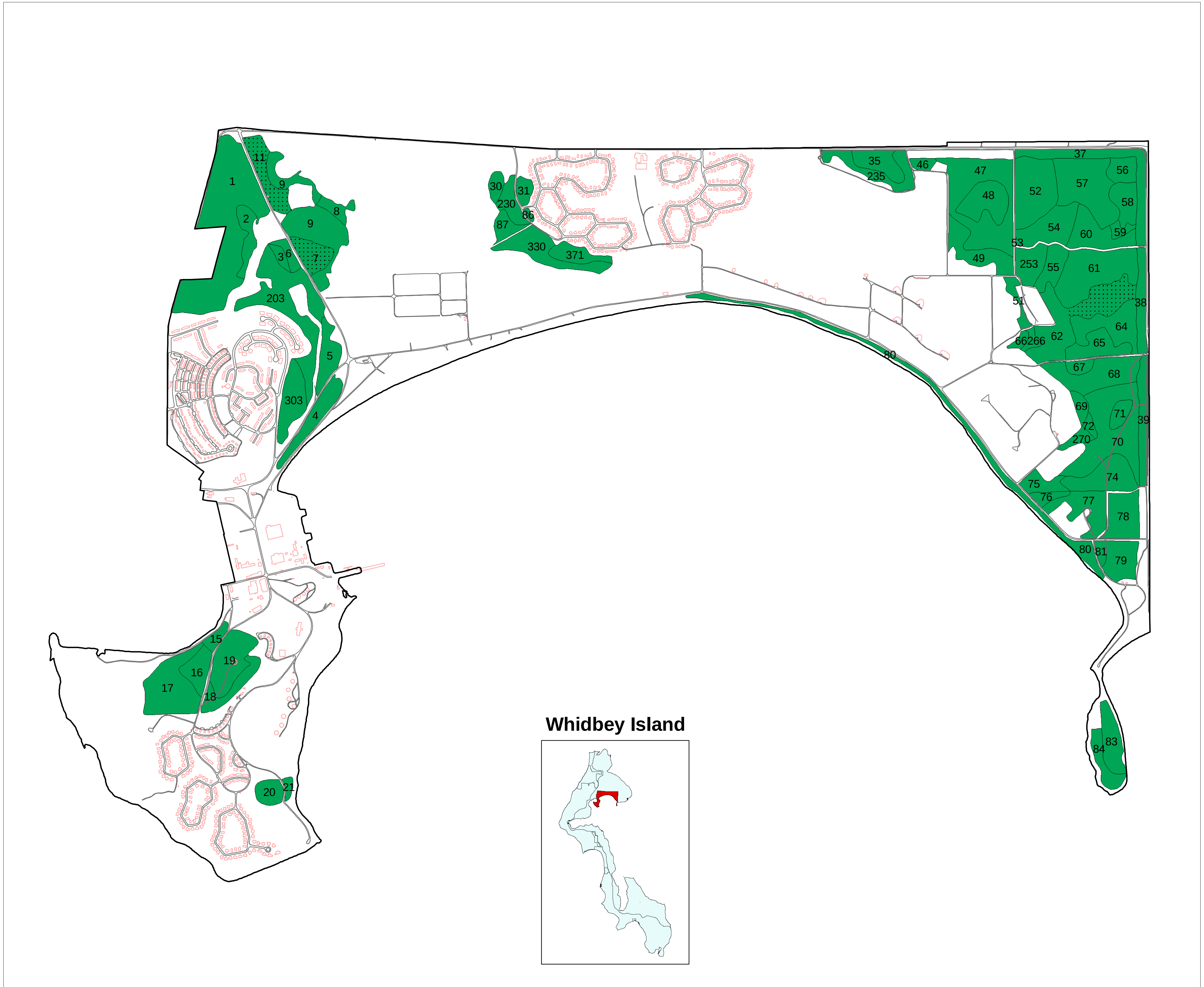
NAS Whidbey Island INRMP
Seaplane Base

Figure 4-6
Forest Management Units



LEGEND

- Installation Boundary
- Roads
- Buildings
- Constitution Groves
- Forest Unit and ID Number

SCALE 1:24,000

0.3 0 0.3 Miles

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4.6.8.3 OLF Coupeville

The following stand prescriptions apply to forest management units on OLF Coupeville component of NAS Whidbey Island. Figure 4-7 shows the mapped forest management units on OLF Coupeville. Forest management units in some portions of the base are identified individually but lumped together for management due to their location relative to controlling mission and operational concerns such as access, security, etc. The numbering sequence of stands may seem incomplete because areas mapped but not suitable for silvicultural management are not included.

Unit #1: This stand will be selectively thinned to 100 conifers/acre (20 feet on center) using the standard thinning criteria and prescription. Prior to thinning, the Navy property line will have to be established and flagged.

Unit #4: No thinning is recommended to protect the wildlife values of the stand.

Unit #5: Small conifers: no treatment anticipated.

Unit #14: Planned treatment is to spray or rake brush and plant conifers. When this area is planted, the visual buffers around the radar installation to the north will be interplanted with Douglas-fir to supplement for the Sitka spruce that are not doing well.

Unit #15: This stand will be selectively thinned to a residual stand of conifers spaced 20 feet on center per the standard thinning criteria and prescription. Any silvicultural activity will require the establishment of the south Navy property line.

Unit #16: Selectively remove red alder and interplant with conifers. No conifers to be removed in the thinning. The south Navy property line will have to be established prior to this thinning.

Unit #17: Red alder dominated unit with wet areas that are likely forested wetland patches. No thinning is recommended to protect the wetland and wildlife values of the unit and to create a mosaic of age classes and forest structures on OLF Coupeville.

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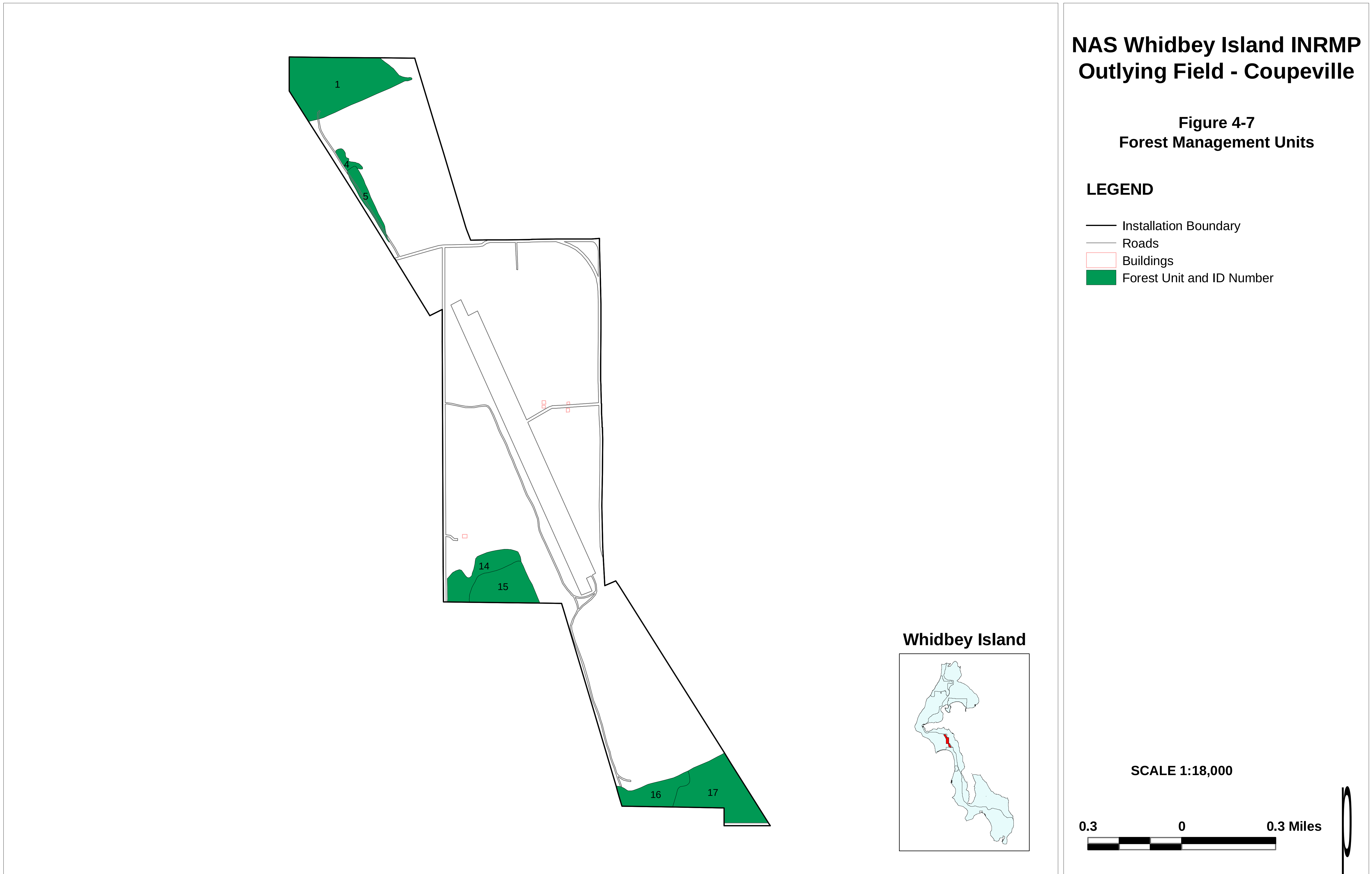
NAS Whidbey Island INRMP
Outlying Field - Coupeville

Figure 4-7
Forest Management Units



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4.6.8.4 Lake Hancock

The following stand prescriptions apply to forest stands on the Lake Hancock component of NAS Whidbey Island. Figure 4-8 shows the mapped forest management units on Lake Hancock. Forest management units in some portions of the base are identified individually but lumped together for management due to their location relative to controlling mission and operational concerns such as access, security, etc. The numbering sequence of stands may seem incomplete because areas mapped but not suitable for silvicultural management are not included.

Unit #2: The area was cleared of coniferous timber in about 1978 and the tower erected. The tower and building was demolished in 2010. Selectively remove red alder and interplant with conifers. No conifers to be removed in the thinning.

Unit #3: This stand of mixed conifers was selectively thinned in about 1986. Because of the previous thinning and eagle perching trees around Lake Hancock, no thinning is recommended to maintain the wildlife values of the units.

Units #4 and 5: Selectively remove the alder, leaving all conifers; replant with a mixture of Douglas-fir and western redcedar. This will require clearing volunteer trees and brush from the access roads. Many of the large conifers at the lake edge are used for eagle perching. All potential perching trees will be maintained.

Unit #8: Douglas-fir plantation planted 10' o.c. in cleared rows in 1987. The only treatment considered under this plan will be precommercial release thinning to remove all alder. No other treatments prescribed in this plan. In a few years it should be considered for precommercial thinning of the conifers.

Unit #10: Red alder dominated unit with wet areas that are likely forested wetland patches. No thinning is recommended to protect the wetland and wildlife values of the unit and to create a mosaic of age classes and forest structures on Lake Hancock.

Unit #12: Unit is composed of stunted conifers. Unit is located within and adjacent to bog habitat next to Lake Hancock. The area is slightly elevated by about 15 to 18 inches above the surrounding bog and the soil depth allows just enough drainage that the upland tree species can maintain themselves. Lodgepole pine is the dominant species. No treatment is recommended to maintain the wildlife and unique habitat values of the unit.

Unit #13: Small Douglas-firs, with low growth rates influenced by cold wet soils. No treatment prescribed under this plan.

Unit #15: Access into this unit is difficult. The unit is also adjacent to the forest south of the Lake Hancock property that contains a bald eagle nest and territory. Because of the limited access and nearby bald eagle nest, no treatment is prescribed to maintain wildlife values of the unit.

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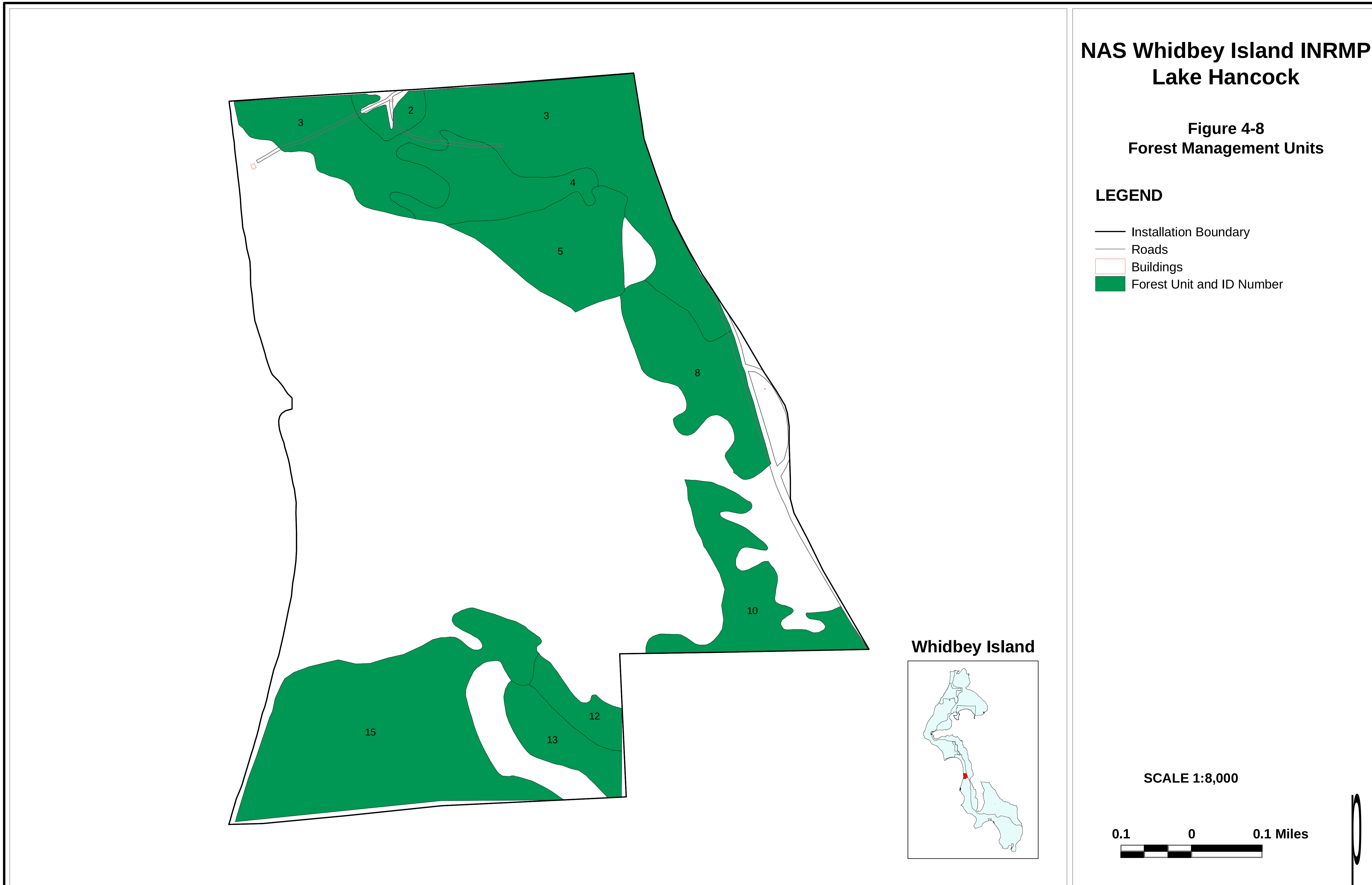
3
2
3
4
5
8
10
15
13
12
Whidbey Island
NAS Whidbey Island INRMP
Lake Hancock
Figure 4-8
Forest Management Units
LEGEND
Installation Boundary
Roads
Buildings
Forest Unit and ID Number
SCALE 1:8,000
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0
0.1 Miles

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4.6.9 Habitat Management – Invasive Plants/Noxious Weeds

Noxious and invasive weeds, as well as bird and insect pests, are controlled at the station by a civilian contractor under the Base Operating Services (BOS) contract. Exceptions include the golf course, which is tended by Community Services employees, and agricultural outlease lands, where pest control is the responsibility of lessee. A list of chemicals that may potentially be used for weed and pest control is compiled by the weed control contractor and then submitted to the station annually for Navy approval. Chemicals are chosen primarily for their effectiveness and for minimal potential environmental impacts. Chemical recommendations change as new chemicals become available and older registrations expire. The contractor typically chooses the specific method and timing of application of weed control measures, working closely with the Island County Noxious Weed Control Agent for advice.

To minimize costs and environmental impacts, chemicals are used as little as possible, in favor of mechanical or biological controls. In environmentally sensitive areas such as wetlands, mechanical weed control is typically used. With the exception of the direct application of herbicides and pesticides in wetlands and streams, no federal or state permits are needed for weed control at the station.

Table 4-1 provides a recommended herbicide application schedule for noxious weeds for NAS Whidbey Island.

Table 4-1. Recommended Herbicide Application Schedule.

Weed Species	Blooming Period	Preferred Period for Herbicide Application
Canada thistle	July-Aug	April-June
Tansy ragwort	July-October	April in areas where infestations have previously been identified, May to June to spray rosettes, late autumn is effective against seedlings
Gorse	March-May	March 15-June 30
Scotch broom	April-June	April-July
Himalayan blackberry	June-August	August-September

4.7 Fish and Wildlife Management

4.7.1 Resource Trustees

Resident food fish, including migratory salmon, are regulated both by the Marine Fisheries Division of the WDFW and the National Marine Fisheries Service (NMFS). Clams, crabs, and other invertebrate species come under the jurisdiction of the Shellfish Division of WDFW. NMFS is responsible for the protection of whales, dolphins, seals, and sea lions under the Marine Mammal Protection Act (MMPA). The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over sea otters under the MMPA. NAS Whidbey Island complies with all state and federal regulations governing marine resources. NAS Whidbey Island cooperates with the Washington Department of Health in monitoring the safety of marine invertebrates for human consumption.

4.7.2 Hunting Program

Hunting is allowed on selected areas of Ault Field, Seaplane Base and OLF Coupeville. No access to Lake Hancock is allowed for hunting or any other recreation because of the safety hazard of encountering unexploded spotting charges. A hunting instruction sets the current parameters of the hunting program and is attached in Appendix J. The natural resources program annual publishes specific hunting program handouts that describe open area and access procedures.

Currently, hunting for waterfowl (ducks, geese and coots) and black-tailed deer is allowed on select areas of Ault field; waterfowl, upland game (California quail, ring-necked pheasant and cottontail rabbit) and black-tailed deer is allowed on select areas of the Seaplane Base; and upland game is allowed on select areas of OLF Coupeville. Figure 4-9 shows the hunting areas on the installation.

Hunting follows laws and rules specified in the current WDFW Hunting Regulations which will be enforced by the NAS Whidbey Island Security Department and WDFW Law Enforcement personnel with assistance from the NAS Whidbey Island NRM. An installation hunting permit (fee required) is required to hunt on NAS Whidbey Island. All hunters are required to have all applicable State of Washington licenses, tags and cards for the species they are hunting. A pheasant release program run with birds provided by the WDFW is open to the general public. Waterfowl, other upland game and black-tailed deer hunting is only open to station personnel and their guests. The installation puts out hunting pamphlets each year with the specific information, access requirements, and open areas.

4.7.3 Fishing Program

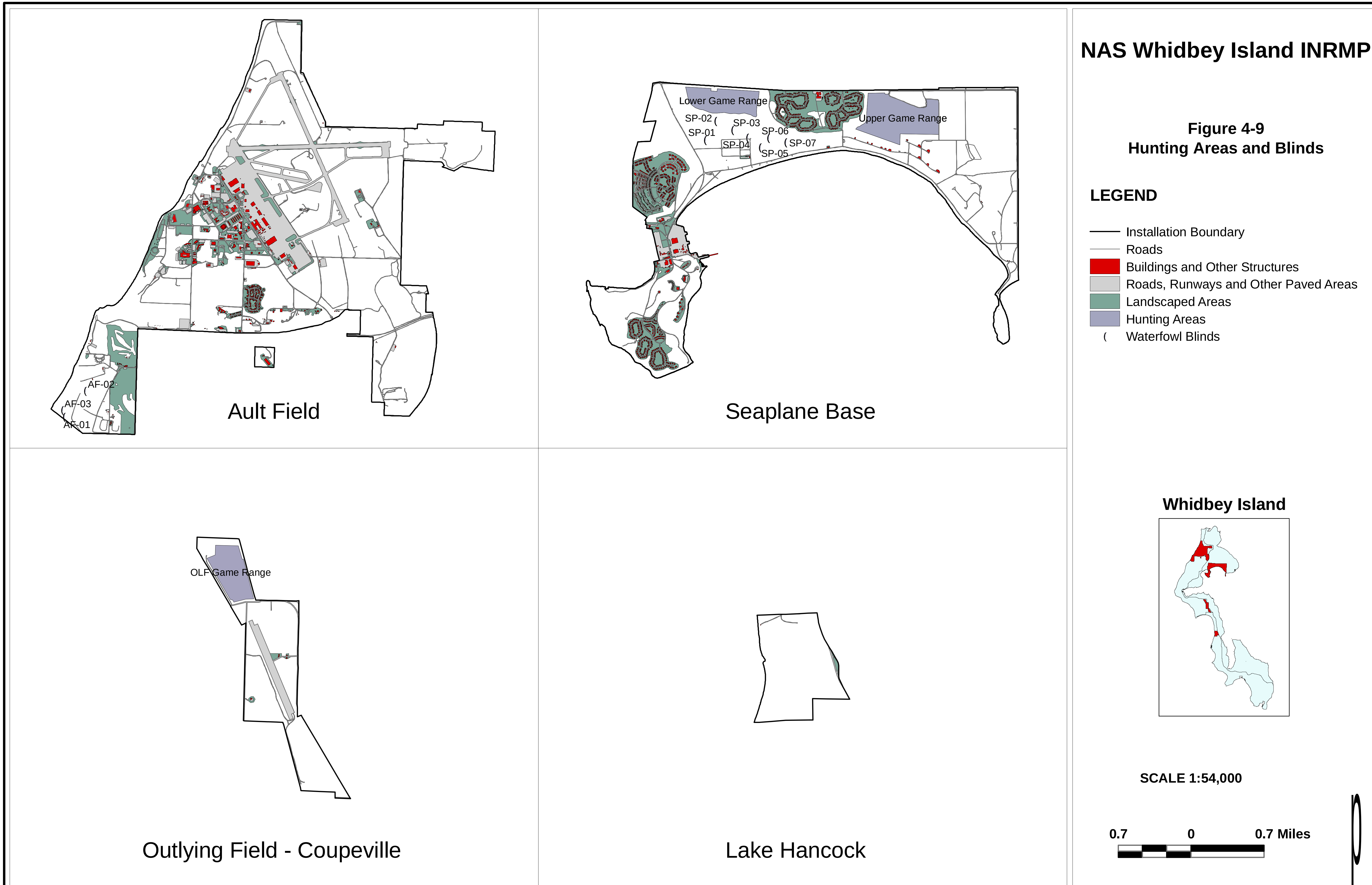
Recreational fishing on NAS Whidbey Island is allowed for DoD or other authorized personnel and their guests with authorized access to the installation. All authorized fishermen will obey State of Washington fishing regulations, including obtaining the appropriate license. Fishing is allowed along open access shorelines of Ault Field and the Seaplane Base. No access to Lake Hancock is allowed for fishing or any other recreation because of the safety hazard of encountering unexploded spotting charges. Typically, fishing for saltwater species occurs along the beaches of Crescent and Oak Harbors and along the Ault Field shoreline.

<u>Penfold Pond</u>

Penfold pond is a small pond that is located south of the Crescent Harbor housing area on the Seaplane Base. This pond was stocked with trout in the past and used for a youth put and take fishery. No fish have been stocked in the pond for 15 years. The pond has no screened outlet and the outlet flows into the Crescent Harbor marsh wetland complex. The pond may be stocked in the future for youth fishing. An assessment will be done with WDFW to determine if the outlet needs to be modified to prevent fish movement and what fish might be suitable for stocking given the new condition downstream. Also, a fish stocking permit will need to be acquired.

4.7.4 Reptiles and Amphibians

As mentioned above, managing habitat for diversity, protection, and enhancement will have the greatest benefit for wildlife, including reptiles and amphibians, on NAS Whidbey Island. Protection of wetlands and retention of some downed logs will have the greatest benefit to these species.


NAS Whidbey Island INRMP
Figure 4-9
Hunting Areas and Blinds
LEGEND
Installation Boundary
Roads
Buildings and Other Structures
Roads, Runways and Other Paved Areas
Landscaped Areas
Hunting Areas
Waterfowl Blinds
Ault Field
AF-01
AF-02
AF-03
Seaplane Base
Lower Game Range
Upper Game Range
SP-01
SP-02
SP-03
SP-04
SP-05
SP-06
SP-07
Outlying Field - Coupeville
OLF Game Range
Lake Hancock
Whidbey Island
SCALE 1:54,000
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0.7 Miles

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4.7.5 Shellfish

Shellfish harvesting is allowed on the Seaplane Base at the Forbes Point shellfish bed for DoD or other authorized personnel and their guests with authorized privileges to the installation. All authorized shellfish harvesters will obey State of Washington regulations and, for authorized tribal gathers, the tribal harvest management plan and appropriate tribal regulations. Shellfish harvesting occurs regularly at Forbes Point on the Seaplane Base as does catching crab by hand in the intertidal zone of Crescent Harbor early in the harvest season.

4.7.6 Marine Fish

The Magnuson-Stevens Fishery Conservation and Management Act, as amended in October 1996, requires that federal agencies consult with the U.S. Secretary of Commerce through NMFS on any action proposed to be undertaken that may adversely affect essential fish habitat (EFH). The objective of this EFH assessment is to determine whether or not the proposed project may adversely affect designated EFH for relevant commercial, federally managed fish species within the proposed action area. It also describes conservation measures proposed to avoid, minimize, or otherwise offset potential adverse effects to designated EFH resulting from the proposed project. Subsection 50 CFR 600.920(f) specifies that EFH consultation should be consolidated with existing environmental review procedures required by other statutes, such as ESA, when appropriate. The NAS Whidbey Island NRM will review all proposed projects, operations, and training plans for possible impacts to EFH. If impacts to EFH are identified, the NRM provides recommendations to the program/project managers so that changes or mitigation can be considered early in the planning process.

4.7.6.1 Essential Fish Habitat

On January 17, 2002, the final rule on the essential fish habitat (EFH) provisions of the Magnuson-Stevens Act was published (NMFS 2002). The EFH provisions of the Act call for direct action to stop or reverse the continued loss of fish habitats. Toward this end, Congress mandated the identification of habitats essential to managed species and measures to conserve and enhance this habitat. The Act requires cooperation among NMFS, fishery management councils, fishing participants, and Federal and state agencies to protect, conserve, and enhance essential fish habitat. The Act also requires that Federal agencies must consult with NMFS for projects and operations that potentially affect essential fish habitat. In keeping with a programmatic approach, NMFS uses the two broad scenarios summarized below for EFH consultations (NMFS 2002). The specifics of each consultation, including suggested EFH conservation and enhancement recommendations, will be tailored to meet the proposed program or project activity.

> 1. Federal actions involving ESA-listed species: in the situation where Federal agency actions are subject to Section 7 consultations under the ESA, such consultations will be combined with EFH consultations to accommodate the substantive requirements of both ESA and the Magnuson-Stevens Act as appropriate.
>
> 2. Federal actions that do not involve ESA-listed species: under this scenario, Federal agency actions are not subject to the ESA Section 7 consultation requirements, but are subject to the EFH consultation requirements of the Magnuson-Stevens Act. In this circumstance, a programmatic approach to consultation, tiering from the general program to specific actions, will be most appropriate. When programmatic consultations are completed, project-specific consultations should only be necessary on those actions not contemplated by the programmatic consultation, or those actions

identified as needing individual consultation in the programmatic consultation.

Included in this scenario are Federal agency actions subject to the National Environmental Policy Act, Federal Power Act, and/or Section 404 of the Clean Water Act. The Federal agency will request that NMFS make a finding that an existing process can be used to meet EFH consultation requirements. NMFS will respond with a letter detailing how the existing process would be used for the EFH consultation and will work with the action agency to ensure that the EFH consultation process is folded into the agency's environmental review process under one of these statutes. EFH information will be submitted through the existing practice, and NMFS will provide advisory conservation recommendations as part of its existing role in the process.

The main EFH on NAS Whidbey Island properties that is covered under this INRMP is the marine intertidal zone along the shoreline and in estuarine and pocket wetlands adjacent to the shoreline. These areas are EFH for most marine, estuarine and anadromous fish that are found in Puget Sound.

4.7.6.2 Noise in Water and Air

There is increasing concern regarding the effect of human-generated (anthropogenic) noise on marine organisms. While most concern is focused on marine mammals, many of the lower frequency (under 1,000 Hz) sounds are also likely to affect fish (Popper 2003).

At NAS Whidbey Island, the NRM will review operations and projects for potential noise impacts to fish and wildlife. Some project actions, such as pile driving, may result in noise and may negatively affect nearby species. The NRM will work with project and program managers to reduce the effects of anthropogenic noise on fish and wildlife. The NRM will use his or her expertise to advise the command and program and project managers in the use of Best Management Practices to reduce or eliminate the effects of noise on fish and wildlife.

4.7.7 Marine Mammals

The Marine Mammal Protection Act of 1972 (MMPA) prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S.

MMPA Definitions

Take: to harass, hunt, capture, or kill, or attempt to harass, hunt, capture or kill any marine mammal.

Harassment: Section 3 (16 U.S.C. § 1362) in subsection (18)(A) reads as follows: "The term "harassment" means any act of pursuit, torment, or annoyance which–

(i) has the potential to injure a marine mammal or marine mammal stock in the wild; or
(ii) 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."

Subsection (18)(B) reads as follows: "In the case of a military readiness activity (as defined in section 315(f) of Public Law 107-314; 16 U.S.C. 703 note) or a scientific research activity conducted by or on behalf of the Federal Government consistent with section 1374(c)(3) of this title, the term "harassment" means -

(i) any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild; or
(ii) any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered."

Subsection (18)(C) reads as follows: "The term "Level A harassment" means harassment described in subparagraph (A)(i) or, in the case of a military readiness activity or scientific research activity described in subparagraph (B), harassment described in subparagraph (B)(i)."

Subsection (18)(D) reads as follows: "The term "Level B harassment" means harassment described in subparagraph (A)(ii) or, in the case of a military readiness activity or scientific research activity described in subparagraph (B), harassment described in subparagraph (B)(ii)."

The NRM will review all proposed projects, operations and training plans for possible impacts to marine mammals. If impacts to marine mammals are identified, the NRM will provide recommendations to the program/project managers so that changes or mitigation can be considered early in the planning process. The NRM will also inform personnel that operate watercraft about the MMPA regulations and restrictions regarding marine mammals.

If distressed or stranded marine mammals are found at NAS Whidbey Island, the IEPD/NRM should be immediately contacted. After recording species and location information, the IEPD/NRM should contact the Whale Hotline (1-800-562-8832) to alert the Northwest Marine Mammal Stranding Network. Harbor seals can be found on any of NAS Whidbey Island beaches during the spring pupping season, in limited numbers, but most marine mammal use is on concentrated haulout rocks. Known marine mammal haulout rocks in the nearby waters (primarily in Crescent Harbor off the Seaplane Base) of NAS Whidbey Island are noted in Figure 2-36.

4.7.8 Terrestrial Mammals

Managing habitat for diversity, protection and enhancement will have the greatest benefit for wildlife on NAS Whidbey Island. The NAS Whidbey Island NRM will review all proposed projects, operations, and training plans for possible impacts to terrestrial mammals, realizing, however, that many minor as well as major projects may impact small mammals such as mice and voles, without consequences to the health of the populations of these species. If serious impacts to terrestrial mammals on NAS Whidbey Island are identified, the NRM will provide recommendations to the program/project managers so that changes or mitigation can be considered early in the planning process.

4.7.9 Birds

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing or possessing migratory birds is unlawful.

Prohibited Acts: Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or receive any migratory bird, part, nest, egg or product, manufactured or not.

On March 15, 2005, the U.S. Fish and Wildlife Service published in the Federal Register (FR 70(49):12710-12716) a final list of the bird species to which the MBTA does not apply because they are not native to the United States and have been introduced by humans everywhere they occur in the nation. The list is required by the Migratory Bird Treaty Reform Act of 2004. The actual list of migratory birds protected by the MBTA is published in the Code of Federal Regulations (Title 50, Part 10.13). When it became law in 2004, the Reform Act excluded any species from protection not specifically included on the Title 50, Part 10 list.

Nuisance birds using Navy Northwest installations include the glaucous-winged gull, Canada goose, rock dove, Eurasian starling and house sparrow. Gulls and geese are a nuisance because of the large amount of feces they produce. The Navy has contracted with U.S. Department of Agriculture Wildlife Services (USDA WS) to control these problem birds on some installations. USDA WS has the expertise and necessary permits to deal with all problem wildlife, not just birds.

Partners in Flight
In 1990, the National Fish and Wildlife Foundation initiated the Neotropical Migratory Bird Conservation Program, known as "Partners in Flight - Aves de Las Americas (PIF)". The purpose of the program is to bring together the diverse array of groups and individuals involved in the conservation and management of birds and their habitats. The initial focus was on neotropical migrants, but has now spread to include most birds requiring terrestrial habitats. The PIF strategy for effective conservation relies on setting realistic biological priorities, using an appropriate geographic scale and applying an ecosystem management approach. The primary goals and objectives of the DoD Partners in Flight program are to:

- Apply information collected from this partnership program to support DoD mission requirements;
- Take proactive management actions to prevent bird species from reaching threatened or endangered status;
- Facilitate cooperative partnership efforts consistent with the military mission;
- Determine the status of migratory and resident bird populations on DoD lands and the causes of population fluctuations;
- Reduce bird aircraft strike hazard risks through implementation of mobile radar;
- Maintain and restore priority habitats on DoD lands for migratory and resident bird populations;
- Reduce or eliminate pesticide use in sensitive habitats, especially in and around wetlands and riparian areas;
- Reduce the spread and impact to birds and their habitats of invasive and nuisance species on military lands, including feral and free-roaming cats.

For further information on the DoD Partners in Flight program go to http://www.DODpif.org (Department of Defense 2002).

4.7.10 Pest Management and Nuisance Wildlife Species Control
The NRM and Installation Pest Manager Coordinator are responsible for the management of pest problems such as insects and rodents. The NRM will respond to calls for sick or injured wildlife and will either resolve the situation or notify the state for assistance. As mentioned in the Fish and Wildlife section, US Department of Agriculture Wildlife Services or other groups may be brought in to deal with

chronic problems with birds or other wildlife. Pest management will include feral dog and cat control per Department of Navy Feral Dog and Cat Policy (Figure 4-10).

The installation has an Integrated Pest Management Plan (IPMP), which provides guidelines for the use and storage of pesticides and herbicides. The NRM reviews the plan and ensures that pesticides and herbicides are used in appropriate situations.

In the past USDA, Wildlife Services has used baited traps to try and catch starlings and brown-headed cowbirds, removed pigeons from hangars, trapped coyotes around the airfield and live-trapped feral cats near the housing areas (Goodman 1995).

No regular control program for wildlife pests and introduced species currently occurs on NAS Whidbey Island and pest management and nuisance species control will occur, as needed, when any problems are identified.

4.8 General Environmental Protection Measures

4.8.1 Project Review Procedures

The installation IEPD/NRM reviews all construction/maintenance projects and military training operations performed on the installation. This ensures that the installation is in compliance with all environmental laws and regulations, provides feedback to the program managers regarding costs and length of time to receive permits, and provides an additional design review check to help catch conflicts or other natural resources issues that were overlooked by the program managers.

4.8.2 Spill Prevention, Control, and Countermeasures

A Spill Prevention, Control, and Countermeasures (SPCC) plan has been developed for the installation (Appendix E). The Environmental Division implements the plan; coordinates training and drills for installation staff; carries out inspections of storage tanks and equipment; reviews procedures that have a potential to release oil to the environment; and participates as spill response team members in the event of an actual release. The SPCC plan identifies sensitive shorelines and wildlife areas in the vicinity of the installation and prescribes strategies for protecting these areas. The Environmental Division, Operations Staff are trained and has the necessary equipment to respond to a spill to the water and begin clean-up procedures. The installation will call upon the Commander, Navy Region Northwest, for notification and assistance in a spill response.

4.9 Related Program Management Issues and Impacts on Natural Resources

4.9.1 Agricultural Outleasing

There currently no active agricultural outleases on NAS Whidbey Island. There are currently no immediate plans to reissue leases during the timeframe of this INRMP. If NAS Whidbey Island reissues leases in the future, it will be on a competitive bid basis and will adhere to all leasing notification and management requirements.

Agricultural outleasing has a long history on installation properties. Figure 4-11 shows the locations of some of the most recent agricultural outleases on NAS Whidbey Island. Agricultural outleasing can occur on lands suitable and available for crop production at NAS Whidbey Island. Leases are on a highest bid and fair market value basis, can extend up to ten years, and require an annual per acre rental fee. These fees are distributed into a general Navy fund to support the administration of the outlease program and natural resource management at naval facilities. Farming methods, pesticide use, noxious weed control, and other land management practices and lease compliance issues are

DEPARTMENT OF DEFENSE PARTNERS IN FLIGHT, AUGUST 2005 PAGE 7

Dept. of Navy Feral Cat Policy

Department of the Navy
Office of the Chief of Naval Operations
2000 Navy Pentagon
Washington, D.C. 20350-2000

In Reply Refer To: 5090, Ser N456M/1U595820, 10 Jan 2002

From: Chief of Naval Operations
Subj: **Policy letter preventing feral cat and dog populations on Navy property**
Ref: (a) SECNAVINST 6410-1A, of 16 Aug 1994, Veterinary Health Services
(b) AFPMB TIM #37, Guidelines for Reducing Feral/Stray Cat Populations on Military Installations in the U.S.
(c) OPNAVINST 6250.4B, of 27 Aug 1998, Pest Management Programs
(d) Executive Order 13112, of 3 Feb 1999, Invasive Species

1. This letter clarifies the application of reference (a) regarding the prevention of free roaming (also called wild, feral or stray) tat and dog populations on Navy installations. The objective is to prevent injury or disease to Navy personnel, and eliminate adverse impacts on native wildlife. It requires Navy commands to institute pro-active pet management procedures in order to prevent establishment of free roaming cat and dog populations. Free roaming cats and dogs pose a potential public health threat to personnel on Navy installations, and they pose a threat to wildlife including endangered species and migratory birds.

2. Existing policy at paragraph 4-2c(4) of reference (a) states Dogs, cats, and other privately-owned or stray animals will not be permitted to run at large on military reservations. Consistent with this policy, Navy commands must ensure the humane capture and removal of free roaming cats and dogs. Consistent with this requirement, Trap/Neuter/Release (TNR) programs will no longer be established on Navy land. All existing TNR programs on Navy land must be terminated no later than 1 January 2003.

3. Responsible pet ownership is a key factor in eliminating free roaming cat and dog populations. In consultation with supporting Army Veterinary Office, installations shall implement appropriate pet management measures to preclude establishment of feral cat/dog populations, including, but not limited to the following:

Require installation residents to keep and feed pet animals indoors or under close supervision when outdoors (such as on leash and collar or other physical control device - cage, fenced yard etc.).

Encourage neutering or spaying of cats and dogs before they reach reproductive age (exceptions to this policy can be made on a case by case basis as determined by the Installation Commander).

Require routine vaccinations of vats and dogs for rabies and other diseases as required by federal, state and local laws and ordnances. A current vaccination record is required at time of registration of pets.

Require microchipping registration (or other system of pet identification approved by supporting veterinary office) of all pet cats and dogs brought onto installations. Installation residents must register cats and dogs and have pets wear registration or identification tags at all times.

Prohibit the feeding of feral animals on the installation.

Provide educational materials to pet owners regarding installation regulations and general pet management.

Enforce prohibition of abandonment of animals on installations.

Comply with all humane and animal control regulations at the federal, state and local level (and their equivalents in host nation countries).

Navy installations in Europe that do not have a supporting veterinary office contact 100th Medical Detachment (VA HQ) (011) 49-622-177-2968; for all other locations that do not have a supporting veterinary office the POC is the VETCOM HQ, Commander (210) 221-6522.

4. Effective prevention, management and elimination of feral cat and dog populations requires close coordination and cooperation between natural resources, pest management, security, veterinary, and housing personnel to develop and implement an effective and humane program. Reference (b) provides information for preventing free roaming cat populations on military installations General pest management guidelines are detailed in reference (c). Every effort should be made to work with other federal, state and local agencies to support reference (a) and reference (d) by eliminating free roaming cat and dog populations on Navy land. Navy commands. should work with local animal control agencies to determine the best approach for the ultimate disposition of the captured animals. Every effort should be made, if practical, to find homes for adoptable feral cats and dogs.

5. My point of contact on this issue is Mr. Joe Cook, CNO N456M, at (703) 602-5335, or DSN 332-5335.

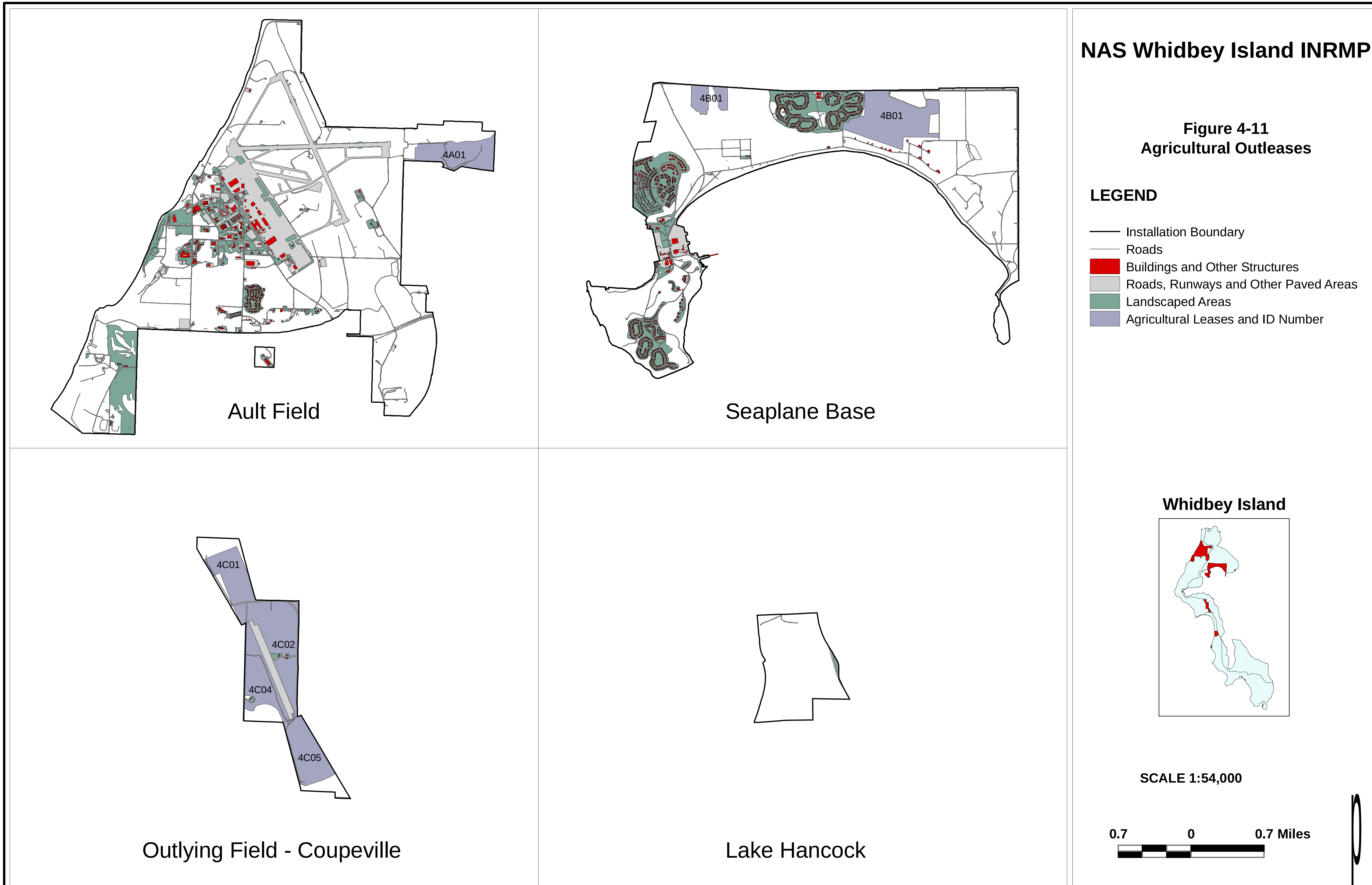
WILLIAM G. MATTHEIS
Deputy Director, Environmental Protection, Safety and Occupational Health Division

Don't Let Your Cat Go AWOL

https://www.denix.osd.mil/denix/Public/ES-Programs/Conservation/Legacy/SafeCats/safecats.html

Military bases often struggle with how to manage domestic cat populations. Frequent transfers of personnel often means cats are left behind, abandoned to fend for themselves. Lucky cats find a new human, but most are not so fortunate. Base commanders must deal with how to humanely and cost-effectively resolve the issue of too many free-roaming cats. ***As a cat owner, you are an important part of the solution.***

Figure 4-10. Navy Feral Dog and Cat Policy


NAS Whidbey Island INRMP
Figure 4-11
Agricultural Outleases
LEGEND
Installation Boundary
Roads
Buildings and Other Structures
Roads, Runways and Other Paved Areas
Landscaped Areas
Agricultural Leases and ID Number
Ault Field
4A01
Seaplane Base
4B01
4B01
Outlying Field - Coupeville
4C01
4C02
4C04
4C05
Lake Hancock
Whidbey Island
SCALE 1:54,000
0.7
0
0.7 Miles

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overseen by personnel from the installation's natural resources program. Regulations and requirements involving soil conservation, pest management, drainage ditch maintenance, fire prevention, and water quality protection are included in the leases. Specific requirements pertaining to particular pieces of land are typically included in the leases as well (e.g., exclusion of grain crops on lands in the vicinity of the airfield). Agricultural outleasing can benefit the installation by helping to control noxious weeds on suitable land parcels and provide income for natural resources management. However, some agricultural practices near the airfield runways can also increase BASH risks.

4.9.2 Bird/Animal Aircraft Strike Hazard (BASH)

The Navy implements a BASH program to mitigate or reduce the bird aircraft strike risk. This primary focus of this program is on Ault Field and to some extent OLF Coupeville, where the main airfield assets are located and the aircraft land and take off. This is where the greatest risk of bird and aircraft collisions occurs. Bird aircraft strikes are extremely hazardous to pilots and economically costly. This is a substantial problem for NAS Whidbey Island due to the large numbers of birds utilizing the station and the abundance of habitat attractants in the vicinity of the runway at Ault Field. BASH issues are also of concern at OLF Coupeville, but the primary issues and aircraft use occurs at Ault Field. The occurrence of freshwater wetlands, water-bearing ditches, marine shoreline, perch sites, tall brush, and short grass at Ault Field all draw birds to the area.

The installation BASH program is run through the NAS Whidbey Island, Operations Department. The installation has a person contracted through the USDA, Wildlife Services that performs the day to day aspects of the BASH program. The NR program provides natural resources expertise to the BASH program and coordinates with the BASH program when needed on overall natural resources management on NAS Whidbey Island properties.

The Navy has been compiling data on numbers of bird aircraft strikes reported at NAS Whidbey Island and bird species involved since 1989. Shorebirds and waterfowl are the types of birds most commonly hit by aircraft at the station. Soaring raptors are some of the highest risk BASH issues occurring around Ault Field.

While the primary management goal for bird species under this INRMP is to protect and enhance existing habitats and therefore maintain species richness, managers must act responsibly to reduce the risk of bird aircraft strike hazards around the operational zone of the runways. This requires a thorough assessment of the locations of existing bird habitat and bird movement patterns at the station and the development of specific strategies to increase or decrease the attractiveness of habitat to birds in appropriate areas. Efforts have intensified to develop a more formalized approach as BASH problems continue to be a high priority for the station. The station completed and implemented a BASH plan in 1997. The BASH plan includes an in-depth study of the problems and proposes detailed management recommendations (Appendix I). Therefore, this INRMP only briefly addresses the issue.

The following activities are currently performed to minimize the incidence of BASH:

(1) monitoring bird activity - includes making bird counts, maintaining current bird activity maps for the station, providing information on seasonal bird activities and conducting wildlife hazard assessments;

(2) monitoring bird aircraft strike incidences - includes collecting and identifying dead birds and bird parts from the airfield and aircraft following strikes, reporting incidences, and compiling and reviewing data on incidences;

(3) educating pilots and other personnel on BASH and methods of avoiding strikes - includes efforts to raise pilot awareness of pre-flight and in-flight options;

(4) eliminating bird attractants in the vicinity of the airfields - includes maintaining taller grass height, controlling broad-leaved weeds, maintaining uniformity of cover, controlling invertebrate and rodent pests, eliminating standing water, removing roost and perch sites such as trees, and other techniques. Methods to accomplish this can include chemical application such as herbicides and rodenticides and mechanical habitat manipulation such as mowing, brush hogging, tree cutting, burning and is some suitable instances agricultural manipulation under an agricultural outlease;

(5) implementing active bird control methods - includes use of pyrotechnic equipment to disperse birds from airfields and the use of netting, shooting, and trapping to remove birds from area; and

(6) modifying flight operational procedures - includes watching for and reporting high hazard periods, modifying timing and formation of approaches and takeoffs under high bird hazard conditions, changing timing of more hazardous low-level routes to accommodate bird movement patterns, and other modifications.

The installation has a USFWS depredation permit that allows the Navy to lethally remove problem birds (protected under the Migratory Bird Treaty Act) from around the airfield and a special use permit that allows the Navy to collect the remains of birds for use in bird identification. The permits carry conditions that are adhered to by the Navy, and all birds lethally removed or collected under the permits are reported to the USFWS annually. Lethal removal is a last resort action to address problems birds around the airfield and non-lethal dispersal methods are use before lethal removal is determined to be necessary.

The installation also has a bald eagle permit from the USFWS that allows bald eagles to be trapped, banded, and removed from the airfield and a deer depredation permit from the WDFW that allows for the lethal removal of deer from the airfield. Bald eagle trapping and relocating will focus on juvenile birds that can congregate near the runways, but will to avoid trapping adults during nesting season to prevent causing nesting failure by removing the adults of nearby nesting pairs. Deer removal is limited to a few deer that try to inhabit the areas near the runways each year.

From a natural resource management perspective, the risk of bird aircraft strikes can best be reduced by a long-term habitat management approach. Removing attractive habitat features from the vicinities of the airfields is probably the most cost-effective method of reducing BASH without significantly impacting the biological diversity of NAS Whidbey Island.

The airfields have generally been maintained as treeless areas since the construction of the runways in the 1940s, but small numbers of trees and patches of tall shrubs still occur in peripheral areas of the airfields. Removing the trees, snags, and tall shrubs from the immediate vicinities of the airfields will eliminate bird perching and roosting habitat. No obstructions such as trees are allowed within the Transitional Surface of the runways. This is an imaginary plane extending upwards on a 7:1 slope from an imaginary line on the ground 750 feet from the runway centerline.

The runway at OLF Coupeville is used primarily for simulated nighttime aircraft carrier landings, although daytime touch and go exercises are conducted occasionally. While fewer birds are active during darkness, the strike hazard increases due to the lack of visibility suffered by pilots. However, bird aircraft strikes are not considered a significant problem, probably because there are fewer bird attractants in the airfield area and vicinity.

4.9.3 Military Training Activities

Most of the military training that occurs on NAS Whidbey Island is from aircraft operations. Primary impacts to fish and wildlife resources are from noise disturbance or direct strike. Of notable exception is underwater Explosive Ordnance Disposal Training, which occurs in Crescent Harbor.

4.9.3.1 Explosive Ordnance Disposal Training

The Navy Explosive Ordnance Disposal (EOD) team stationed in the Puget Sound region is responsible for safeguarding lives and property by rapidly responding to threats, removing explosive devices, and disposing of explosive devices. The EOD units require frequent training to stay current in disposal techniques. The training consists of using explosive charges to destroy or disable inert mines at four underwater locations in Puget Sound, including a site at Crescent Harbor. There is also a disposal/training site on land near the Survival Area at the Seaplane Base. In accordance with OPNAVINST 8027.6E, Navy qualified EOD technicians must re-qualify monthly in the preparation, placement, and detonation of explosive materials. The explosive used is C-4. The weight of the explosive used in training ranges from 2.5 to 20 pounds.

A Biological Assessment (BA) of the underwater EOD training was written in 2000 (SAIC 2000) and submitted to NMFS and USFWS in 2001. The BA describes in detail the EOD operations and addresses potential impacts to resources. The training affects aquatic resources in Crescent Harbor by adding sources of loud impulse noise into the water. NMFS and USFWS completed their Biological Opinions in 2008 (2001/00063 and 13410-2009-F-0020, respectively) and additional opinions for reduced levels of training in 2010 for EOD operations within the Northwest Training Range Complex (NMFS Programmatic Biological Opinion on Keyport AND Northwest Training Range Complexes and USFWS 13410-2009-F-0104). Numerous conservation measures and terms and conditions where developed in the BOs for the training to reduce, offset, and quantify affects from the training.

4.9.4 Firewood Cutting

There is no regularly established firewood cutting program on NAS Whidbey Island. Firewood cutting tends to remove down and dead wood from forest areas that can reduce important microhabitat features use by amphibians, reptiles, and birds. Therefore, a personal-use-only firewood cutting program might be intermittently established at the base if suitable resources are available and security conditions permit. If so, it will be implemented, administered, and controlled as directed by CNRNW and NAVFAC NW instructions. The installation NRM will identify suitable and available material and coordinate with the NAVFAC NW Forester to produce a map that must accompany each and every firewood cutting and removal permit. This is an opportunistic program, with the suitable material and areas available and dependent upon logging slash, removal of hazard trees, and natural occurrences such as storm damage and windthrow in accessible areas. The number of permits allowed to be issued to each authorized patron will be limited. It will be implemented only in areas with suitable material and access. In accordance with law and regulation, timber is government property that may be disposed of through prescribed, legally sufficient, and compliant methods. For the firewood-cutting program, this means that a serially numbered cutting permit/bill of sale must be issued. Fees are collected for woodcutting and may include a payment for the material as well as a payment for administration of the program. These fees are collected via a special permit provided by the NAVFAC NW Forest Management Program, serially numbered and tracked for deposits to the U. S. Treasury. The funds received for firewood are deposited to the Navy Timber Sales Receipts Account pursuant to Department of Defense Financial Management Regulation Volume 11A, Chapter 16 (August 2002) "Accounting For Production and Sale of Forest Products".

4.9.5 Outdoor Recreation

An outdoor recreation Cooperative Agreement between the Navy, the National Park Service (NPS), and the Washington Interagency Committee for Outdoor Recreation provides for the coordination of actions relating to the use, management, and protection of outdoor recreation resources at NAS Whidbey Island (see Appendix D for the complete text of this agreement). This addresses outdoor recreation as it relates to the use of natural resources, not highly developed recreation facilities such as playgrounds and golf courses. NPS and the State have agreed to serve in an advisory capacity to NAS Whidbey Island, providing technical assistance, information, and education where needed and within the limitations of the availability of funds and personnel. This agreement was signed in the spring of 1996. The National Park Service (NPS 1990) wrote an Outdoor Recreation Management Plan for NAS Whidbey Island in 1990. This plan includes a summary of the existing recreational opportunities at the station, as well as objectives and recommendations for managing the outdoor recreation program. The stated objectives of the plan are to:

1) address optimum outdoor recreation benefits within the constraints of the military mission and capability of the resources;

2) identify natural and other special interest areas, and measures to protect and preserve these areas whenever feasible;

3) mediate conflicts between competing recreational uses;

4) ensure multiple use of natural resources for outdoor recreation, fish and wildlife, forestry, and other purposes on a sustainable yield basis; and

5) maximize available and potential outdoor recreation resources for the benefit of military personnel, their dependents, and civilian employees of the station (NPS 1990).

These objectives account for the need to manage outdoor recreation in a manner compatible with natural resource management objectives.

A number of outdoor recreation facilities are maintained at NAS Whidbey Island. The primary facilities at Ault Field include:

- Cliffside Park, with 60 spaces for recreational vehicle camping and a large picnicking capacity;
- Rocky Point Picnic Area, with 20 spaces for camping and a large picnicking capacity;
- Rocky Point Archery Range;
- the golf course;

Seaplane Base has a marina on Crescent Harbor and a viewpoint vista at Forbes Point. Boating from the marina occurs off of NAS Whidbey Island control property and can occur in the vicinity of sensitive areas like seal haulout rock or bald eagle nests. To date no specific problems from the activity has been identified. Lake Hancock has a viewpoint vista off the east side of Highway 525, and OLF Coupeville allows controlled model airplane flying. In addition to these facilities, more dispersed recreation activities are pursued in the abundant scenic natural areas of the station. These activities include bicycling, beachcombing, bird watching, boating, hiking, and other activities. Further information on these activities is available in the Outdoor Recreation Management Plan (NPS 1990).

In general, most recreation activities at NAS Whidbey Island are compatible with natural resources in certain areas. Those activities that are rated somewhat compatible with a particular resource are evaluated as to the long-term impacts on ecosystem health, biodiversity, and individual species viability. In Table 4-2, recreation activities are rated as to their compatibility with various natural

Table 4-2. Level of Compatibility Between Outdoor Recreation and Natural Resources.

Activity	Bald Eagle Nests	Amphibs.	Neotrop. Migratory Birds	Soil Resources	Seal Haulout Rocks	Mature Forest Communities	Wetlands
Archery	2	3	3	3	NA	2	NA
Shooting Ranges	2	NA	1	3	NA	2	NA
Picnicking	2	3	4	4	NA	3	3
Wildlife Watching	3	4	4	4	4	4	4
Boating	2	NA	NA	NA	1	NA	4 for beaches
Off-road Vehicle Operation	1	1	2	1	NA	1	1
Model Airplane Flying	1	2	1	4	1	NA	1
Hiking/ Jogging/ Walking	2	3	4	3	1	4	4
Bicycling	2	2	3	2	NA	2	1
Camping	2	3	3	3	NA	2	1
Outdoor Education/ Interpretation	3	4	4	4	4	4	4

Compatibility Level: 1 - Not Compatible, 2 - Somewhat Compatible, 3- Moderately Compatible, 4 - Highly Compatible, NA - Not Applicable

resources occurring on the station. These are ratings based on known characteristics of the resources and on the experience of NAS Whidbey Island natural resource program. Several outdoor recreation activities that are or can be incompatible with natural resource management goals under this INRMP are discussed in further details below.

4.9.5.1 Archery Club at Rocky Point

The Bowman's Archery Club has a range in a stand of Douglas-fir forest at Rocky Point. This range impacts wildlife use of the Rocky Point area by severely altering the wildlife habitat in the large expanse of the range area and by the large human presence at the site. After the range was established, natural resources managers discovered a bald eagle nest in this stand adjacent to the archery range. The use of the range was limited to prevent impact with the nearby bald eagle nest. Following the bald eagle requirements listed in Section 4.3.1, above, will limit the potential to affect nesting at the Rocky Point bald eagle nesting and prevent compliance issue with the Bald and Golden Eagle Protection Act.

4.9.5.2 Cliffside Park Campground

Cliffside Park campground is a 60 unit full service RV park with a small tent camping area located on Ault Field. The facility is located along the bluff overlooking the Strait of Juan de Fuca between the airfield and Rocky Point. Cliffside Park is bordered to the west by the coastal bluff/dune/beach complex and to the east and south by forest units. The Rocky Point bald eagle nest is located south of the campground and established eagle perching/roosting occurs in the forest units immediately east of the campground. In the past, the facility and recreational use did not appear to have any effect on the Rocky Point nest or eagle use of the surrounding forests. In early 2012, the facility was expanded. The increased human use has the potential to disturb and alter bald eagle use of the forested areas around the campground. To reduce this potential and limit conflicts with eagle use of Cliffside Park, human activity and lighting will be confined to the developed campground area. Human use and access will be discouraged within the forest canopy east and south of the campground except on established developed areas such as the jogging and fitness trail. Eagle nesting and use of the Rocky Point area will continue to be monitored and if negative affect develop for the expanded campground, additional measures to reduce human/eagle conflicts will be developed and implemented.

4.9.5.3 Paintball Wargames

A paintball range is operated in the forest stand adjacent to the Convergence Zone (NAS Whidbey Island bowling alley). This is an activity that is considered moderately intrusive to wildlife and highly intrusive to native plant communities. It requires an extensive amount of land and the exclusion of all other users from the area for the duration of the event. Wildlife use of the forest stand is reduced, especially during use of the range. This activity is limited to the one forest stand. The stand is isolated with no sensitive resources within it and wildlife use is limited. Given the isolated nature of the habitat, the impact to natural resources from the activity is minimal.

4.9.6 Outdoor Education

Education of the station population regarding the value and sensitivity of natural resources can contribute in significant ways to mitigating environmental impacts associated with various forms of outdoor recreation. Public education programs administered through the installation include the Watchable Wildlife Program. The primary components of the Watchable Wildlife Program are a pamphlet-guided driving route through the Seaplane Base and the establishment of the Back to Nature and Wildlife Habitat Improvement areas. Environmental Division also coordinates with the Public Affairs Office on issues related to environmental education.

4.9.7 Off-road Vehicle (ORV) Use

Recreational use of off-road vehicles (ORV), such as all terrain vehicles, dirt bikes, non-motorized mountain bikes, etc., is not authorized on NAS Whidbey Island. DoD policy (OPNAVINST 5090.1C, DODDIR 4700.4) requires that any ORV use areas must be reviewed, monitored and officially designated through chain-of-command approval. There are no designated ORV use areas on NAS Whidbey Island. The recreational use of ORVs, by civilians or military personnel, on the property is not considered consistent with the installation's training mission and natural resources management requirements. This recreational use of the land conflicts with military land use requirements, wise land management practices, environmental values, and training sustainment activities. Use of the property is restricted to military training and their support activities. Recreational ORV use increases impacts to habitats and wetlands, destabilizes the soil, promotes invasive plant species introductions and is a potential source of wildfire ignition which reduces military training capabilities and increases natural resources training sustainment costs. The restrictions on off-road vehicles do not apply to official use by an employee, agent, or designated representative of the federal government or one of its contractors in performance of their assigned duties (EO 11644). That is, the use of military or contractor provided ORVs for road and perimeter patrols, fencing repairs, ordnance clearance and invasive weed spraying, or military training support activities are not subject to the ORV use restriction. All other non-duty ORV use on NAS Whidbey Island is not authorized and not appropriate on an active military installation.

4.9.8 Road Maintenance

Road grading and ditch maintenance have a moderate to high risk of causing sedimentation problems for the streams and lakes on the Station, unless care and best management practices (BMPs) are employed to minimize the risk. Common road grading and ditch maintenance BMPs include:

- when possible, conduct road grading and earth moving during dry periods of the year;
- use silt fences to control soil erosion and deposition of sediments into streams;
- use jute matting/sod or re-seed ditches and bare dirt areas immediately with a native grass mixture;
- cover soil piles if left for more than 2 days during the wet season, 7 days during the dry season;
- when grading large areas: create temporary sediment traps or ponds and direct runoff into them;
- use temporary check dams when working in ditches around streams: use sand bags, silt fences, rocks to slow velocities and trap sediments;
- install permanent check dams in long ditches to slow runoff velocities and minimize erosion.

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5.0 IMPLEMENTATION

This chapter of the INRMP addresses how the plan will be carried out as a means of supporting the military mission through effective land stewardship. All actions contemplated in this INRMP are subject to the availability of funds properly authorized and appropriated under Federal law. Nothing in this INRMP is intended to be nor must be construed to be a violation of the Anti-Deficiency Act, 31 U.S.C. §1341.

A list of NAS Whidbey Island proposed projects may be found in Appendix A of this INRMP.

5.1 Project Requirements and Funding

Project and management action implementation is the most important part of this management document. It is through implementation that conservation benefits are realized. A major function of implementation is funding.

All INRMP projects must be entered into the Environmental Program Requirements (EPR) web and receive approval up the chain of command prior to funding. The Navy prioritizes funding based on the Environmental Readiness Level (ERL) of a project. ERL levels go from 1-4 with 4 being the highest priority funding requirement.

All in-house Navy and external funding sources will be explored and utilized to implement this management plan, as appropriate. Major funding sources for project implementation are conducting management actions using Navy in-house labor, utilizing Navy O&MN environmental funding, legacy funding, forestry revenue funding, agricultural outlease revenue funding, or fish and wildlife fees. Non-Navy funding/labor resources or volunteer assets will also be used when available.

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APPENDIX A. Natural Resources Projects

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Table A-1. INRMP Project Recommendations

Project Recommendations	ERL	Estimated Cost	Implementation Year
Land and Physical Environment Resources			
LR-1: Review and recommend provisions in all construction projects at NAS Whidbey Island for adequate and suitable erosion control, sediment control, disturbance minimization and site restoration.	4	In-house Labor	FY2013, 2014, 2015, 2016, 2017
Water Resources			
WR-1: Conduct regular monitoring for Spartina clones at both Maylor's marsh and Crescent Harbor Marsh. Initiate control actions as necessary in cooperation with WDFW and WA DNR.	3	In-house Labor	FY2013, 2014, 2015, 2016, 2017
WR-2: Control Spartina invasion of salt marsh at Lake Hancock and conduct regular monitoring in cooperation with WDFW.	4	$10,000 ($2,000 each year)	FY2013, 2014, 2015, 2016, 2017
WR-3: Conduct and assessment to determine the feasibility of restoring Crescent Creek into a natural at-grade channel to benefit water quality flowing into the restored Crescent Harbor marsh project and provide additional juvenile salmon habitat in Crescent Harbor marsh. Explore if there are interested partners to assist with the project.	4	In-house Labor	FY2013, 2014
Flora and Vegetation Resources			
PR-1: Expand the oak woodland by planting Garry oak sprouted from acorns gathered on this site. Install drip irrigation for the first three years. The long-term goal is to improve the quality and extent of this native oak savanna area. The community could be expanded to the west, north, or east without eliminating any existing structures. Post signs along the outer boundaries of the oak woodland to inform residents and Navy construction/maintenance offices of the importance of the community and advise them of specific impact avoidance measures to be taken in this area for maintenance treatments and construction projects.	3	$13,200 ($9,000 in FY2014 and $1,400 in each following year)	FY2014, 2015, 2016, 2017
PR-2: Conduct a field inventory of the transition zone wetland at Lake Hancock for the presence of Indian rice.	3	$8,000	FY2015
PR-3: Control high priority invasive plant/noxious weed species on NAS Whidbey Island. Control will focus on tansy ragwort, gorse, poison hemlock and Canada thistle.	4	$160,000 ($32,000 each year)	FY2013, 2014, 2015, 2016, 2017

Project Recommendations	ERL	Estimated Cost	Implementation Year
PR-4: Retain dead and damaged trees for wildlife habitat unless their fall would directly imperil station facilities or personnel. Trees that fall into roadways or other developed areas should be disposed of in adjacent natural areas whenever possible and left *in situ* as large organic debris for habitat values.	2	In-house Labor	FY 2013, 2014, 2015, 2016, 2017
Fauna and Fish and Wildlife Resources			
FW-1: Monitor Crescent Harbor Marsh to document the development of estuarine habitat components and salmonid use following full tidal restoration.	4	\$60,000 (\$30,000 each year)	FY2013, 2014
FW-2: Conduct marine mammal density surveys of Crescent Harbor and the waters adjacent to NAS Whidbey Island to establish density estimates for NAS Whidbey Island to be used in marine mammal assessments for project actions and for support in acquiring MMPA permit requirements.	4	\$300,000 (\$100,000 each year)	FY2014, 2015, 2016
FW-3: Survey for reptiles and amphibians. Survey for amphibians and reptile use of NAS Whidbey Island properties.	2	\$32,000	FY2016
FW-4: Conduct intertidal surveys of benthic populations and shoreline plant/macroalgae communities for the purpose of providing baseline data for Natural Resources Damage Assessments (NRDA) and general NR planning.	3	\$30,000	FY2017
FW-5: Conduct forage fish spawning surveys along Station shorelines to determine utilization.	4	\$20,000 (\$10,000 each year) and In-house Labor	FY 2014, 2016
FW-6: Annually monitor bald eagle nest for activity and fledging success. Also, look for new nesting areas.	4	In-house Labor	FY2013, 2014, 2015, 2016, 2017
FW-7: Update and remap GIS data layers for INRMP update and general NR planning. Focus on any new listed species, habitat changes and new developments since last update.	3	\$72,000	FY2017
Threatened and Endangered (TES) Species			
T&E-1: Conduct surveys along the Station shorelines to obtain monitoring data of salmonid and forage fish, as well as rockfish and other TES fish utilizing nearshore habitat.	4	\$64,000 (\$32,000 each year) and In-house Labor	FY2014, 2016

Project Recommendations	ERL	Estimated Cost	Implementation Year
T&E-2: Conduct marbled murrelet populations surveys in the near and offshore areas adjacent to the installations, focusing on Crescent Harbor.	4	$48,000 ($24,000 each year) and In-house Labor	FY 2014, 2016
T&E-3: Annually survey the golden paintbrush population for both plant numbers and area occupied.	4	In-house Labor	FY2013, 2014, 2015, 2016, 2017
T&E 4: Maintain the fence around the golden paintbrush site. Inspect the site on a regular basis to ensure integrity.	4	$6,000 ($3,000 each year)	FY2014, 2017
T&E 5: Annually control vegetation in the Golden Paintbrush management area and plant enclosure. Mowing and brush cutting is needed to reduce plant competition. Additional control burns will be planned FY2013 and/or FY2015	4	$70,000 ($10,000 each year with an additional $20,000 during the burn year)	FY2013, 2014, 2015, 2016, 2017
T&E 6: Monitor the Maylor Point beach restoration project for forage fish use and beach material movement.	4	$26,500 ($5,300 each year) and In-house Labor	FY2013, 2014, 2015, 2016, 2017

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APPENDIX B. INRMP FONSI and Environmental Assessment

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APPENDIX C. Correspondence

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DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
3730 NORTH CHARLES PORTER AVENUE
OAK HARBOR, WASHINGTON 98278-5000

IN REPLY REFER TO:

5090
Ser N46/0476
April 18, 2012

Mr. Kent Livezey
U.S. Fish and Wildlife Service
Western Washington
Fish and Wildlife Office
510 Desmond Drive SE, Suite 102
Lacey, WA 98503

Dear Mr. Livezey:

Enclosed for your review is a draft of Naval Air Station Whidbey Island's Integrated Natural Resources Management Plan. We are in the process of updating this management plan and invite your agency's input on the draft. The purpose of this review is to solicit technical review early in the update process when it is easier to identify and address issues, so together we can make this a quality management plan for our installation's natural resources.

The Federal Sikes Act (codified in 16 USC 670, et. seq.) requires that military installations develop an Integrated Natural Resources Management Plan in cooperation with the U.S. Fish and Wildlife Service and have the final plan approved by your agency.

Additionally, as stated in Public Law 108-136 (The Defense Authorization Act of 2004), an approved Integrated Natural Resources Management Plan that has benefits for a listed species shall take the place of designated critical habitat on the military installation. It is to all our benefit to do what we can to make these resource management plans of the highest quality.

This draft is a large document that will require a substantial commitment of your time for review. If there are any others in your organization that should also review this plan, please feel free to forward the information. To help the Navy meet document preparation schedules, please submit any comments you have by May 31, 2012.

5090
Ser N46/0476
April 18, 2012

Your point of contact for questions and comments concerning the development of the Integrated Natural Resources Management Plan is Mr. John Phillips at (360)257-8873 or john.r.phillips1@navy.mil.

Sincerely,

M. DYSART
Commander, U.S. Navy
By direction of the
Commanding Officer

Enclosure: 1. Draft NAS Whidbey Island INRMP (CD)

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
510 Desmond Dr. SE, Suite 102
Lacey, Washington 98503

MAY 30 2012

Commander M. Dysart
Naval Air Station Whidbey Island
3730 North Charles Porter Avenue
Oak Harbor, Washington 98278-5000

Dear Commander Dysart:

This is in response to your letter dated April 18, 2012, requesting U.S. Fish and Wildlife Service (Service) review of your draft Revised Integrated Natural Resources Management Plan (INRMP) of February, 2012, for Naval Air Station Whidbey Island. This letter has been prepared under the authority of, and in accordance with, the Sikes Act (16 U.S.C. 67a *et seq.*), Sikes Act Improvement Amendments, and the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

The Service considers three criteria to determine if an INRMP provides adequate management or protection of natural resources. These three criteria are whether the INRMP (1) provides a conservation benefit to the species, (2) gives assurances that it will be implemented, and (3) provides assurances that conservation efforts will be effective. To evaluate whether INRMPs adequately address these criteria, we look for adequacy of information concerning threatened and endangered species, critical habitat, wetlands, migratory birds, contaminants, and law enforcement. The threatened golden paintbrush (*Castilleja levisecta*) is located on Forbes Point of the Seaplane Base. The marbled murrelet (*Brachyramphus marmoratus*) and bull trout (*Salvelinus confluentus*), both threatened species occur along the shores of your installations. Because of your approved INRMPs, bull trout critical habitat has not been designated in the waters by your base.

The Service's comments on the Naval Air Station Whidbey Island's INRMP are in the enclosure that follows. In addition, the Service has the following recommendations for the golden paintbrush population. A survey of the population was recently conducted during the week of May 14, 2012. Based on the survey, the following management actions should be included in the INRMP.

- Investigate possible recent changes in the hydrology at Forbes Point. Standing water was observed inside the fence last year in May, and there was evidence of wet areas this year. Declines in the number of golden paintbrush plants suggest recent changes in the hydrology at the site. This may be due to runoff from recent construction of the new housing development near the plants.

- Mow inside the fence and also in surrounding areas. **Mowing** should be a top priority at this site, as shrubs have dramatically increased inside the fenced area and are encroaching from the west. The Service recommends opening the fence, or installing a gate, so a tractor can get in and **mow inside the fence and on all sides around it**, including to the north. The Service recommends a late summer or fall mowing first, and possibly a second early spring mowing before the paintbrush is up. The golden paintbrush population at Fort Casey on Whidbey Island appears to show good results from two mowings. The Service recommends mowing an area approximately 70 feet beyond the perimeter of the golden paintbrush population to reduce all vegetation.

- Continue augmentation plantings. Most of the live plants at the site are from outplantings. Additional outplantings should be attempted, especially in areas that are now covered in shrubs. As these are mowed back, it may provide relatively weed free habitat where plantings could succeed.

- Review burning as a strategy that should be considered for additional use at the site. If burning results in bare soils, planting golden paintbrush seeds directly into the burned soil may be beneficial.

Thank you for the opportunity to review and comment on the INRMP. If you have any questions, please contact Jim Muck (206-526-4740) of my staff.

Sincerely,

Ken S. Berg, Manager
Washington Fish and Wildlife Office

U.S. Fish and Wildlife Comments on the Naval Air Station Whidbey Island's INRMP.

Date	Section/page	Comment	Reviewer
May 2012	2.3.7.1, page 2-28	First paragraph states that the USACE conducted a shoreline erosion control project in the late 1980s and concluded that a treated timber bulkhead backed by filter cloth was the most effective bluff stabilization structure. New methods, science, and technology may indicate a different, more environmentally friendly alternative to a timber bulkhead to reduce erosion. Sediment from bluff erosion is very important to the nearshore ecosystem and should only be controlled when infrastructure may be lost or damaged.	USFWS/Muck
	2.3.8.2, page 2.20	Text states that concrete rubble and riprap have been used to modify approximately 1.6 miles of shoreline of Ault field. Does the INRMP discuss restoring shoreline to more natural condition?	
	2.4.1, page 2-45	Section states stormwater is collected and discharged to four locations, is this stormwater treated? Section 2.4.2.2 page 2-47 states that wetlands receive much of the surface runoff from the station. This is not consistent.	
	2.5.1, page 2-73	This section could identify critical habitat for listed species. The section defines listed species, but no mention of critical habitat.	
	2.5.3.9, page 2-145	First full paragraph on this page mentions "active agricultural use," however, on section 4.8.1 on page 4-56 says there are currently no active agricultural outleases on NAS Whidbey Island.	
	3.2.5, page 3-3	The section on the Bald and Golden Eagle Act should be updated with the 2009 final rule regarding new permit regulations. The Navy would be responsible for obtaining any permits for "take" of eagles under the Bald and Golden Eagle Act.	
	3.7 and Table 3-1, Pages 3-7, 3-8	This section identifies Conservation Actions in WDFW's CWCS. The section states that NAS Whidbey Island incorporates some of the Conservation Actions of the CWCS, but it is not clear which ones. If Table 3-1 identifies the Conservation Actions that NAS Whidbey Island is implementing it should clearly state this, these Conservation Actions should then also be included in Appendix A which provides the project recommendations for the INRMP.	
	4.2, page 4-1	This section identified the 2004 NDAA to allow an approved INRMP to be used by the DOI in lieu of a critical habitat designation. Information on the October 18, 2010 bull trout critical habitat designation could be included here that excludes NAS Whidbey Island land as designated critical habitat.	
	4.2.3, page 4-7	This section should be updated with new bull trout critical habitat designation on October 18, 2010.	
	4.5.4, page 4-27	By the section title "Habitat Management – Riparian/Wetlands" it appears that information about riparian habitat management would be included. It appears from the first sentence which states that there are no natural streams that no riparian habitat management would be needed, however riparian habitat along marine shorelines are just as important as along streams. Information could be provided on riparian habitat management along marine shorelines.	

Date	Section/page	Comment	Reviewer
	4.6.10, page 4-54	The last paragraph states that no regular control program for wildlife pests and introduced species currently occurs on NAS Whidbey Island. However, Table 2-21 on page 2-140 identifies species that are controlled pests.	
	4.8.8, page 4-65	The second to the last bullet mentions the use of straw bales to slow water velocities and trap sediments. For temporary purposes straw bales can be used, but EPA does not recommend their use. See the following website: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=122.	
Appendix A and Table A-1 provides a list of INRMP Project Recommendations, the following are additional recommendations.			
	2.1, page 2-1	Section identifies remnants of a small boat pier that could be removed to restore the shoreline and improve migratory corridor for salmonids along the nearshore.	
	2.3.8.2, page 2-20	First paragraph states that 1.6 miles of shoreline near the north end of Ault Field has concrete rubble and riprap. The FWS recommends that restoration activities occur along this shoreline to improve migratory corridor.	
	2.3.9.2, page 2-27	Same comment as above, except for modified shoreline in Crescent Harbor at the Seaplane Base.	
	2.3.9.2, page 2-27	Section mentions a piling and plank bulkhead that is old and has deteriorated to a point where it is no longer effective. This bulkhead should be removed to restore the shoreline and improve the migratory corridor for salmonids along the nearshore.	
	2.5.3.10, Page 2-154	Section on freshwater fish states that the redevelopment of a riparian zone along the lower channel complex of the drainages flowing into Crescent Harbor Marsh would provide higher quality habitat. The FWS suggests a recommendation to install or improve riparian habitat along stream corridors and marine shorelines. This is similar to a conservation action identified in Table 3-1, but it is unclear which of these activities are being implemented within the INRMP.	
	2.4.7.1, page 2-50	This section mentions stormwater draining into Dugualla Bay. The FWS suggests a recommendation to provide treatment of stormwater, where feasible, that enters directly into Puget Sound.	
	2.4.8.1, page 2-57	The text on Maylor's Marsh states that salt marshes with native vegetation are rare and should be protected. The FWS recommends that the tide gate be removed to allow restoration or re-establishment of the salt marsh.	
Overall comment – the INRMP should include a section that discusses climate change and how the NAS Whidbey Island is addressing ongoing climate change in its management of natural resources.			

DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
3730 NORTH CHARLES PORTER AVENUE
OAK HARBOR, WASHINGTON 98278-5000

IN REPLY REFER TO:

5090
Ser N46/0477
April 18, 2012

Mr. Tom Sibley
National Marine Fisheries Service
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Dear Mr. Sibley:

Enclosed for your review is a draft of Naval Air Station Whidbey Island's Integrated Natural Resources Management Plan. We are in the process of updating this management plan and invite your agency's input on the draft. The purpose of this review is to solicit technical review early in the update process when it is easier to identify and address issues, so together we can make this a quality management plan for our installation's natural resources.

The Federal Sikes Act (codified in 16 USC 670, et. seq.) requires that military installations develop an Integrated Natural Resources Management Plan in cooperation with the U.S. Fish and Wildlife Service and have the final plan approved by your agency.

Additionally, as stated in Public Law 108-136 (The Defense Authorization Act of 2004), an approved Integrated Natural Resources Management Plan that has benefits for a listed species shall take the place of designated critical habitat on the military installation. It is to all our benefit to do what we can to make these resource management plans of the highest quality.

This draft is a large document that will require a substantial commitment of your time for review. If there are any others in your organization that should also review this plan, please feel free to forward the information. To help the Navy meet document preparation schedules, please submit any comments you have by May 31, 2012.

5090
Ser N46/0477
April 18, 2012

Your point of contact for questions and comments concerning the development of the Integrated Natural Resources Management Plan is Mr. John Phillips at (360)257-8873 or john.r.phillips1@navy.mil.

Sincerely,

M. DYSART
Commander, U.S. Navy
By direction of the
Commanding Officer

Enclosure: 1. Draft NAS Whidbey Island INRMP (CD)

Phillips, John R CIV NAVFAC NW, PRW4

From: Janet Curran [janet.curran@noaa.gov]
Sent: Tuesday, May 29, 2012 2:35 PM
To: Phillips, John R CIV NAVFAC NW, PRW4
Cc: Thomas Sibley
Subject: INRMP NAS Whidbey Island

John,

Thank you for the opportunity to review the Navy's draft of Naval Air Station Whidbey Island's Integrated Natural Resources Management Plan. The plan could be improved by incorporating a strategy for reacting to climate change. The Washington State Department of Ecology prepared a guidance document (http://www.ecy.wa.gov/programs/sea/shorelines/smp/handbook/sea_level_guidance.pdf) that you may find useful. The document was created for local governments to use while updating their shoreline management plans. Of particular concern at NAS Whidbey Island is sea level rise and more frequent/intense storm event that may intensify existing management challenges such as development in flood prone areas, construction of shoreline armoring, and protection of beaches and salt marshes.

Overall, NMFS believes that the plan is protective of listed species, Essential Fish Habitat, and it provides equivalent protection of habitat in lieu of critical habitat designations on Navy lands.

--
Janet Curran
Professional Wetland Scientist
North Puget Sound Habitat Biologist
NOAA Fisheries Service
7600 Sand Point Way NE
Seattle, WA 98115

Phillips, John R CIV NAVFAC NW, PRW4

From:	Tonnes, Dan NMFS [dan.tonnes@noaa.gov]
Sent:	Wednesday, July 03, 2012 14:06 AM
To:	Phillips, John R CIV NAVFAC NW, PRW4
Cc:	
Subject:	Whidbey comments for ESA-listed rockfish
Attachments:	Comments from NMFS Protected Resources Division Whidbey INRP.doc

From: Dan Tonnes [mailto:dan.tonnes@noaa.gov]
Sent: Tuesday, July 03, 2012 14:06
To: Hayes, Dan E CIV NAVFAC NW, EV BLC, NRNW N45; john.phillips@navy.mil
Cc: Janet Curran; Thomas Sibley
Subject: Whidbey comments for ESA-listed rockfish

Hello Dan & John,

I've attached a document with some brief comments on the draft Whidbey INRMP (specifically for ESA-listed rockfish). Please contact me if you have any questions, and have a nice 4th.

Dan Tonnes

July 3, 2012

Whidbey INRP Comments (for ESA listed Rockfish--Dan Tonnes)

Section 2.5.1.6 Rockfish. This section seems to conclude that nearshore and juvenile rockfish habitat is lacking along the shorelines of the Whidbey sites. It references Palsson et al. 2009. The maps and data in Palsson et al (2009) are probably too coarse of a data source to indicate the relative quality of juvenile rockfish habitat.

Section 4.5.4. There needs to be a section added, similar to the eelgrass section that identifies the prioritization of protection of kelp species. For background, kelp is photosynthetic and requires high ambient light levels and a lack of fine sediment that can block light or smother the gametophytes (Mumford 2007[1]). There are 20 annual or perennial species of kelp in the Puget Sound (Mumford 2007). Kelp are attached to solid substrates such as bedrock, large rocks or pebbles, clam shells, or artificial structures by a holdfast and grows in areas of high to moderate wave energy or currents to depths as great as 65 feet (20 meters) (Mumford 2007). Most kelp species form blades 3 to 6 feet (1 to 2 m) long though the two floating varieties (*Nereocystis luetkeana*) and (*Macrocystis integrifolia*) grow to over 32 feet (10 m) long. Habitat among the blades provides structure for feeding, predation refuge, and reduced currents that enable energy conservation for juvenile canary rockfish and bocaccio.

Section 4.5.5. "**Organize beach clean-ups and inspect the beach areas for man-made debris."** Please add provisions for reporting lost fishing nets. If any derelict fishing nets are observed near or on Navy properties, they can be reported to the Northwest Straits Initiative **http://www.derelictgeardb.org/reportgear.aspx,** by calling 360-428-1084 or 1-855-542-3935.

Section 2.3.7.1 and Section 4.5.5. These sections should identify a goal for future shoreline armoring repairs using bioengineering methods, rather than traditional bulkheads, as applicable, for the particular project. Bioengineering guidance can be found at http://www.pugetsoundnearshore.org/technical_papers/management_measures.pdf and http://www.ser.org/sernw/pdf/WDOE_alt_shoreline_protection.pdf

Page 4-10: "***Rockfish Special Management and Protection Requirements***
Criteria 1. Conservation Benefit

NAS Whidbey Island will ensure that all proposed routine construction and repair activities that will take place below the MHHW line be restricted to the approved in-water work time for bull trout and salmon (July 16 - February 15) in Tidal Reference Area 8."

Note that for some activities that disturb nearshore habitats, a work window that starts after October 1 may be advised to protect juvenile bocaccio and canary rockfish. This would be determined in consultation with NMFS on a project by project basis.

[1] Mumford, T.F. 2007. Kelp and eelgrass in Puget Sound. Technical Report 2007-5. Prepared in support of the Puget Sound Nearshore Partnership.

For all installations: Future nearshore surveys should also assess juvenile rockfish species and assemblages. For background, juvenile canary rockfish and bocaccio use similar habitats (Carr 1983[2]). When they reach 1 to 3.5 inches (3 to 9 cm) and 3 to 6 months old, juvenile canary rockfish and bocaccio move from open waters to settle onto nearshore benthic habitats typically in mid-summer to early fall. They most readily use rocky areas with and without kelp, and also use sandy areas and areas that support eelgrass (Love et al. 1991[3]).

[2] Carr, M.H. 1983. Spatial and temporal patterns of recruitment of young of the year rockfishes (genus Sebastes) into a central California kelp Forest. Masters thesis, San Francisco State University, CA 94132, 104p)

[3] Love, M.S., M. Carr, and L. Haldorson. 1991. The ecology of substrate –associated juveniles of the genus Sebastes. Env. Biol. Fish. 30:225-243.

Phillips, John R CIV NAVFAC NW, PRW4

From: Steve Stone [steve.stone@noaa.gov]
Sent: Wednesday, July 25, 2012 3:09 PM
To: Phillips, John R CIV NAVFAC NW, PRW4
Cc: Thomas Sibley; Janet Curran; Dan Tonnes
Subject: Re: NMFS Sand Point Comment to NAS Whidbey Island INRMP

Hi John. Thanks for the chance to review this INRMP. I concur with Janet Curran's (NMFS) May 29, 2012 response. I reviewed this primarily with an eye toward steelhead and critical habitat. As we discussed, I am not aware of any steelhead streams on NAS Whidbey, and the INRMP correctly notes their likely use of nearshore marine waters. That said, there is reference on page 2-137 to "rainbow trout, specifically:

"The only fish species of note believed to occur in freshwater streams on the station are the rainbow trout (Salmo gairdneri) and coastal cutthroat trout (Salmo clarki clarki)."

A minor point here is that the current scientific name for steelhead and rainbows is now Oncorhynchus mykiss (a similar error is made in Table 5 of Appendix F which refers to the species by another old name "O. gairdneri").

A potentially more substantive question is if in fact there actually are O. mykiss in some streams at NAS Whidbey? Again, my GIS data do not indicate this is the case but it would be good to nail this down in the INRMP. I'd appreciate hearing what you find out.

Overall, I support the INRMPs Project Recommendations (Appendix A, Table A-1) and believe they will prove beneficial and help conserve Puget Sound steelhead and their nearshore habitats. Also, I encourage the Navy's commitment to working with WDFW (and the consideration of possible impacts on ESA-listed species) in the case that re-stocking of Penfold Pond becomes a possibility.

Thanks again for the chance to comment.
Cheers,
Steve Stone
NMFS
503-231-2317

DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
3730 NORTH CHARLES PORTER AVENUE
OAK HARBOR, WASHINGTON 98278-5000

IN REPLY REFER TO:

5090
Ser N46/0478
April 18, 2012

Mr. Steve Hinton
Director of Habitat Restoration
Skagit River Systems Cooperative
PO Box 368
La Conner, WA 98257

Dear Mr. Hinton:

The purpose of this letter is to inform you that Naval Air Station (NAS) Whidbey Island is in the process of preparing an Integrated Natural Resources Management Plan (INRMP) for Navy properties on Whidbey Island. The INRMP is the strategic planning document for natural resources at NAS Whidbey Island and is designed to guide natural resources management planning for a 5-year period under the federal Sikes Act.

Enclosed is a copy of this draft plan for your reference and review. Since this is a programmatic styled planning document, it is our intent to engage the Swinomish Nation each year in the late summer timeframe to gather specific input on the following year's scheduled and funded natural resource management projects and identify any new tribal concerns. That information will be used in annual discussions with the US Fish and Wildlife Service and Washington Department of Fish and Wildlife for updates to the plan's management strategy, modifications to individual projects and to incorporate project specific tribal concerns.

The Navy is very interested in receiving your input on this natural resources management strategy and respectfully request that you respond via written correspondence with any comments and concerns that you may have and to assist the Navy in identifying tribal trust resource concerns. If there are any others in your organization that should also review this plan, please feel free to forward the information. To help the Navy meet document preparation schedules, please submit any comments you have by May 31, 2012.

5090
Ser N46/0478
April 18, 2012

If you have any questions, concerns or require further information regarding the proposed plan review, please contact our Natural Resources Manager, Mr. John Phillips, at (360)257-8873 or john.r.phillips1@navy.mil.

Sincerely,

M. DYSART
Commander, U.S. Navy
By direction of the
Commanding Officer

Enclosure: 1. Draft NAS Whidbey Island INRMP (CD)

June 14, 2012

Mr. John Phillips
Installation Natural Resources Manager
Environmental Affairs Department
NAS Whidbey Island
1155 W. Lexington St., Bldg. 113
Oak Harbor, WA 98278-3800

RE: Comments on DRAFT NASWI INRMP UPDATE_Feb12

Dear Mr. Phillips;

The Skagit River System Cooperative (SRSC), a tribal consortium working on behalf of the Sauk-Suiattle and Swinomish Tribal Communities, is grateful for the opportunity to review and comment on the Draft INRMP plan for the Whidbey Naval Air Station submitted to our attention on April 21, 2012. After reviewing the document SRSC would like to offer the following comments and suggestions;

General Comments:

1. Specific comments relative to the Crescent Creek and Marsh area refer to maps (and metrics based upon them) that do not reflect habitat conditions present at the site following restoration at Crescent Harbor Salt Marsh.

2. SRSC is pleased to see lower Crescent Creek listed as a potential restoration site (Section 4.5.4), with the commitment to work with interested partners such as SRSC to implement restoration actions. The impending relocation of Oak Harbor's wastewater treatment plant, its potential habitat impacts (particularly with respect to lower Crescent Creek & Marsh), and the opportunities for restoration within the footprint of the existing plant and should be mentioned as well. SRSC is highly interested in partnering with the Navy to implement restoration actions at Crescent Creek and within the footprint of the existing treatment plant once it has been decommissioned.

3. There is no mention of restoration opportunities at the Dugualla Bay/lower Clover Valley marsh/lagoon complex. While this site is outside of NASWI boundaries, there is a high potential at the site for restoration actions that provide large salmon habitat gains while reducing bird strike potential at Ault Field and costs incurred to the Navy through operation and maintenance

of the pumping station at Dugualla Bay. Restoration at the site would dovetail nicely with recent nearby property acquisitions and planned restoration actions by local conservation groups, and would greatly increase connectivity of nearshore and delta habitat associated with the Skagit River delta and Skagit Bay. SRSC is very interested in partnering with the Navy to conduct a study to further investigate the feasibility of restoration at the site.

Specific Comments

1. **Section 1.4.5** omits mention of treaty Tribes. The Swinomish Tribal Community (SITC) represents decedents of ancestral communities that maintained usual and accustomed areas in and around the present day Naval facilities. The Swinomish and SRSC recognize and commend NAS Whidbey's efforts to coordinate environmental and cultural activities with SRSC and SITC and would like to see such acknowledgement in this section and throughout the document where appropriate.
2. **Section 1.4.**7 note spacing in the word "Senior" on page 1-5
3. **Section 1.**6 note formatting problems in first and second paragraphs. We commend the Navy for recognizing and including keystone principles of biodiversity sustainability in the management strategy.
4. **Figure 2-3** uses a pre-restoration aerial photo. Newer imagery showing existing conditions is available.
5. **Figure 2-8** could use updating to account for post restoration activities and changes.
6. **Figure 2-9** could also use updating.
7. **Section 2.4.8.4**: Restoration actions also included removing fill that had been placed on historic marsh surfaces.
8. **Section 2.5.1.15**: Typo: "Given that steelhead are known to migrate along and inhabit the Crescent harbor shoreline, **they** would also be expected to use this restored tidal wetland complex."
9. **Table 2-15, Table 2-18, and Table 2-24**: Acreage listed for salt marsh vegetation cover type is too low. Other acreages may need to be adjusted as well.
10. **Figure 2-16** the wetland ratings and mapping shown in this figure might not be accurate given post restoration tidal influences. This mapping might need updating.
11. **Figure 2-25**: Vegetation cover types as mapped do not reflect current habitat conditions at Crescent Harbor Marsh.
12. **Figure 2-26:** Potential habitat map for *Cicuta bulbifera* may no longer be current following restoration of tidal inundation to the Crescent Harbor Marsh site, though the salt tolerance of the species is not entirely clear to us.
13. **Section 2.5.1.2** This section could benefit from a discussion of recent sampling efforts by SRSC in the vicinity of Crescent Harbor salt marsh and nearby nearshore environs.
14. **Section 2.5.1.14** acknowledgement of the historic wetland types along the eastern portion of Ault field and their function to juvenile salmonids would help support the discussion and consideration of restoration actions in and around Clover Valley

15. **Section 2.5.3.10, Neotropical Migratory Birds:** is acreage of freshwater marsh habitat as shown still current? Most of the habitat types listed have decreased since tidal inundation was restored to the site.
16. **Section 2.5.3.10, Birds**: A small heron rookery is present at the northern edge of the Crescent harbor marsh
17. **Section 2.5.3.9** page 2-145 the description of why andromous fish are unable to access Clover Valley habitats should more specifically include mention of anthropogenic barriers that have isolated and degraded historic habitats.
18. **Section 2.5.3.10, Mammals**: Description may not represent current habitat conditions.
19. **Table 2-24** acres of salt marsh habitat should be updated.
20. **Figure 2-37**: Wildlife habitat types map does not reflect current habitat conditions
21. **Section 4.2.2, Conservation Benefit:** "…beach cleanups that remove... predator hiding places from salmon habitat areas"- what does this mean exactly?
22. **Section 4.5.4:** Typo: remove space after first letter of "uplands" in the first bulleted item
23. **Section 4.5.4**: Typo: remove "s" at the end of "Systems" to read "Skagit River System Cooperative"

As we mentioned earlier SRSC is grateful for the opportunity to provide these comments on behalf of the Swinomish and Sauk-Suiattle Tribal communities. We have appreciated our working partnership with NAS Whidbey on the Crescent Harbor Marsh project and remain confident our mutual desire for protecting and restoring environmental assets on the base will lead to future endeavors.

If any additional detail or support is desired relative to our comment above please know that we are available and equipped to assist if called upon.

In Trust,

Steve R Hinton
Director of Habitat Restoration
Skagit River System Cooperative

CC:
Larry Wasserman, Environmental Coordinator, Swinomish Tribal Community
Jason Joseph, Natural Resource Director, Sauk-Suiattle Tribe
Eric Mickelson, Skagit River System Cooperative
Stan Walsh, Skagit River System Cooperative

DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
3730 NORTH CHARLES PORTER AVENUE
OAK HARBOR, WASHINGTON 98278-5000

IN REPLY REFER TO:

5090
Ser N46/0479
April 18, 2012

Mr. Todd Wilbur
Wildlife Program
Swinomish Tribe
11404 Moorage Way
La Conner, WA 98257

Dear Mr. Wilbur:

The purpose of this letter is to inform you that Naval Air Station (NAS) Whidbey Island is in the process of preparing an Integrated Natural Resources Management Plan (INRMP) for Navy properties on Whidbey Island. The INRMP is the strategic planning document for natural resources at NAS Whidbey Island and is designed to guide natural resources management planning for a 5-year period under the Federal Sikes Act.

Enclosed is a copy of this draft plan for your reference and review. Since this is a programmatic styled planning document, it is our intent to engage the Swinomish Nation each year in the late summer timeframe to gather specific input on the following year's scheduled and funded natural resource management projects and identify any new tribal concerns. That information will be used in annual discussions with the US Fish and Wildlife Service and Washington Department of Fish and Wildlife for updates to the plan's management strategy, modifications to individual projects and to incorporate project specific tribal concerns.

The Navy is very interested in receiving your input on this natural resources management strategy and respectfully request that you respond via written correspondence with any comments and concerns that you may have and to assist the Navy in identifying tribal trust resource concerns. If there are any others in your organization that should also review this plan, please feel free to forward the information. To help the Navy meet document preparation schedules, please submit any comments you have by May 31, 2012.

5090
Ser N46/0479
April 18, 2012

If you have any questions, concerns or require further information regarding the proposed plan review, please contact our Natural Resources Manager, Mr. John Phillips, at (360)257-8873 or john.r.phillips1@navy.mil.

Sincerely,

M. DYSART
Commander, U.S. Navy
By direction of the
Commanding Officer

Enclosure: 1. Draft NAS Whidbey Island INRMP (CD)

DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
3730 NORTH CHARLES PORTER AVENUE
OAK HARBOR, WASHINGTON 98278-5000

IN REPLY REFER TO:

5090
Ser N46/0480
April 18, 2012

Mr. Scott Schuyler
Upper Skagit Tribe
25944 Community Plaza
Sedro Woolley, WA 98284

Dear Mr. Schuyler:

The purpose of this letter is to inform you that Naval Air Station (NAS) Whidbey Island is in the process of preparing an Integrated Natural Resources Management Plan (INRMP) for Navy properties on Whidbey Island. The INRMP is the strategic planning document for natural resources at NAS Whidbey Island and is designed to guide natural resources management planning for a 5-year period under the Federal Sikes Act.

Enclosed is a copy of this draft plan for your reference and review. Since this is a programmatic styled planning document, it is our intent to engage the Upper Skagit Tribe each year in the late summer timeframe to gather specific input on the following year's scheduled and funded natural resource management projects and identify any new tribal concerns. That information will be used in annual discussions with the US Fish and Wildlife Service and Washington Department of Fish and Wildlife for updates to the plan's management strategy, modifications to individual projects and to incorporate project specific tribal concerns.

The Navy is very interested in receiving your input on this natural resources management strategy and respectfully request that you respond via written correspondence with any comments and concerns that you may have and to assist the Navy in identifying tribal trust resource concerns. If there are any others in your organization that should also review this plan, please feel free to forward the information. To help the Navy meet document preparation schedules, please submit any comments you have by May 31, 2012.

5090
Ser N46/0480
April 18, 2012

If you have any questions, concerns or require further information regarding the proposed plan review, please contact our Natural Resources Manager, Mr. John Phillips, at (360)257-8873 or john.r.phillips1@navy.mil.

Sincerely,

M. DYSART
Commander, U.S. Navy
By direction of the
Commanding Officer

Enclosure: 1. Draft NAS Whidbey Island INRMP (CD)

DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
3730 NORTH CHARLES PORTER AVENUE
OAK HARBOR, WASHINGTON 98278-5000

IN REPLY REFER TO :

5090
Ser N46/0481
April 18, 2012

Ms. Ruth Milner
Washington Department of Fish and Wildlife
La Conner Field Office
PO Box 1100
La Conner, WA 98257

Dear Ms. Milner:

Enclosed for your review is a working draft of Naval Air Station Whidbey Island's Integrated Natural Resources Management Plan. We are in the process of updating this management plan and invite your agency's input on the draft. The purpose of this review is to solicit technical review early in the update process when it is easier to identify and address issues, so together we can make this a quality management plan for our installation's natural resources.

The Federal Sikes Act (codified in 16 USC 670, et. seq.) requires that military installations develop an Integrated Natural Resources Management Plan in cooperation with the Washington Department of Fish and Wildlife and have the final plan approved by your agency.

Additionally, as stated in Public Law 108-136 (The Defense Authorization Act of 2004), an approved Integrated Natural Resources Management Plan that has benefits for a listed species shall take the place of designated critical habitat on the military installation. It is to all our benefit to do what we can to make these resource management plans of the highest quality.

This draft is a large document that will require a substantial commitment of your time for review. If there are any others in your organization that should also review this plan, please feel free to forward the information. To help the Navy meet document preparation schedules, please submit any comments you have by May 31, 2012.

5090
Ser N46/0481
April 18, 2012

Your point of contact for the questions and comments concerning the development of the Integrated Natural Resources Management Plan is Mr. John Phillips at (360)257-8873 or john.r.phillips1@navy.mil.

Sincerely,

M. DYSART
Commander, U.S. Navy
By direction of the
Commanding Officer

Enclosure: 1. Draft NAS Whidbey Island INRMP (CD)

Phillips, John R CIV NAVFAC NW, PRW4

From: Milner, Ruth L (DFW) [Ruth.Milner@dfw.wa.gov]
Sent: Wednesday, June 13, 2012 3:37 PM
To: Phillips, John R CIV NAVFAC NW, PRW4
Subject: INRMP review
Attachments: Navy INrp comments.doc

Hi John,

Attached are my comments. A couple of things came to mind during the review. I included the link to WDFW's priority habitats and species program. You've addressed the T&E species in the document, but you might want to look over the PHS list and add additional species on that list that occur on Navy property. You referenced the SWGS plan and captured some of the species of greatest conservation need. I suggest looking at that document and adding all the species from that list that occur on the Navy properties. You could put both these lists in an appendix if you don't want to include them in the text or reference specific management actions for them, but at least you'd have captured the complete set of lists the State uses to prioritize our funding and management efforts. If you need updated bald eagle nest information, which will only be current up to 2005, contact Gretchen Blatz in our Olympia office (360-902-2484; Gretchen.Blatz@dfw.wa.gov <mailto:Gretchen.Blatz@dfw.wa.gov>).

Cheers,

Ruth

Ruth Milner

WDFW District Wildlife Biologist

PO Box 1100

La Conner, WA 98257

360-466-4345 ext 265

Section/page	comment	reviewer
2.4.22	Sea otter does not occur in our waters. They are strictly outer coast. Grebes are not waterfowl. Alcids are a subgroup of seabirds so are redundant in this list.	
2.5.1 T,E,S species	Change the designation for state listing from "W" to "S" to be consistent with WDFW's designations. This will reduce confusion for people going between this document and WDFW's lists. WDFW uses "S" to designate "State" and "F" to designate Federal. I think it is standard format.	Milner
	Eastern steller sea lion should be Steller sea lion. Capitalize Steller because it's a proper name	
	Leatherback sea turtle is also SE	
	Delete merlin, it is no longer SC and has no other designation	
	Pacific western big-eared bat is now Pacific Townsend's big eared bat. Change the genus to *Corynorhinus*	
	Add: Taylor's checkerspot butterfly *Euphydryas Edina taloryi*. It is FC and SE. Has not been found on Whidbey but was there historically and you have habitat (grasslands & oak savannah)	
	Western pond turtle and western gray squirrel are not known to have ever occurred on Whidbey. The woodland Park Zoo released a couple of turtles on south Whidbey in the 1980's, but Whidbey is outside the documented historic range of both species.	
	There is another list of Washington species within our Priority Species and Habitats Program that you might want to consider in this document: http://wdfw.wa.gov/conservation/phs/ This list includes rare and declining species, but also includes recreationally important and vulnerable species, which are considered priority even though they may be relatively common or abundant.	
2.5.1.1	The Klope 1995 reference to non-native rabbits grazing near golden paintbrush is odd. The statement says they were recently observed, but the citation is 12 years old. Are rabbits still in the area and are they a threat? Has any enhancement work occurred at the site since the mid-1990's? Any new sites found on the installation? I believe Joe Arnett from DNR may have done some surveys in the last 5 years or so?	
2.5.1.6	Typo in the last sentence on page 2-77. Need a left hand parenthesis after "Love et al. 2002"	
2.5.10	Add "Marbled" to the first sentence in this section. Ancient murrelets also occur in WA, so use the entire common name to avoid confusion.	
2.5.1.12	The statement in the first paragraph on page 2-81that bald eagles are nesting with increasing frequency on human-made structures does not apply to WA. I know of 1 nest in the entire state on a man-made structure. Delete this phrase.	
2.5.1.13	Last sentence typo? Should "forging" be "foraging"?	
Page 2-90.	Marble Murrelet: text says no nesting has been observed, but have any nesting surveys been conducted? I suspect not, and you should re-word to say nesting has not been observed or reported, but formal, protocol surveys have not been conducted. Bald Eagle: syntax problem in 1st sentence. Either change "are" to "is" or make "eagle" plural. Change "concentrated observation areas" to "concentration areas"	
2.5.2.3	You mention reed canary grass later in the description of the wet areas. Why is it not discussed in the invasive plants and noxious weeds section?	
Page 2-102	Significant Native Plant communities: All this information is from 1995. Is it still in	

	fair to good condition? Has it been registered as a Natural Area? Is it still impacted by recreation? This section is very awkward because of the 17 year old references. Can you update this to reflect what's changed in that time, or if nothing has changed, explain why not? Typo at the end of this paragraph. "WDFW"? Second paragraph beginning with "WDFW": should this be DNR? WDFW doesn't typically identify habitat for plants unless there is a fish or wildlife species associated with it.	
Page 2-212	Gary oak woodland: material all appears to be based on 1995 DNR data. There has been a lot of oak savanna work done since that time. Check to see if any new information about the ecology and importance of this area could be included in the document. I believe regionwide inventories have been completed, so the importance of this site may have more context now compared to 1995. Why has it not been registered with the Natural Area program? Invasive Plants and Noxious weeds: 3rd sentence says *spartina* should be controlled as soon as possible. Last sentence says it's considered controlled at this point. These contradictory statements make it difficult to determine the state of *spartina* control at Maylor's marsh. I suggest a re-write of this section to discuss what has occurred to date and what more, if anything, is required from this point on.	
2.5.2.9	Significant Native Terrestrial Plant Communities: 1st sentence refers to the seaplane base but this section is covering Lake Hancock. Invasive Plants: this section refers to observations made in 1995. What's the status of *spartina* in 2012?	
2.5.3	Biological diversity section: typo 1st sentence paragraph 4: "various" should be "varies"	
Page 2-136	Snags and woody debris: this section could be made more relevant by discussing the species that occur on Whidbey that use these features. Marten, fisher, and western gray squirrel and bushy tailed woodrat are not found on the island. Chicaree should be changed to the more accepted common name of Douglas squirrel.	
Page 2-138	Reptiles and Amphibians: 2nd paragraph refers to recent studies dated 1992 and 1993. Eliminate the word "recent".	
2.5.3.8	Introduced species: coyote is not introduced. More likely made its way over the Deception Pass Bridge. You refer to Goodman 1995 as the source for the idea that they were introduced. I can find no evidence of deliberate introductions in any of our records and believe the idea of a deliberate introduction to be an urban legend. They are native to WA and have expanded their range throughout the state. If Fred has documentation, I'd love to see it. Brown-headed cowbird: like the coyote, a native species that expanded its range following human habitat alterations of interior forests. Opossum is discussed in the paragraph above table 2-21 but is not included in the introduced species section. Opossum is exotic to WA and is "introduced" throughout the state. You probably need to modify the headings to reflect pest species, whether native or exotic; and exotic species if it's still a relevant section. Starlings: citation is from 1995. Is the information still current? Klope 1995 is also referenced relative to coyote predation on pheasant releases. Does WDFW still release pheasants on Navy property? (I should know the answer to that question but	

	have lost track of the pheasant program on NAS Whidbey). Is the feral cat section current? The citations from the 1990's are disconcerting, because it's hard to tell if those statements are still true, or if the sections that contain them simply weren't updated. Insects: change "Major bug" to "Major insect" . the term "bug" in the entomological world actually refers to a specific genus of insects.	
Page 2-145	Great Blue Heron: The Ault Field breeding colony was abandoned in 2004. I'm not aware of any active colonies on Navy property. Northern Harrier: This section is likely out of date and kind of misleading. Anderson and Beckworth's studies, which occurred on Whidbey, account for the high percentage of recorded nests occurring on the islands. That doesn't mean they are rare elsewhere, but the way this is written, it's implied that Whidbey supports the majority of nests. I suggest deleting the second sentence in this section because it's not particularly relevant in 2012. Beckworth probably has more recent information to share. Is the contaminants information provided still current? I'm not sure why this section is here, other than the fact that there has been some work on harriers on the base. Will there be active management for this species as a result of this information?	
Page 2-162	Neotropical migratory birds: text refers to 1995 DNR data, stating that 35 acres of navy forest are contiguous with a larger forest stand on adjacent lands for a total of 320 acres. Is this still accurate after 17 years? Have any of the private landowners who own most of the 320 acres altered anything since 1995? Solitary vireo is now called the Cassin's vireo. Band-tailed pigeons are no longer showing long-term declines. Cassin's vireo probably never was declining, is now regarded as showing a slight increase across its range.	
2.5.3.12	Birds: No significant habitat for neotropical migratory birds occurs at the site? "Many species in Appendix D have been observed at Lake Hancock." Lake Hancock has forested habitat thus has plenty of significant habitat for neotrops. "Appendix D" should actually be referenced as Appendix F.	
Appendix F	NASWI 1996 eagle plan and July 1997 WDFW bald eagle report is old and meaningless unless you are going to include updates into the 21st century. WDFW has some data up until 2005 that could be added to the 1997 information. I'm not sure any of this is relevant to the 2012 document.	

DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
3730 NORTH CHARLES PORTER AVENUE
OAK HARBOR, WASHINGTON 98278-5000

IN REPLY REFER TO:

5090
Ser N46/0482
April 18, 2012

Mr. Merle Jefferson, Sr.
Natural Resources Department
Lummi Nation
2616 Kwina Road
Bellingham, WA 98226

Dear Mr. Jefferson:

The purpose of this letter is to inform you that Naval Air Station (NAS) Whidbey Island is in the process of preparing an Integrated Natural Resources Management Plan (INRMP) for Navy properties on Whidbey Island. The INRMP is the strategic planning document for natural resources at NAS Whidbey Island and is designed to guide natural resources management planning for a 5-year period under the Federal Sikes Act.

Enclosed is a copy of this draft plan for your reference and review. Since this is a programmatic styled planning document, it is our intent to engage the Lummi Nation each year in the late summer timeframe to gather specific input on the following year's scheduled and funded natural resource management projects and identify any new tribal concerns. That information will be used in annual discussions with the US Fish and Wildlife Service and Washington Department of Fish and Wildlife for updates to the plan's management strategy, modifications to individual projects and to incorporate project specific tribal concerns.

The Navy is very interested in receiving your input on this natural resources management strategy and respectfully request that you respond via written correspondence with any comments and concerns that you may have and to assist the Navy in identifying tribal trust resource concerns. If there are any others in your organization that should also review this plan, please feel free to forward the information. To help the Navy meet document preparation schedules, please submit any comments you have by May 31, 2012.

5090
Ser N46/0482
April 18, 2012

If you have any questions, concerns or require further information regarding the proposed plan review, please contact our Natural Resources Manager, Mr. John Phillips, at (360)257-8873 or john.r.phillips1@navy.mil.

Sincerely,

M. DYSART
Commander, U.S. Navy
By direction of the
Commanding Officer

Enclosure: 1. Draft NAS Whidbey Island INRMP (CD)

DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
3730 NORTH CHARLES PORTER AVENUE
OAK HARBOR, WASHINGTON 98278-5000

IN REPLY REFER TO:

5090
Ser N46/0483
April 18, 2012

Ms. Christine Woodward
Department of Natural Resources
Samish Indian Nation
PO Box 217
Anacortes, WA 98221

Dear Ms. Woodward:

The purpose of this letter is to inform you that Naval Air Station (NAS) Whidbey Island is in the process of preparing an Integrated Natural Resources Management Plan (INRMP) for Navy properties on Whidbey Island. The INRMP is the strategic planning document for natural resources at NAS Whidbey Island and is designed to guide natural resources management planning for a 5-year period under the Federal Sikes Act.

Enclosed is a copy of this draft plan for your reference and review. Since this is a programmatic styled planning document, it is our intent to engage the Lummi Nation each year in the late summer timeframe to gather specific input on the following year's scheduled and funded natural resource management projects and identify any new tribal concerns. That information will be used in annual discussions with the U.S. Fish and Wildlife Service and Washington Department of Fish and Wildlife for updates to the plan's management strategy, modifications to individual projects and to incorporate project specific tribal concerns.

The Navy is very interested in receiving your input on this natural resources management strategy and respectfully request that you respond via written correspondence with any comments and concerns that you may have and to assist the Navy in identifying tribal trust resource concerns. If there are any others in your organization that should also review this plan, please feel free to forward the information. To help the Navy meet document preparation schedules, please submit any comments you have by May 31, 2012.

5090
Ser N46/0483
April 18, 2012

If you have any questions, concerns or require further information regarding the proposed plan review, please contact our Natural Resources Manager, Mr. John Phillips, at (360)257-8873 or john.r.phillips1@navy.mil.

Sincerely,

M. DYSART
Commander, U.S. Navy
By direction of the
Commanding Officer

Enclosure: 1. Draft NAS Whidbey Island INRMP (CD)

DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
3730 NORTH CHARLES PORTER AVENUE
OAK HARBOR, WASHINGTON 98278-5000

IN REPLY REFER TO:

5090
Ser N46/0484
April 18, 2012

Mr. Steve Todd
Fisheries Department
Suquamish Tribe
PO Box 498
Suquamish, WA 98392

Dear Mr. Todd:

The purpose of this letter is to inform you that Naval Air Station (NAS) Whidbey Island is in the process of preparing an Integrated Natural Resources Management Plan (INRMP) for Navy properties on Whidbey Island. The INRMP is the strategic planning document for natural resources at NAS Whidbey Island and is designed to guide natural resources management planning for a 5-year period under the Federal Sikes Act.

Enclosed is a copy of this draft plan for your reference and review. Since this is a programmatic styled planning document, it is our intent to engage the Suquamish Tribe each year in the late summer timeframe to gather specific input on the following year's scheduled and funded natural resource management projects and identify any new tribal concerns. That information will be used in annual discussions with the U.S. Fish and Wildlife Service and Washington Department of Fish and Wildlife for updates to the plan's management strategy, modifications to individual projects and to incorporate project specific tribal concerns.

The Navy is very interested in receiving your input on this natural resources management strategy and respectfully request that you respond via written correspondence with any comments and concerns that you may have and to assist the Navy in identifying tribal trust resource concerns. If there are any others in your organization that should also review this plan, please feel free to forward the information. To help the Navy meet document preparation schedules, please submit any comments you have by May 31, 2012.

5090
Ser N46/0484
April 18, 2012

If you have any questions, concerns or require further information regarding the proposed plan review, please contact our Natural Resources Manager, Mr. John Phillips, at (360)257-8873 or john.r.phillips1@navy.mil.

Sincerely,

M. DYSART
Commander, U.S. Navy
By direction of the
Commanding Officer

Enclosure: 1. Draft NAS Whidbey Island INRMP (CD)

DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
3730 NORTH CHARLES PORTER AVENUE
OAK HARBOR, WASHINGTON 98278-5000

IN REPLY REFER TO:

5090
Ser N46/0485
April 18, 2012

Mr. Curt Soper
The Nature Conservancy
Washington Program Office
1917 1st Avenue
Seattle, WA 98101

Dear Mr. Soper:

Enclosed for your review is a working draft of Naval Air Station Whidbey Island's Integrated Natural Resources Management Plan. We are in the process of updating this management plan and invite your agency's input on the draft. The purpose of this review is to solicit technical review early in the update process when it is easier to identify and address issues, so together we can make this a quality management plan for our installation's natural resources.

The Federal Sikes Act (codified in 16 USC 670, et. seq.) requires that military installations develop an Integrated Natural Resources Management Plan in cooperation with the Washington Department of Fish and Wildlife and have the final plan approved by your agency.

Given our close relationship with Golden Paintbrush and general natural resources management on NAS Whidbey Island and cooperative management of adjoining properties, we would like to get your input on our strategic natural resources planning document.

This draft is a large document that will require a substantial commitment of your time for review. If there are any others in your organization that should also review this plan, please feel free to forward the information. To help the Navy meet document preparation schedules, please submit any comments you have by May 31, 2012.

5090
Ser N46/0485
April 18, 2012

Your point of contact for the questions and comments concerning the development of the Integrated Natural Resources Management Plan is Mr. John Phillips at (360)257-8873 or john.r.phillips1@navy.mil.

Sincerely,

M. DYSART
Commander, U.S. Navy
By direction of the
Commanding Officer

Enclosure: 1. Draft NAS Whidbey Island INRMP (CD)

DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
3730 NORTH CHARLES PORTER AVENUE
OAK HARBOR, WASHINGTON 98278-5000

IN REPLY REFER TO :

5090
Ser N46/0486
April 18, 2012

Mr. Joe Arnett
Washington Natural Heritage Program
1111 Washington St. SE
Olympia, WA 98504-7014

Dear Mr. Arnett:

Enclosed for your review is a working draft of Naval Air Station Whidbey Island's Integrated Natural Resources Management Plan. We are in the process of updating this management plan and invite your agency's input on the draft. The purpose of this review is to solicit technical review early in the update process when it is easier to identify and address issues, so together we can make this a quality management plan for our installation's natural resources.

The Federal Sikes Act (codified in 16 USC 670, et. seq.) requires that military installations develop an Integrated Natural Resources Management Plan in cooperation with the Washington Department of Fish and Wildlife and have the final plan approved by your agency.

Given our close relationship with Golden Paintbrush management and identification of Natural Heritage element occurrence sites on NAS Whidbey Island, we would like to get your input on our strategic natural resources planning document.

This draft is a large document that will require a substantial commitment of your time for review. If there are any others in your organization that should also review this plan, please feel free to forward the information. To help the Navy meet document preparation schedules, please submit any comments you have by May 31, 2012.

5090
Ser N46/0486
April 18, 2012

Your point of contact for any questions and comments concerning the development of the Integrated Natural Resources Management Plan is Mr. John Phillips at (360)257-8873 or john.r.phillips1@navy.mil.

Sincerely,

M. DYSART
Commander, U.S. Navy
By direction of the
Commanding Officer

Enclosure: 1. Draft NAS Whidbey Island INRMP (CD)

Naval Air Station Whidbey Island

Kimberly A. Martin
Public Affairs Officer
(360) 257-2286   FAX (360) 257-3972
E-mail: whdb_naswi_pao@navy.mil

NEWS

FOR IMMEDIATE RELEASE

RELEASE 12-06
May 9, 2012

Comments requested on Natural Resources Management Plan

NAVAL AIR STATION WHIDBEY ISLAND, Wash. – The Navy is preparing an updated Integrated Natural Resources Management Plan (INRMP) for Naval Air Station (NAS) Whidbey Island in Oak Harbor, Wash.

Per the Sikes Act, an INRMP is prepared to guide the management of natural resources on NAS Whidbey Island. INRMPs are broad-scoped strategic management plans that set the goals and objectives for the natural resources program. The INRMP currently in place was signed and approved in 1996 and requires update to comply Department of Defense and Navy policies and be consistent with current natural resource issues and military training uses of the installation.

The INRMP update incorporates on-going practices used for natural resources management at NAS Whidbey Island and includes new initiatives and management actions to address newer natural resource management concerns and federally-listed threatened and endangered species.

The Navy would like to incorporate and consider the public's comments and concerns as they prepare and finalize the INRMP. A copy of the draft of the NAS Whidbey Island INRMP dated February 2012 can be reviewed on the NAS Whidbey Island web site: www.cnic.navy.mil/whidbey. Click on Operations & Management then scroll down to Environmental Support. The links are to the right under the document name. You may also copy and paste the following links directly to your browser:

Part 1:
http://www.cnic.navy.mil/navycni/groups/public/@cnrnw/@whidbey/documents/document/cnicp_a288587.pdf

Part 2:
http://www.cnic.navy.mil/navycni/groups/public/@cnrnw/@whidbey/documents/document/cnicp_a288588.pdf

Submit comments by June 9, 2012 to:
NAS Whidbey Island
Public Works Department, Natural Resources Management Program
1115 W. Lexington Street, Bldg. 103
Oak Harbor, WA 98278-3500

Please direct questions to John Phillips, Natural Resources Program Manager at (360) 257-8873.

-- 30--

Two boats to Coupeville

For the first time in nearly five years, the Port Townsend-to-Coupeville ferry route will enjoy two-vessel service for the entire tourist season.

Two ferries, the Salish and the Kennewick, started sailing to and from Keystone Harbor May 13, and will continue until early October. The additional ferry means another five round trips daily.

The route that crosses Admiralty Inlet endured limited service for years after the Steel Electric ferries were pulled from service in November 2007.

The route enjoyed two-boat service for part of the summer in 2011. Construction of new ferries has made it possibly to fully restore service this tourist season.

Navy seeks comments

The Navy is preparing an updated Integrated Natural Resources Management Plan for Whidbey Island Naval Air Station and would like the public to comment.

The INRMP is a broad-scoped strategic management plan that sets goals and objectives for managing natural resources on NAS Whidbey. A news release states the current plan was signed and approved in 1996 and must be updated to comply with Department of Defense and Navy policies. It must also be consistent with current natural resource and military training uses of the installation.

The Navy would like to consider the public's comments and concerns as it prepares and finalizes the INRMP. A copy of the draft can be reviewed at the NAS Whidbey website at www.cnic.navy.mil/whidbey. Click on "Operations and Management," then scroll down to "Environmental Support."

Comments should be submitted by June 9 and can be sent to: NAS Whidbey Island, Public Works Department, Natural Resources Management Program, 1115 W. Lexington St., Building 103, Oak Harbor, WA 98278-3500. Questions can be directed to John Phillips, Natural Resources program manager, at 257-8873.

Port discusses Greenbank Farm

The commissioners for the Port of Coupeville will meet this week to discuss several issues pertaining to the Greenbank Farm.

The meeting will take place from noon to 3 p.m. Thursday, May 17, in the Coupeville Library located on Alexander Street.

Commissioners plan to discuss the conservation easement for the Greenbank Farm. That document would add another layer of protection for the publicly owned farm and is also a requirement for Conservation Futures dollars the county commissioners approved in 2011. Since that approval, negotiations between the county and the port have stalled.

Bob Pederson, director of planning and community development for Island County, along with Greenbank Farm Management Group President Michael Stansbury, will attend the meeting.

The commissioners will also talk about the current zoning of the farm and the future of the management group, which the port pays to operate the farm.

Pair dispute broken arm

A 37-year-old Freeland woman was arrested for allegedly breaking her boyfriend's arm in a jealous range, court documents allege.

Prosecutors charged Rachael Dandridge in Island County Superior Court May 2 with second-degree assault, a domestic violence charge.

Dandridge was accused of attacking her boyfriend in a Freeland home they share. The man claimed that he was watching a movie when she came home and started accusing him of cheating on her.

Dandridge hit the man in the face, kicked him and pushed him into a wall, according to a report by a deputy with the Island County Sheriff's Office. The man's arm was broken in the attack.

Dandridge, on the other hand, claimed that her boyfriend attacked her and she fended him off, forcing him outside. She said he may have broken his arm while banging on the door, the report states.

If convicted of the charge, Dandridge could face from three to nine months in jail under the standard sentencing range.

25 May 2012

Naval Air Station Whidbey Island
Public Works Department
Natural Resources Management Program
1115 W. Lexington St., Building 103
Oak Harbor, WA 98278-3500

Dear Mr. Phillips,

This letter is in response to your "Navy Seeks Comment" article published in the Whidbey News-Times on 6 May 2012.

I am one of many residents who live in the general vicinity of the Navy's Gallery Golf Course.

The subject of major concern to us is the sensible use, conservation and possible contamination of groundwater in our area.

Under paragraph 2.24 **Groundwater** of your present "Integrated National Resources Management Plan", it states in part: "Groundwater supply and potential contamination is a major concern within the county (Island County). The Washington Department of Ecology has designated Island County as a high-priority groundwater management area." Additionally, the Federal Water Pollution Control Act (Clean Water Act) states its objective to be to restore and **maintain** the chemical, physical, and biological integrity of the Nation's waters.

The NAS Whidbey plan to commence using groundwater to **irrigate its golf course** is in direct contradiction to the above stated concerns of the County and State and Federal Government..

North Whidbey Island's aquifers are recharged by rainwater only. There are no rivers, nor subterranean streams. Most of its aquifers come in contact with the sea, and hydrostatic pressure alone prevents seawater and superfund NAS Whidbey pollution plumes from intruding them.

A permit, based on a study conducted by the Puget Groundwater Group (PGG), and granted by DOE (G128658, 6/8/11), allows the Golf Course to withdraw up to 120 acre feet of water annually during the dry season (April 15-October 15)..

The permitted quantity of water to be extracted on a yearly basis is considerable (39,102,120 gallons), and could have impacts as far south as Penn Cove.
Such a withdrawal during the dry season would be equivalent to drilling an estimated 278 new private wells into the aquifer, each serving a family of four (using EPA averages).

Incoming
JUN 01 2012

The primary risks of drawdowns of this magnitude are **seawater intrusion, contamination by the accelerated movement of the superfund pollution plume into the area, and a possible major reduction in the quantity of palatable water available.** The PGG considers these risks to be minor; however, for those of us who obtain our water from the same aquifer that would serve the Golf Course they are of major magnitude. In a worst case scenario, our health could be at risk from consuming polluted water and the value of our homes and land property would significantly decline.

In view of the foregoing, it is strongly recommended that the updated NAS Whidbey "Integrated National Resources Management Plan" parallel its policies on **groundwater** with those of Island County, the state of Washington and the Federal Government; and that added emphasis be placed on the **conservation** of this valuable natural resource.

Sincerely,

George B Robbins

George B. Robbins
3026 Ironwood Lane
Oak Harbor, WA 98277

Notice of Availability Draft Environmental Assessment for Naval Air Station Whidbey Island for the Integrated Natural Resources Management Plan for Naval Air Station Whidbey Island, WA.

Pursuant to Section 102 (2) (C) of the National Environmental Policy Act (NEPA) 1969, as implemented by the Council on Environmental Quality Regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508), the U.S. Department of the Navy (Navy) announces the availability for public review and comment of a Draft Environmental Assessment (EA) to implement all objectives and recommendations of the revised Integrated Natural Resources Management Plan (INRMP) including high-, medium- and low-priority objectives at Naval Air Station Whidbey Island, Washington.

A 15-day public comment period is being held to receive written comments on the Draft EA. Members of the public, government agencies, and tribes are invited to review and comment on the Draft EA. An electronic version can be viewed or downloaded at: (http://www.cnic.navy.mil/Whidbey/OperationsAndManagement/EnvironmentalSupport/index.htm).

The EA identifies and evaluates the potential effects of implementing objectives and recommendations of the INRMP. The EA analyzes one alternative and a No-Action alternative. The purpose of and need for the proposed action is to comply with the Sikes Act Improvement Act of 1997, provide management requirements for species listed under the Endangered Species Act and meet the requirements of Department of Defense and Navy instructions. Moreover, the conservation program must be consistent with the mission-essential use of the installation and its lands and not cause a net loss of military land use. The analysis includes potential direct and indirect impacts to land use; air and water quality; noise; flora and fauna; and threatened, endangered, and sensitive species. Additionally, cumulative impacts and mitigation measures are addressed in the EA. There is no cooperating agency for this EA.

Copies of the document will be placed at the Anacortes, Coupeville and Oak Harbor public libraries.

Comments on the Draft EA can be made in writing via mail or email. All comments should be forwarded to:

Naval Air Station Whidbey Island
Public Works Department
Environmental Division
Naval Facilities Engineering Command Northwest
1115 West Lexington Drive, Bldg. 103

Oak Harbor, WA 98278
Or by email to: Whdb_naswi_pao@navy.mil

To be considered, all comments must be received by 26 February 2013.

Notice of Availability Draft Environmental Assessment for Naval Air Station Whidbey Island for the Integrated Natural Resources Management Plan for Naval Air Station Whidbey Island, WA.

Pursuant to Section 102 (2) (C) of the National Environmental Policy Act (NEPA) 1969, as implemented by the Council on Environmental Quality Regulations (40 Code of Federal Regulations [CFR] Parts 1500 1508), the U.S. Department of the Navy (Navy) announces the availability for public review and comment of a Draft Environmental Assessment (EA) to implement all objectives and recommendations of the revised Integrated Natural Resources Management Plan (INRMP) including high-, medium- and low-priority objectives at Naval Air Station Whidbey Island, Washington.

A 15-day public comment period is being held to receive written comments on the Draft EA. Members of the public, government agencies, and tribes are invited to review and comment on the Draft EA. An electronic version can be viewed or downloaded at: (http://www.cnic.navy.mil/Whidbey/OperationsAndManagement/EnvironmentalSupport/index.htm).

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Copies of the document will be placed at the Anacortes, Coupeville and Oak Harbor public libraries.

Comments on the Draft EA can be made in writing via mail or email. All comments should be forwarded to:

Naval Air Station Whidbey Island
Public Works Department
Environmental Division
Naval Facilities Engineering Command Northwest
1115 West Lexington Drive, Bldg. 103
Oak Harbor, WA 98278;
Or by email to: Whdb_naswi_pao@navy.mil

To be considered, all comments must be received by 26 February 2013.

LEGAL NO. 456847
Published: The Whidbey News Times, The South Whidbey Record.
February 9, 13, 16, 2013.

IN THE SUPERIOR COURT OF
THE STATE OF WASHINGTON
COUNTY OF ISLAND
AFFIDAVIT OF PUBLICATION

In the Matter of Public Notice ______________________

STATE OF WASHINGTON
SS.
COUNTY OF ISLAND

The undersigned, being first duly sworn, on oath deposes that she is principal clerk of the **WHIDBEY NEWS-TIMES/SOUTH WHIDBEY RECORD** a bi-weekly newspaper. That said newspaper has been approved as a legal newspaper by the Superior Court of Island County and it is now and has been for more than six months prior to the date of publication herein after referred to, published in the English language continually as a bi-weekly newspaper in Island County, Washington, and it is now and during all of the said time was printed in an office maintained by said newspaper.

That the annexed is a true copy of all advertisement, with publication dates, as it was published in regular issues (and not in supplemental form) of said newspaper commencing with the issue of

February 9, and ending with the issue of February 16, 2013.

That said newspaper was regularly distributed to its subscribers during all of said period. That the full amount of the fee charged for the foregoing publication is the sum of $ 485.94

Paula McDall

Subscribed and sworn to me this 20 day of February 2013

Connie I Ross

CONNIE I ROSS
COMMISSION EXPIRES
NOTARY PUBLIC
3/11/2016
STATE OF WASHINGTON

Notary Public in and for the State of Washington Residing at Oak Harbor
WHIDBEY NEWSPAPER GROUP
P.O. BOX 1200
Coupeville, WA 98239

APPENDIX D. Cooperative Agreements

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**FISH AND WILDLIFE
COOPERATIVE AGREEMENT FOR
NAVAL AIR STATION WHIDBEY ISLAND**

PURPOSE AND AUTHORITY

This tripartite agreement is made and entered into by and between the Naval Air Station Whidbey Island, hereinafter referred to as NAS Whidbey Island, acting by and through its authorized representative; the U.S. Fish and Wildlife Service, hereinafter referred to as the Service, acting by and through its authorized representative; and the Washington Department of Fish and Wildlife, hereinafter referred to as the State, acting by and through its authorized representative. This agreement is entered into by NAS Whidbey Island under the authority of OPNAVINST 5090.1B, Chapter 22; by the Service under the authority of the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661 *et seq.*), Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a-742j), and the Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 7421); and by both parties under the authority of the Sikes Act, as amended (16 U.S.C. 670a-670o) and the Economy Act (31 U.S.C. 1535). This agreement is entered into by the State under the authority of RCW 39.29. This agreement documents the responsibilities of NAS Whidbey Island, the Service, and the State in coordinating and developing a Sikes Act Cooperative Conservation and Management Plan for Fish and Wildlife Resources, hereinafter referred to as the Cooperative Plan.

The purpose of this agreement is to provide a framework for the Service and the State to assist NAS Whidbey Island in the coordination, development and implementation of a Cooperative Plan for the protection, enhancement, restoration, and management of fish and wildlife resources of state and national significance, and their habitats, at NAS Whidbey Island. This cooperative agreement, together with the Fish and Wildlife Management Section of the NAS Whidbey Island Integrated Natural Resources Management Plan, hereinafter referred to as the NAS Whidbey Island INRMP, constitutes the Cooperative Plan for fish and wildlife management pursuant to the Sikes Act. The NAS Whidbey Island INRMP will be available for review and approval by all signatory parties.

This agreement is within the purview of the National Environmental Policy Act (Public Law 91-190); the Endangered Species Act, as amended (Public Law 93-205); the Bald Eagle Protection Act (Public Law 86-70); the Non-Game Act (Public Law 96-366); the Migratory Bird Treaty Act (16 U.S.C. Sections 703-711); Executive Order 11990 (Preservation of Wetlands); Conservation Programs on Military Reservations (Public Law 90-465); and Conservation and Rehabilitation Programs on Military and Public Lands (Public Law 93-452).

EXPLANATORY RECITALS AND MUTUAL AGREEMENTS

Whereas, fish and wildlife species of national and state significance utilize lands and waters of NAS Whidbey Island to a significant extent; and,

Whereas, NAS Whidbey Island is responsible for the wise management of its fish and wildlife resources, and their habitats, as set forth in OPNAVINST 5090.1B, Chapter 22; and, Whereas, the Sikes Act requires that fish and wildlife resources on military reservations be cooperatively managed by federal and state agencies having responsibilities for conservation and management of fish and wildlife resources; and,

Whereas, the Service is an agency of the U.S. Department of the Interior, a federal government entity responsible for conserving, protecting, and enhancing fish and wildlife resources and their habitats for the continuing benefit of the public; and,

Whereas, the Service has national and regional policies to establish formal partnerships with other Federal, state, tribal, and private entities to guide the conservation, development, and management of the nation's fish and wildlife resources; and,

Whereas, the Washington Department of Fish and Wildlife (WDFW) was created under the laws of the State of Washington to protect, enhance, control, regulate, and manage fish and wildlife resources in Washington; and,

Whereas, it is of mutual interest and benefit to NAS Whidbey Island, the Service and the State to work cooperatively for the common purpose of protecting, enhancing, and managing the fish and wildlife resources at NAS Whidbey Island for the best interests of the people of Washington and the United States.

Therefore, it is mutually agreed that:

1. The signatory parties shall assist each other in development and implementation of a Cooperative Plan.

2. The Service and the State shall cooperate in providing an advisory role to NAS Whidbey Island in the preparation and periodic revision of the NAS Whidbey Island INRMP.

3. The parties shall meet as necessary to coordinate, review, and update programs and objectives of the NAS Whidbey Island INRMP. Proposed revisions to the INRMP will be made by mutual agreement of the signatory parties.

4. The parties shall review this agreement for adequacy and compliance not later than five years following the date it becomes effective and every five years thereafter.

5. Fish and wildlife management programs resulting from the Cooperative Plan shall be coordinated to the maximum extent possible with other existing natural resource, outdoor recreation, and cultural/historical management programs at NAS Whidbey Island.

6. The parties shall regulate hunting and fishing at NAS Whidbey Island subject to applicable federal and state regulations.

7. Transplanting of fish and wildlife species to NAS Whidbey Island shall be consistent with applicable federal and state regulations and policies, and shall be authorized only

by mutual consent of the signatory parties. Such authorization is to be based on appropriate supportive documentation such as capture/transplant plans, species recovery plans, and monitoring and management plans. Reintroduction of species once indigenous to Whidbey Island will be given strong consideration in the development of plans to transplant fish and wildlife species.

8. The use of chemical toxicants for controlling nuisance wildlife species on NAS Whidbey Island lands will be in accordance with current federal and state laws, regulations, and policies.

SPECIFIC RESPONSIBILITIES OF THE PARTIES

Section 1. NAS Whidbey Island Responsibilities

Within the limitations of the assigned military mission and the availability of funds and personnel, NAS Whidbey Island shall:

1. Manage the natural resources program to protect fish and wildlife resources and maintain favorable habitat for indigenous species of fish and wildlife.

2. Strive to enhance fish and wildlife habitats in accordance with objectives of the fish and wildlife section of the NAS Whidbey Island INRMP.

3. Protect threatened and endangered species, other species of concern, and their habitats, in accordance with federal and state laws.

4. Provide, as necessary, information, expertise, personnel, and equipment, and otherwise cooperate with the Service and the State in the management of fish and wildlife resources on lands of NAS Whidbey Island.

5. Provide a description of those areas where fish and wildlife management activities are restricted due to NAS Whidbey Island's mission (including a description of the restrictions), as well as a description of those areas suitable and available for use under the management plan without restrictions.

6. Provide, as may be necessary and if available, law enforcement assistance from designated NAS Whidbey Island Security officers.

7. Grant access to NAS Whidbey Island to Service and State personnel, including law enforcement officers, in the execution of this cooperative agreement unless security or other military exigency should prevent the granting of such access. Access is granted upon receiving permission from the NAS Whidbey Island Security Department, and upon coordinating in advance with the NAS Whidbey Environmental Affairs Department.

8. Regulate hunting and fishing at NAS Whidbey Island according to applicable federal and state laws and NAS Whidbey Island policies. Participate, as necessary, in

regulation development with WDFW staff, and subject to Fish and Wildlife Commission and WDFW Director approval.

Section II. Service Responsibilities

Consistent with its primary objectives and responsibilities and within the limitation of available funds and personnel, the Service shall:

1. Provide technical assistance to NAS Whidbey Island in the development and implementation of the Cooperative Plan and in the preparation of specific management plans for fish and wildlife species of national significance and their habitats.

2. Provide, as necessary, information, expertise, personnel and equipment, and otherwise cooperate with NAS Whidbey Island and the State in the management of fish and wildlife resources on NAS Whidbey Island lands.

3. Provide technical assistance to plan and/or conduct surveys of fish and wildlife resources and habitat delineation on NAS Whidbey Island.

4. Provide technical assistance in the identification, protection, and restoration of endangered and threatened flora and fauna, and their habitats and/or plant communities on NAS Whidbey Island.

5. Further the understanding of fish and wildlife conservation by conducting related research to solve field problems and assisting in related training programs.

6. Provide, as necessary, law enforcement and permitting assistance in upholding federal and state endangered species regulations.

7. Identify Service fish and wildlife technical training courses available to NAS Whidbey Island and other Department of the Navy personnel.

Section III. State Responsibilities

Consistent with its primary objectives and responsibilities and within the limitation of available funds and personnel, the State shall:

1. Provide technical assistance to NAS Whidbey Island in the development and implementation of the Cooperative Plan and in the preparation of specific management plans for fish and wildlife species of state significance and their habitats.

2. Provide, as necessary, information, expertise, personnel and equipment, and otherwise cooperate with the Service and NAS Whidbey Island in the management of fish and wildlife resources on NAS Whidbey Island lands.

3. Provide technical assistance to plan and/or conduct surveys of fish and wildlife resources and habitat delineation on NAS Whidbey Island.

4. Provide technical assistance in the identification, protection, and restoration of endangered and threatened flora and fauna, and their habitats on NAS Whidbey Island.

5. Further the understanding of fish and wildlife conservation by conducting related research to solve field problems and assisting in related training programs.

6. Provide, as necessary, law enforcement and assistance in upholding state laws, as applicable to natural resource management.

7. The State shall furnish, on an annual basis, current state hunting and fishing regulations.

8. Identify state-sponsored fish and wildlife technical training courses available to NAS Whidbey Island and other Department of the Navy personnel.

9. Assist NAS Whidbey Island, as necessary, in managing resident game populations to minimize animal damage control claims.

GENERAL PROVISIONS

1. Implementation of this agreement shall be subject to and consistent with the availability of personnel and appropriated funds.

2. The agreement recognizes the mission of NAS Whidbey Island to carry out its military function. Except as required by specific federal and state regulations, the implementation of this agreement shall in no way interfere with the mission of NAS Whidbey Island.

3. This document, with its references, constitutes the entire agreement between the signatory parties and supersedes any previous written or oral agreements or understandings concerning this cooperative effort.

4. This agreement may be modified or amended only in writing and by mutual consent of all signatory parties. Furthermore, any modification or amendment of this agreement is not effective or binding unless made in writing and signed by all signatory parties.

5. This agreement shall be in force and effective upon the date of the last signatory and shall continue in effect unless terminated by one of the parties upon ninety (90) days written notice of termination to the other parties.

SIGNATORIES

In witness whereof, the parties have executed this agreement as of the last date written below.

DEPARTMENT OF THE NAVY

Commanding Officer
Naval Air Station Whidbey Island
Oak Harbor, Washington 98278-5000
(360) 257-1009 - Environmental Affairs Department

4/24/96
Date

U.S. FISH AND WILDLIFE SERVICE

Regional Director, Western Region
U.S. Fish and Wildlife Service
911 N.E. 11th Avenue
Portland, Oregon 97232-4181
(503) 231-6828

1/10/96
Date

STATE OF WASHINGTON

for Director
Washington Department of Fish and Wildlife
600 Capitol Way N.
Olympia, Washington 98501-1091
(360) 902-2200

9/29/95
Date

OUTDOOR RECREATION
COOPERATIVE AGREEMENT FOR
NAVAL AIR STATION WHIDBEY ISLAND

PURPOSE AND AUTHORITY

This cooperative agreement is made and entered into by and between the Department of Defense functioning through the Installation Commanding Officer, Naval Air Station, Whidbey Island, hereinafter referred to as NAS Whidbey Island under the authority contained in 16 USC 670a-670f and OPNAVINST 5090.1B, Chapter 22; the Department of Interior functioning through the Superintendent, Columbia Cascades System Support Office of the National Park Service under the authority contained in 16 USC 670c, hereinafter referred to as the Service; and the State of Washington functioning through the Director, Interagency Committee for Outdoor Recreation, under the authority contained in Chapter 43-99 RCW, Marine Recreation Lands Act, Title 286WAC Interagency Committee for Outdoor Recreation, hereinafter referred to as the State, is entered into for the purpose of providing the Installation Commanding Officer, NAS Whidbey Island, with professional and technical information necessary to coordinate actions pertaining to the operation, development, management and protection of outdoor recreation resources at NAS Whidbey Island. This agreement is within the purview of the policies set forth in Public Law 91-190, National Environmental Policy Act (42 USC 4321, 4331-4335, and 4341, 4347), Public Law 88-29, Outdoor Recreation - Federal State Programs (16 USC 460L-460L-3), Public Law 86-797 as amended by Public Law 90-465 and Public Law 93-452, Conservation Programs on Military Reservations (16 USC 670a-670f), Public Law 90-542, Wild and Scenic Rivers Act (16 USC 1271-1287), Public Law 90-543, National Trails System Act (16 USC 1241-1249), Public Law 89-665, National Historic Preservation Act (16 USC470-470m), Executive Order 11644, Use of Off-Road Vehicles on the Public Lands, and under the principles of multiple use and sustained yield as defined in Public Law 86-517 (16 USC 528-531). Outdoor recreation as used in this agreement includes natural resources which provide or may provide opportunities for outdoor recreation. It does not include highly developed recreation facilities normally associated with urban developments such as playgrounds, golf courses, athletic field/courts, and swimming pools. Fish and wildlife conservation and management is covered by Public Law 86-797 (16 USC 670a-670b, 10 USC 2671) and is not to be included in this agreement.

EXPLANATORY RECITALS AND MUTUAL AGREEMENTS

Whereas, the Commanding Officer, NAS Whidbey Island has jurisdiction over NAS Whidbey Island and has the trusteeship responsibility to develop, enhance, operate, protect, maintain and control public access to the outdoor recreation resources thereon, and

Whereas, the Service is the agency of the federal government primarily responsible for the development and coordination of outdoor recreation opportunities, resources and plans with exclusive federal responsibility for the administration of the stateside Land and Water Conservation fund, and

Whereas, the State Interagency Committee for Outdoor Recreation was created under the laws of the State of Washington to work actively for the implementation of a unified state-wide strategy for meeting the recreational needs of Washington's citizens, and

Whereas, it is the mutual desire of NAS Whidbey Island, the Service and the State to work in harmony for the common purpose of developing, enhancing, and maintaining the outdoor recreation resources at NAS Whidbey Island in the best interest of the people served by these resources.

Therefore, it is mutually agreed that:

1. The Service and State will act in an advisory capacity to NAS Whidbey Island on matters pertaining to the management of outdoor recreation resources on lands administered by NAS Whidbey Island. Actual management of the outdoor recreation resources will remain the responsibility of the Commanding Officer, NAS Whidbey Island.

2. An interdisciplinary approach shall be promoted by all interested parties to resolve problems relating to multiple use management of natural resources.

3. All parties will jointly meet, as needed, to discuss matters relating to the conservation and management of outdoor recreation resources on or affecting the lands administered by NAS Whidbey Island, such as law enforcement, education and interpretive programs, cooperative studies, plans, surveys, fee collection and other matters as may be relevant to outdoor recreation resource management within the concept of multiple use management.

4. Nothing in this Cooperative Agreement is intended to modify in any manner the present cooperative program with other public agencies, conservation groups or educational institutions, or modify any rights granted by treaty or otherwise to any Indian tribe or member thereof. In the event of a conflict between this Cooperative Agreement and the Memorandum of Understanding between the Department of Interior and the Department of Defense, provisions in the Memorandum of Understanding will prevail.

5. This Agreement may be modified or amended by mutual agreement by the authorized representatives of the three agencies provided, however, the Installation Commanding Officer upon written notice to the Service and the State shall have the right to terminate this Agreement, in whole or in part, at any time when in his opinion the installation's mission or other national security requirements render termination or modification a necessity.

SPECIFIC RESPONSIBILITIES OF THE PARTIES

Section I. NAS Whidbey Island Responsibilities

Within the limitations of the assigned military mission and the availability of funds and manpower, NAS Whidbey Island agrees to:

1. Provide access to authorized agents and employees of the Service and State in the execution of this cooperative agreement unless security or other military exigency should prevent the granting of such access.

2. Maintain, operate, and manage outdoor recreation resources and activities, in accordance with the approved NAS Whidbey Island outdoor recreation management plan and approved natural resources management plan.

3. Protect and preserve special interest areas.

4. Provide information on the development of NAS Whidbey Island outdoor recreation plans to the service; state; and Engineering Field Activity, Northwest, Naval Facilities Engineering Command.

Section II. Service Responsibilities

Consistent with its primary objectives and responsibilities, the Service agrees within the limitation of funds and personnel to:

1. Provide technical consulting assistance in developing the outdoor recreation resources and activities for the aesthetic, recreational and economic benefit of authorized users and members of the public.

2. Provide technical assistance in the resolution of special problems that may arise subsequent to the execution of this agreement.

3. Participate in design, development, and implementation of recreation resource surveys and make recommendations on protecting, developing and interpreting special interest areas.

4. Further an understanding of recreation and recreation resources by providing related research and assisting in related training programs.

5. Provide copies of related field reports, studies and evaluations to the NAS Whidbey Island Commanding Officer and State.

Section III. State Responsibilities

Within the availability of funds and personnel, the State agrees to:

1. Assist in the determination of projected demands by NAS Whidbey Island personnel for various outdoor recreation activities and provide management recommendations for restoring, maintaining, developing or enhancing recreational facilities and activities.

2. Assist in determination of carrying capacity (level of recreational use) to avoid damage to public health, safety, resource itself and other resource values.

3. Provide copies of related reports, studies and evaluations to the NAS Whidbey Island Commanding Officer and Service.

4. Provide technical assistance in related areas such as comprehensive planning, and site acquisition and development programs.

5. Furnish one copy of the state Outdoor Recreation Plan to the NAS Whidbey Island Commanding Officer.

Public Access:

It is the policy of the Department of Defense to permit public access to outdoor recreation resources to the greatest degree possible, consistent with the NAS Whidbey Island safety and security requirements and its available manpower and natural resources to support such activities without degradation or impairment of environmental qualities or of military programs.

This cooperative agreement will become effective upon the date subscribed by the last signatory and shall continue in full force indefinitely until terminated by any of the parties signing this Agreement. Any party terminating participation in the agreement shall give written notice of said termination to the other parties to the agreement.

SIGNATORIES

In witness whereof, the parties have executed this agreement as of the last date written below.

DEPARTMENT OF THE NAVY

Commanding Officer
Naval Air Station Whidbey Island
Oak Harbor, Washington 98278-5000

24 Apr 96
Date

NATIONAL PARK SERVICE

Superintendent
Columbia Cascades System Support Office
909 First Avenue
Seattle, Washington 98104-1060

10-25-95
Date

STATE OF WASHINGTON

Laura E. Johnson
Director
Interagency Committee for Outdoor Recreation
P.O. Box 40917
Olympia, Washington 98504

11/9/95
Date

DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
OAK HARBOR, WASHINGTON 98278-5000

5090
Ser N44/ 0744
JUL 26 2004

From: Commanding Officer, Naval Air Station Whidbey Island
To: Mr. John Phillips, Ecologist

Subj: APPOINTMENT AS INSTALLATION NATURAL RESOURCES MANAGER/COORDINATOR

Ref: (a) OPNAVINST 5090.1B, CH-4, 22-13.5e

1. Per reference (a), as the trained natural resources management professional in the Environmental Affairs Department, you are assigned the duty as Natural Resources Manager/ Coordinator for Naval Air Station Whidbey Island properties/ ranges and Naval Weapons Systems Training Facility Boardman, effective the date of this letter.

2. As the Natural Resources Manager/Coordinator, you are required to ensure that the Commanding Officer is informed regarding natural resource issues, conditions of natural resources, objectives of the Integrated Natural Resources Management Plan, potential or actual conflicts between mission requirements and natural resources mandates. You are also responsible for the inherently governmental decisions made on behalf of the installation and the Commanding Officer with regards to Sikes Act compliance.

3. This appointment shall remain in effect until specifically revoked by the Commanding Officer.

STEPHEN P. BLACK

APPENDIX E. Spill Prevention, Control and Countermeasures (SPCC)

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<u>SPCC Plan Summary</u>

Introduction

This Oil Spill Prevention Control and Countermeasure (SPCC) Plan was written to meet the requirements of Washington Administrative Code (WAC) 173-180 and U.S. Environmental Protection Agency (EPA) regulations in 40 CFR 112. The purpose of the SPCC Plan is to document measures being taken to prevent discharges of oil into waters of the United States. The SPCC Plan includes a facility description and basic operating procedures for areas of Naval Air Station (NAS) Whidbey Island where oil is handled or used. Procedures and equipment that reduce the risk of a spill are described. Recommendations for procedural improvement and equipment upgrade or replacement necessary to meet the requirements of WAC 173-180 and 40 CFR) 112 are included.

This SPCC Plan includes all NAS Whidbey Island facilities used for storing, handling, transferring or transporting oil in bulk. No facilities at NAS Whidbey Island are used to produce or process oil in bulk. NAS Whidbey Island is required to have an SPCC because the cumulative oil storage capacity is equal to or greater than 1,320 gallons in aboveground containers or equipment, or 42,000 gallons in underground containers or equipment, and because of the facility's potential to cause a discharge to navigable waters of the United States. This plan:

Includes all oil containers with a capacity equal to or greater than 55 gallons.

Includes all operational equipment (transformers, switch gear) that contains 55 gallons or more of oil.

Shows the location and contents of all oil storage tanks and operating equipment on facility diagrams. While tanks that are fully regulated by all technical requirements of 40 CFR 280 are not required to be addressed in SPCC Plans, they are still shown on facility diagrams as required.

Facilities that could reasonably be expected to cause substantial harm to the environment are required by EPA to have a facility response plan for oil spills. These facilities meet the substantial harm criteria. Facilities that ***do not*** meet the substantial harm criteria must complete a certification of substantial harm determination form and maintain the form at the facility. NAS Whidbey Island meets the substantial harm criteria and has therefore been included in the Commander, Navy Region Northwest (CNRNW) Oil and Hazardous Substances (OHS) Integrated Contingency Plan (ICP) (COMNAVREGNWINST 5090.1). This plan complies with OPA-90 and 40 CFR 112.20 requirements.

Deviations from some requirements of the EPA regulations are allowed by 40 CFR 112.7(a)(2) as long as the alternative that is applied is described, and the means of achieving equivalent environmental protection is explained. Generally, applicable deviations are described in Section 2, whiled site-specific deviations are described in the applicable facility discussion in Section 3.

The document is organized as follows:

Section 1, Introduction: Provides miscellaneous information required under the SPCC regulations.

- Section 2, General Facility Information: Provides SPCC elements that apply to all tanks or sites such as discussions on industry standard applicability and how certain SPCC requirements are being met, general spill prevention procedures, NAS Whidbey Island security measures and features, maintenance and inspection procedures, and spill response procedures.

- Section 3, Site Specific Information: Provides detailed site descriptions and recommendations, including a general description of the site, spill prevention technology, transfer operations, spill prediction, specific maintenance and inspection procedures and schedules, and any recommended corrective actions for that site.

Appendices: Appendix A is a List of Recommended Corrective Actions; Appendix B is the Facility Oil Spill Risk Analysis; Appendix C is a Base Operating Services Contract (BOSC) excerpt addressing NAS Whidbey Island maintenance requirements; and Appendix D is the Standard Operating Procedures and Inspection Checklists used by BOSC and Hazardous Materials Management Coordinators (HMMC), Fuel Supply and Distribution Contractor (FSDC) inspection and maintenance is addressed in the *NAS Whidbey Island Operations Manual*); Appendix E is the Alcohol and Drug Use Awareness and Treatment Program; Appendix F provides Facility Maps showing SPCC sites and transformer locations at both Ault Field and Seaplane Base, and Appendix G is a list of Electric Operational Equipment.

APPENDIX F. Fish, Wildlife and Plant Species Information

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PLANT LIST

Table 1 lists plant species that have been observed at NAS Whidbey Island by station personnel and by staff members of Washington Department of Natural Resources, The Nature Conservancy, and EA Engineering, Science and Technology. While a comprehensive vegetation inventory has not been conducted at the station, this list includes the species most commonly encountered. The numbered codes in the third column correspond to vegetation cover types as follows:

1	Douglas Fir Forest	9	Sitka Spruce Bog
2	Mixed Forest	10	Freshwater Marsh
3	Alder Forest	11	Wet Meadow
4	Quaking Aspen Grove	12	Salt Marsh
5	Oregon White Oak Grove	13	Dune Natives
6	Willow Stand	14	Grasslands and Cultivated Fields
7	Orchard	15	Disturbed Area
8	Scrub-shrub	16	Landscaped Area

Table 1. Plant Species Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Occurring in Vegetation Cover Type
	Trees	
apple	*Pyrus malus*	7,16
Austrian pine*	*Pinus nigra*	16
bigleaf maple	*Acer macrophyllum*	2, 3, 16
bitter cherry	*Prunus emarginata*	2, 16
black cottonwood	*Populus trichocarpa*	3, 5
cascara	*Rhamnus purshiana*	2
Douglas fir	*Pseudotsuga menziesii*	1, 2, 3, 16
grand fir	*Abies grandis*	1, 2, 16
Hooker's willow	*Salix hookeriana*	3, 6
lodgepole pine	*Pinus contorta*	1, 2
Oregon white oak	*Quercus garryana*	5
Pacific yew	*Taxus brevifolia*	1, 2
Pacific madrone	*Arbutus menziesii*	1, 2

1 Douglas Fir Forest	5 Oregon White Oak Grove	9 Sitka Spruce Bog	13 Dune Natives
2 Mixed Forest	6 Willow Stand	10 Freshwater Marsh	14 Grasslands and Cultivated Fields
3 Alder Forest	7 Orchard	11 Wet Meadow	15 Disturbed Area
4 Quaking Aspen Grove	8 Scrub-shrub	12 Salt Marsh	16 Landscaped Area

* denotes non-native species

Table 1. **Plant Species Occurring at NAS Whidbey Island.**

Common Name	Scientific Name	Occurring in Vegetation Cover Type
ponderosa pine	*Pinus ponderosa*	1, 2
quaking aspen	*Populus tremuloides*	3, 4, 6
red alder	*Alnus rubra*	1, 2, 3, 6, 8
Rocky Mountain juniper	*Juniperus scopulorum*	1, 2, 16
Scouler's Willow	*Salix scouleriana*	6
Sitka spruce	*Picea sitchensis*	1, 2, 9
vine maple	*Acer circinatum*	1, 2, 3, 6, 8
western crabapple	*Pyrus fusca*	2, 16
western hazelnut	*Corylus cornuta*	2, 3, 16
western hemlock	*Tsuga heterophylla*	1, 2, 16
western red cedar	*Thuja plicata*	1, 2, 16
western white pine	*Pinus monticola*	1, 2, 16
Shrubs		
baldhip rose	*Rosa gymnocarpa*	2, 3, 8
black hawthorn	*Crataegus douglasii*	2, 3, 8
black twinberry	*Lonicera involucrata*	2, 3, 8
blackcap	*Rubus leucodermis*	1, 2
bog birch	*Betula glandulosa*	9
clustered wild rose	*Rosa pisocarpa*	3, 8
coast black gooseberry	*Ribes divaricatum*	1, 2
Douglas' maple	*Acer glabrum*	2
Douglas' spiraea	*Spiraea douglasii*	3, 6, 8, 9, 10
dull Oregongrape	*Berberis nervosa*	1, 2
English ivy*	*Hedera helix*	16
English holly*	*Ilex aquifolium*	1, 2, 16
European mountain-ash*	*Sorbus aucuparia*	1, 2
evergreen huckleberry	*Vaccinium ovatum*	1, 2
evergreen blackberry*	*Rubus laciniatus*	1, 2, 8

1 Douglas Fir Forest
2 Mixed Forest
3 Alder Forest
4 Quaking Aspen Grove
5 Oregon White Oak Grove
6 Willow Stand
7 Orchard
8 Scrub-shrub
9 Sitka Spruce Bog
10 Freshwater Marsh
11 Wet Meadow
12 Salt Marsh
13 Dune Natives
14 Grasslands and Cultivated Fields
15 Disturbed Area
16 Landscaped Area

* denotes non-native species

Table 1. Plant Species Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Occurring in Vegetation Cover Type
gorse*	*Ulex europaeus*	14, 15
hairy honeysuckle	*Lonicera hispidula*	2
Himalayan blackberry*	*Rubus discolor*	3, 8, 15
Labrador tea	*Ledum groenlandicum*	9
mockorange	*Philadelphus lewisii*	1, 16
Nootka rose	*Rosa nutkana*	4, 5, 8
oceanspray	*Holodiscus discolor*	1, 2, 5
orange honeysuckle	*Lonicera ciliosa*	2
Pacific ninebark	*Physocarpus capitatus*	2, 3, 8
Pacific wax-myrtle	*Myrica californica*	2
Pacific rhododendron	*Rhododendron macrophyllum*	1
red elderberry	*Sambucus racemosa*	1, 2
red huckleberry	*Vaccinium parvifolium*	2, 3
red-flowering currant	*Ribes sanguineum*	1, 2
red-osier dogwood	*Cornus stolonifera*	2, 3, 8, 10
salal	*Gaultheria shallon*	1, 2, 8, 9
salmonberry	*Rubus spectabilis*	2, 3, 6, 8
Scot's broom*	*Cytisus scoparius*	8, 15
serviceberry	*Amelanchier alnifolia*	2, 5
snowberry	*Symphoricarpos albus*	1, 2, 4, 5, 7
soopolallie	*Shepherdia canadensis*	8
swamp gooseberry	*Ribes lacustre*	8, 10
sweet gale	*Myrica gale*	8, 10
tall Oregongrape	*Berberis aquifolium*	1, 2, 5
thimbleberry	*Rubus parviflorus*	2
trailing blackberry	*Rubus ursinus*	1, 2, 3, 5, 8, 15
western swamp laurel	*Kalmia occidentalis*	9

1 Douglas Fir Forest
2 Mixed Forest
3 Alder Forest
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16 Landscaped Area

* denotes non-native species

Table 1. Plant Species Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Occurring in Vegetation Cover Type
	Forbs	
American water plantain	*Alisma plantago-aquatica*	10
American vetch	*Vicia americana*	2, 3, 14, 15
American searocket	*Cakile edentula*	13
beach carrot	*Glehnia littoralis*	12, 13
beggars-tick	*Bidens cernua*	14, 15
brass buttons	*Cotula coronopifolia*	12
broad-leaved dock*	*Rumex obtusifolius*	10, 11, 14, 15
broadleaf arrowhead	*Saggitaria latifolia*	10
bull thistle*	*Cirsium vulgare*	8, 13, 14, 15
Canada thistle*	*Cirsium arvense*	8, 13, 14, 15
Canada sandspurry	*Spergularia canadensis*	12
Canada goldenrod	*Solidago canadensis*	14, 15
cleavers	*Galium aparine*	1, 2
climbing nightshade*	*Solanum dulcamara*	2, 8, 15
cole crops (e.g. broccoli)*	*Brassica spp.*	14
Columbia lily	*Lilium columbianum*	2, 8, 14
common dandelion*	*Taraxacum officinale*	15, 16
common plantain*	*Plantago major*	14, 15, 16
common vetch*	*Vicia sativa*	14, 15, 16
common yarrow	*Achillea millefolium*	14, 15, 16
Cooley's hedge-nettle	*Stachys cooleyae*	10
creeping buttercup*	*Ranunculus repens*	2, 3, 10, 11, 20
curly dock*	*Rumex crispus*	11, 14, 15
Douglas aster	*Aster subspicatus*	2, 3, 10, 13
enchanter's nightshade	*Circaea alpina*	2, 3
English plantain*	*Plantago lanceolata*	14, 15, 16
false lily-of-the-valley	*Maianthemum dilatatum*	2

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Table 1. Plant Species Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Occurring in Vegetation Cover Type
false solomon's seal	*Smilacina racemosa*	2
fireweed	*Epilobium angustifolium*	1, 2, 3, 15
fleshy jaumea	*Jaumea carnosa*	12
floating-leaved pondweed	*Potamogeton natans*	10
foamflower	*Tiarella trifoliata*	2, 3
foxglove*	*Digitalis purpurea*	1, 2, 16
fragrant bedstraw	*Galium triflorum*	1, 2
fringecup	*Tellima grandiflora*	2
giant vetch	*Vicia gigantea*	13, 14, 15
glehnia	*Glehnia leiocarpa*	13
golden Indian-paintbrush	*Castilleja levisecta*	14
hairy cats-ear*	*Hypochaeris radicata*	14, 15, 16
hairy vetch*	*Vicia hirsuta*	14, 15
harsh paintbrush	*Castilleja hispida*	14
hemlock-parsley	*Conioselinum pacificum*	14
Indian pipe	*Monotropa uniflora*	1, 2
Japanese beach pea	*Lathyrus japonicus*	13
little buttercup	*Ranunculus uncinatus*	2, 10, 11
little prince's pine	*Chimaphila menziesii*	1, 2
mare's-tail	*Hippurus vulgaris*	10
marsh willow-herb	*Epilobium watsonii*	10
miner's lettuce	*Montia perfoliata*	1, 2
mountain sweet-cicely	*Osmorhiza chilensis*	2, 3, 4, 6
New Zealand white clover	*Trifolium repens*	14, 15
Nuttall's peavine	*Lathyrus nevadensis*	2, 3, 4, 5
orache	*Atriplex patula*	12
oxeye-daisy*	*Chrysanthemum leucanthemum*	14, 15
Pacific sanicle	*Sanicula crassicaulis*	2, 3

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Table 1. Plant Species Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Occurring in Vegetation Cover Type
Pacific silverweed	*Potentilla pacifica*	9, 12
Pacific water-parsley	*Oenanthe sarmentosa*	8, 10
pearly everlasting	*Anaphalis margaritacea*	13, 14, 15
peas*	*Pisum sativum*	14
pickleweed	*Salicornia virginica*	12
potatoes*	*Solanum sp.*	14
Puget Sound gumweed	*Grindelia integrifolia*	12, 13
purple loosestrife*	*Lythrum salicaria*	10
purple cudweed	*Gnaphalium purpureum*	14, 15
purple sanicle	*Sanicula bipinnatifida*	14
queen anne's lace*	*Daucus carota*	14, 15
rattlesnake-plantain	*Goodyera oblongifolia*	1, 2
red clover*	*Trifolium pratense*	14, 15
salsify*	*Tragopogon porrifolius*	14, 15
saltmarsh dodder	*Cuscuta salina*	12
saltmarsh sandspurry	*Spergularia marina*	12, 13
sea purslane	*Honkenya peploides*	12
sea plantain	*Plantago maritima*	12
sea thrift	*Armeria maritima*	13
seashore lupine	*Lupinus littoralis*	13
self-heal	*Prunella vulgaris*	11, 14, 15
sheep sorrel*	*Rumex acetosella*	14, 15, 16
short-styled thistle	*Cirsium brevistylum*	11, 14, 15
Siberian montia	*Montia siberica*	2
sicklekeeled lupine	*Lupinus albicaulis*	14
silver bursage	*Ambrosia chamissonis*	12, 13
simplestem burreed	*Sparganium emersum*	10
skunk cabbage	*Lysichitum americanum*	10

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Table 1. Plant Species Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Occurring in Vegetation Cover Type
small-flowered nemophila	*Nemophila parviflora*	3, 4, 5
smartweed	*Polygonum spp.*	10
spotted coralroot	*Corallorhiza maculata*	1, 2
springbank clover	*Trifolium wormskjoldii*	11, 13
St. John's-wort*	*Hypericum perforatum*	14, 15
starry solomon-plume	*Smilacina stellata*	2
stinging nettle	*Urtica dioica*	2, 3, 4, 6, 8, 10
suckling clover*	*Trifolium dubium*	14
sweet coltsfoot	*Petasites frigidus*	2, 3, 6, 10, 11
tansy ragwort*	*Senecio jacobaea*	14, 15
touch-me-not	*Impatiens noli-tangere*	2, 3
trail-plant	*Adenocaulon bicolor*	2
twinflower	*Linnaea borealis*	2
wall lettuce*	*Lactuca muralis*	11, 14
western dock	*Rumex occidentalis*	11, 14, 15
western starflower	*Trientalis latifolia*	2
western trillium	*Trillium ovatum*	2
white clover*	*Trifolium repens*	14, 15
white-flowered hawkweed	*Hieracium albiflorum*	3, 4, 6
woods strawberry	*Fragaria vesca*	2, 3, 4, 11, 14
yellow iris	*Iris pseudacorus*	10
yellow parentucellia*	*Parentucellia viscosa*	11, 14
yellow sandverbena	*Abronia latifolia*	13
yerba buena	*Satureja douglasii*	1, 2
Ferns and Fern Allies		
bracken fern	*Pteridium aquilinum*	1, 2, 3, 8, 15
deer fern	*Blechnum spicant*	2
field horsetail	*Equisetum arvense*	1, 2, 3, 6, 8, 11, 14, 15, 16

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Table 1. Plant Species Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Occurring in Vegetation Cover Type
lady fern	*Athyrium filix-femina*	2, 3, 6
licorice fern	*Polypodium glycyrrhiza*	2
spreading wood fern	*Dryopteris expansa*	2
sword fern	*Polystichum munitum*	1, 2, 3
Grasses, Sedges, and Rushes		
alfalfa	*Medicago sativa*	14
Amercan threesquare	*Scirpus americanus*	10, 12
Baltic rush	*Juncus balticus*	10, 12
barren fescue*	*Festuca bromoides*	14, 15
big-headed sedge	*Carex macrocephala*	13
blue wildrye	*Elymus glaucus*	5, 14
Canadian bluegrass*	*Poa compressa*	14, 16
Coast Range fescue	*Festuca subuliflora*	14, 15
Columbia brome	*Bromus vulgaris*	14
common cattail	*Typha latifolia*	10
common rush	*Juncus effusus*	10, 11, 14
common velvetgrass*	*Holcus lanatus*	13, 14, 15
Dewey's sedge	*Carex deweyana*	3, 10
dune wildrye	*Elymus mollis*	13
dwarf alkaligrass	*Puccinellia pumila*	12, 13
eelgrass	*Zostera marina*	12
English ryegrass	*Lolium perenne*	14, 15
hard fescue	*Festuca ovina*	14, 15
hard-stemmed bulrush	*Scirpus acutus*	10
Kentucky bluegrass*	*Poa pratensis*	5, 14, 16
long stolon sedge	*Carex pensylvanica*	5, 10
Lyngby's sedge	*Carex lyngbyei*	10, 12
meadow barley	*Hordeum brachyantherum*	14, 15
narrow-leaved cattail	*Typha angustifolia*	10

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Table 1. Plant Species Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Occurring in Vegetation Cover Type
nodding fescue	*Festuca subulata*	14
nodding trisetum	*Trisetum cernuum*	14
Nuttall's alkaligrass	*Puccinellia nuttalliana*	12
oats	*Avena sativa*	14
orchard grass*	*Dactylis glomerata*	14, 15, 16
Pacific brome	*Bromus pacificus*	14
quack grass*	*Agropyron repens*	14, 15
red fescue	*Festuca rubra*	5, 13, 14, 15
redtop*	*Agrostis alba*	14, 15, 16
reed canarygrass*	*Phalaris arundinacea*	10, 11
ripgut*	*Bromus rigidus*	14, 15
saltmarsh bulrush	*Scirpus maritimus*	12
sand-dune sedge	*Carex pansa*	13
seashore saltgrass	*Distichlis spicata*	12
seaside arrowgrass	*Triglochin maritimum*	12
slough sedge	*Carex obnupta*	8, 10
small-flowered woodrush	*Luzula parviflora*	1, 2, 10
small-flowered bulrush	*Scirpus microcarpus*	10
soft brome*	*Bromus mollis*	14, 15
spikerush	*Eleocharis spp.*	10, 11
squirrel-tailed barley	*Hordeum jubatum*	14, 15
sweet vernalgrass*	*Anthoxanthum odoratum*	14, 15
tall fescue*	*Festuca arundinacea*	14, 15
timothy	*Phleum pratense*	14
Townsend's cordgrass*	*Spartina anglica*	12
tufted hairgrass	*Deschampsia caespitosa*	10, 11, 12, 14
western fescue	*Festuca occidentalis*	14, 15

Sources: SCS 1991, WDNR 1995.

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FISH AND WILDLIFE SPECIES OCCURRING AT NAS WHIDBEY ISLAND

Animal species potentially occurring at NAS Whidbey Island are divided into four tables: birds, mammals, reptiles and amphibians, and marine species. These lists are compiled based on information provided by NAS Whidbey Island personnel, National Fish and Wildlife Foundation, Washington Department of Fish and Wildlife, Washington Department of Natural Resources, the U.S. Fish and Wildlife Service and other sources. The species in each table are ordered by family and presented in the sequence of their presumed natural relationships.

Life Form

The terrestrial animal species in these tables have been assigned a life form category based on specific combinations of habitat requirements for reproduction and feeding. This can be used as a tool by managers to gain information on the relationship of a species to its habitat and to consider potential impacts from management activities on the wildlife community inhabiting a certain habitat type. For example, the importance of a particular successional stage of a plant community to one life form can be determined and managed accordingly. The life form categories are defined in Table E-1. Each species in Tables 2 through 5 are assigned a number corresponding to one of these life forms.

Table E-1. Life Form Descriptions.

Life Form	Reproduction	Feeding
1	in water	in water
2	in water	on the ground, in bushes, and/or in trees
3	on the ground around water	on the ground, in bushes or trees, and/or in water
4	in cliffs, caves, rimrock, and/or talus	on the ground or in the air
5	on the ground without specific water, cliff, rimrock, or talus association	on the ground
6	on the ground	in bushes, trees, or the air
7	in bushes	on the ground, in water, or the air
8	in bushes	in trees, bushes, or the air
9	primarily in deciduous trees	in trees, bushes, or the air
10	primarily in conifers	in trees, bushes, or the air
11	in conifers or deciduous trees	in trees, in bushes, on the ground, or in the air
12	on very thick branches	on the ground or in water
13	in own hole excavated in tree	in trees, in bushes, on the ground, or in the air

Table E-1. **Life Form Descriptions.**

Life Form	Reproduction	Feeding
14	in a hole made by another species or in a natural hole	on the ground, in water, or the air
15	in a burrow underground	on the ground or under it
16	in a burrow underground	in the air or in the water

Source: USDA Forest Service 1979.

Seasonal Abundance

Bird species have been divided into expected abundance on Whidbey Island for the various seasons. Each species in Table 2 has been assigned a numbered code corresponding to the following:

1. Common Year-Round Resident
2. Common Winter Resident
3. Common Summer Resident
4. Common Summer and Fall Visitor
5. Common Migrant
6. Uncommon Species
7. Rare Species
8. Very Rare Species

Habitat Types

The habitat types listed below are described in Chapter 5. Numbered codes for habitat types in which each animal is expected to occur are listed in Tables 2 through 5 as follows:

1 Structurally Complex Forest
2 Fully Functional Older Forest
3 Closed Canopy Forest
4 Dense Pole Forest
5 Regeneration Forest
6 Mature Deciduous Forest
7 Young Deciduous Forest
8 Scrub-shrub
9 Freshwater Marsh
10 Wet Meadow
11 Drainage Ditches/Sloughs
12 Ponds
13 Sitka Spruce Bog
14 Salt Marsh
15 Coastal Lagoon
16 Mud Flat
17 Rocky/Cobble Beach
18 Rocky/Sand Beach
19 Cobble/Sand Beach
20 Gravel/Sand Beach
21 Marine Subtidal
22 Dune Natives
23 Bluff
24 Grassland
25 Orchards
26 Disturbed Area
27 Landscaped Area
28 Structures and Transportation

[1]**Seasonal Abundance**
1. Common Year-Round Resident
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7. Rare Species
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[2]**Habitat Types**
1. Structurally Complex Forest
2. Fully Functional Older Forest
3. Closed Canopy Forest
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[3]**Type Use of Logs**
C. Cover
R. Reproduction
N. Nesting
O. Other

Table 2. **Birds Potentially Occurring at NAS Whidbey Island.**

Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Ht. (ft.)	Special Habitat Needs: Snag Use by Cavity Nesters: Min. dbh (in.)	Special Habitat Needs: Use of Down Logs[3]
Family Gaviidae (Loons)								
red-throated loon	*Gavia stellata*	W	2	15, 21	3			
Pacific loon	*Gavia pacifica*	W	2	15, 21	3			
common loon	*Gavia immer*	W	2	15, 21	3			
yellow-billed loon	*Gavia adamsii*	W	2	15, 21	3			
Family Podicipedidae (Grebes)								
pied-billed grebe	*Podilymbus podiceps*	W	1	9, 12, 15, 21	3			
horned grebe	*Podiceps auritus*	W	2	7, 9, 11, 12, 15, 17-21	3			
red-necked grebe	*Podiceps grisegena*	W	2	9, 12, 17-21	3			
eared grebe	*Podiceps nigricollis*	W	2	12, 15, 21	3			
Clark's grebe	*Aechmophorus clarkii*	W	8	12, 15, 21	3			
western grebe	*Aechmophorus occidentalis*	W	3	15, 17- 21	3			
Family Procellariidae (Shearwaters, Petrels)								
northern fulmar	*Fulmarus glacialis*	W	7	21, 23	3			
sooty shearwater	*Puffinus griseus*	W	6	21, 23	16			
short-tailed shearwater	*Puffinus tenuirostris*	W	8	21, 23	16			

[1]**Seasonal Abundance**
1. Common Year-Round Resident
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[2]**Habitat Types**
1. Structurally Complex Forest
2. Fully Functional Older Forest
3. Closed Canopy Forest
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7. Young Deciduous Forest
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18. Rocky/Sand Beach
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20. Gravel/Sand Beach
21. Marine Subtidal
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[3]**Type Use of Logs**
C. Cover
R. Reproduction
N. Nesting
O. Other

Table 2. Birds Potentially Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Ht. (ft.)	Special Habitat Needs: Snag Use by Cavity Nesters: Min. dbh (in.)	Special Habitat Needs: Use of Down Logs[3]
Family Hydrobatidae (Storm-petrels)								
fork-tailed storm-petrel	*Oceanodroma furcata*	W	8	21	7			
Family Fregatidae (Frigatebirds)								
magnificent frigatebird	*Fregata magnificens*	W	8	21	7			
Family Pelecanidae (Pelicans)								
brown pelican	*Pelecanus occidentalis*	W	7	15,19, 20, 21	3			
Family Phalacrocoracidae (Cormorants)								
double-crested cormorant	*Phalacrocorax auritus*	W	1	15, 21	3			O
Brandt's cormorant	*Phalacrocorax penicillatus*	W	1	15, 17, 18, 21, 23,	3			
pelagic cormorant	*Phalacrocorax pelagicus*	W	1	15, 21	3			
Family Ardeidae (Herons)								
American bittern	*Botaurus lentiginosus*	W	6	9, 12, 14, 15	3			
great blue heron	*Ardea herodias*	W	1	1, 2, 7, 9, 11, 12, 14, 15, 17, 18, 19, 20	12			O
great egret	*Casmerodius albus*	W	8	9, 12, 14, 15	12			
snowy egret	*Egretta thula*	W	8	14, 15, 21	7			

[1]**Seasonal Abundance**
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Table 2. Birds Potentially Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Ht. (ft.)	Min. dbh (in.)	Use of Down Logs[3]
little blue heron	*Egretta caerulea*	W	8	6, 7, 8	7			
green heron	*Butorides striatus*	W	6	6, 7, 8, 9, 11, 12	7			
black-crowned night heron	*Nycticorax nycticorax*	W	8	1, 2, 6, 9	7			O
Family Anatidae (Swans, Geese, Ducks)								
tundra swan	*Cygnus columbianus*	W	6	9, 15, 21	3			
trumpeter swan	*Cygnus buccinator*	W	6	9, 15, 21	3			
greater white-fronted goose	*Anser abifrons*	W	6	9, 15, 21	3			O
snow goose	*Chen caerulescens*	W	6	9, 14, 15, 24	3			O
brant	*Branta bernicla*	W	2	14, 15, 21	3			
Canada goose	*Branta canadensis*	W	4	9, 10, 11, 12, 14, 15, 24, 27	3			
wood duck	*Aix sponsa*	W	6	6, 7, 9, 12	14	6	27	R,O
green-winged teal	*Anas crecca*	W	2	9, 12	3			O
mallard	*Anas platyrhynchos*	W	1	9, 10, 11, 12, 14, 15, 21	3			R,O
northern pintail	*Anas acuta*	W	2	9, 14, 15, 16	6			O
blue-winged teal	*Anas discors*	W	6	9, 12	3			O

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19. Cobble/Sand Beach
20. Gravel/Sand Beach
21. Marine Subtidal
22. Dune Natives
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[3]**Type Use of Logs**
C. Cover
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O. Other

Table 2. Birds Potentially Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Ht. (ft.)	Special Habitat Needs: Snag Use by Cavity Nesters: Min. dbh (in.)	Special Habitat Needs: Use of Down Logs[3]
cinnamon teal	*Anas cyanoptera*	W	6	9, 11, 12	3			O
northern shoveler	*Anas clypeata*	W	2	9, 11, 12, 14	3			O
gadwall	*Anas strepera*	W	6	9, 11, 12, 14, 16	3			O
Eurasian wigeon	*Anas penelope*	W	6	9, 11, 12, 14, 16	3			O
American wigeon	*Anas americana*	W	2	9, 11, 12, 24	3			O
canvasback	*Aythya valisineria*	W	2	9, 12, 14, 15, 21	3			
redhead	*Aythya americana*	W	7	9, 12, 14, 15, 21	3			
ring-necked duck	*Aythya collaris*	W	6	9, 11, 12	3			O
greater scaup	*Aythya marila*	W	2	7, 9, 10, 12, 17	3			O
lesser scaup	*Aythya affinis*	W	2	9, 11, 12	3			O
harlequin duck	*Histrionicus histrionicus*	W	6	14, 15, 17, 18	3			R,O
oldsquaw	*Clangula hyemalis*	W	6	15, 21	3			
black scoter	*Melanitta nigra*	W	6	15, 21	3			
surf scoter	*Melanitta perspicillata*	W	2	15, 21	3			
white-winged scoter	*Melanitta fusca*	W	2	15, 21	3			

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1. Common Year-Round Resident
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8. Very Rare Species

[2]Habitat Types
1. Structurally Complex Forest
2. Fully Functional Older Forest
3. Closed Canopy Forest
4. Dense Pole Forest
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7. Young Deciduous Forest
8. Scrub-shrub
9. Freshwater Marsh
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common goldeneye	*Bucephala clangula*	W	2	15, 21	14	6	20	R,O
Barrow's goldeneye	*Bucephala islandica*	W	2	15, 21	14	6	20	R,O
bufflehead	*Bucephala albeola*	W	2	15, 21	17, 18	6	15	
hooded merganser	*Lophodytes cucullatus*	W	6	11, 12, 15, 21	14	6	15	R,O
common merganser	*Mergus merganser*	W	2	11, 12, 15, 21	14	6	20	R,O
red-breasted merganser	*Mergus serrator*	W	2	15, 21	3			
ruddy duck	*Oxyura jamaicensis*	W	6	9, 11, 12, 15, 21	3			
Family Cathartidae (American Vultures)								
turkey vulture	*Cathartes aura*	L	6	3, 6, 7, 24, 26	4			R
Family Accipitridae (Kites, Hawks, Eagles)								
osprey	*Pandion haliaetus*	W	6	1, 2, 21	12			
bald eagle	*Haliaeetus leucocephalus*	L	1	1, 2, 3, 14, 15, 17-21, 28	12			
black-shouldered kite	*Elanus caeruleus*	L	8	8, 24				
northern harrier	*Circus cyaneus*	L	1	9, 10, 11, 14, 24, 28	5			O

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sharp-shinned hawk	*Accipiter striatus*	L	6	1, 2, 3, 6, 8, 9, 11, 14, 15	11			F,O
Cooper's hawk	*Accipiter cooperii*	L	6	1, 2, 3, 6, 24	11			F,O
northern goshawk	*Accipiter gentilis*	L	6	1, 2, 3, 6, 23, 24	7			F,O
Swainson's hawk	*Buteo swainsoni*	L	1	23, 24	7			
red-shouldered hawk	*Buteo lineatus*	L	6	6, 7	9			
red-tailed hawk	*Buteo jamaicensis*	L	6	1, 2, 3, 6, 23, 24, 27, 28	12			
rough-legged hawk	*Buteo lagopus*	L	6	9, 24, 28	5			
golden eagle	*Aquila chrysaetos*	L	6	1-7, 23, 24	12			
Family Falconidae (Falcons)								
American kestrel	*Falco sparverius*	L	6	23, 24, 27, 28	14	15	12	
merlin	*Falco columbarius*	L	6	1-7, 9, 10, 12, 14, 15, 24, 28	4			
peregrine falcon	*Falco peregrinus*	L	6	1-3, 9, 11, 14, 23, 24, 28	4			
gyrfalcon	*Falco rusticolus*	L	7	9, 14, 15, 23, 24	4			

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Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs		
						Snag Use by Cavity Nesters		
						Min. Nesting Ht. (ft.)	Min. dbh (in.)	Use of Down Logs[3]
Family Phasianidae (Grouse, Ptarmigans)								
ring-necked pheasant	*Phasianus colchicus*	L	1	6, 8, 24	5			R
California quail	*Callipepla californica*	L	1	8, 24	5			C,F,R, O
Family Rallidae (Rails, Coots)								
Virginia rail	*Rallus limicola*	W	6	9, 14	3			
sora	*Porzana carolina*	W	6	9, 12, 14	3			
American coot	*Fulica americana*	W	1	9, 12, 14, 15, 21	3			
Family Charadriidae (Plovers)								
black-bellied plover	*Pluvialis squatarola*	W	5	9, 14, 16, 19, 20, 24, 28	5			
American golden-plover	*Pluvialis dominica*	W	6	14, 16, 19, 20, 24	5			
semipalmated plover	*Charadrius semipalmatus*	W	6	14, 15, 16, 19, 20, 28	5			
killdeer	*Charadrius vociferus*	W	2	24, 26, 28	3			
Family Haematopodidae (Oystercatchers)								
black oystercatcher	*Haematopus bachmani*	W	6	14, 15, 17, 18, 19, 20, 21	3			

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Family Scolopacidae (Sandpipers)								
long-billed curlew	*Numenius americanus*	W	7	11, 14, 16, 19, 20, 22	3			
marbled godwit	*Limosa fedoa*	W	6	11, 14, 16, 19, 20, 22, 24	3			
whimbrel	*Numenius phaeopus*	W	5	14, 16, 22, 24	3			
greater yellowlegs	*Tringa melanoleuca*	W	5	12, 14, 15, 16, 28	3			
lesser yellowlegs	*Tringa flavipes*	W	6	11, 12, 14, 15, 16, 28	3			
solitary sandpiper	*Tringa solitaria*	W	7	9, 12, 22, 24	7			
spotted sandpiper	*Actitis macularia*	W	4	6, 7, 9, 11, 12, 22	3			
stilt sandpiper	*Calidris himantopus*	W	8	12, 14, 16, 19, 20, 22	3			
semipalmated sandpiper	*Calidris pusilla*	W	7	14, 15, 16, 19, 20, 22	3			
western sandpiper	*Calidris mauri*	W	2	9, 16, 19, 20, 22, 24, 28	3			
least sandpiper	*Calidris minutilla*	W	5	9, 16, 22, 24, 28	3			

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Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Ht. (ft.)	Min. dbh (in.)	Use of Down Logs[3]
Baird's sandpiper	*Calidris bairdii*	W	6	9, 22, 24	3			
pectoral sandpiper	*Calidris melanotos*	W	4	9, 11, 12, 14, 22, 24, 27	3			
sharp-tailed sandpiper	*Calidris acuminata*	W	7	20, 22	3			
rock sandpiper	*Calidris ptilocnemis*	W	6	17, 18	3			
dunlin	*Calidris alpina*	W	2	14, 15, 16, 19, 20, 22, 24, 28	3			
short-billed dowitcher	*Limnodromus griseus*	W	4	9, 11, 14, 15, 16, 22, 28	3			
long-billed dowitcher	*Limnodromus scolopaceus*	W	4	9, 12, 14, 16, 22, 28	3			
common snipe	*Gallinago gallinago*	W	2	9, 12, 14, 24	3			
Wilson's phalarope	*Phalaropus tricolor*	W	6	9, 12, 14, 24	3			O
red-necked phalarope	*Phalaropus lobatus*	W	6	14, 15, 16, 19, 20, 22	3			
red phalarope	*Phalaropus fulicaria*	W	6	15, 21	3			
ruddy turnstone	*Arenaria interpres*	W	6	14, 16, 19, 20, 22	3			

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black turnstone	*Arenaria melanocephala*	W	2	17, 18	6			
surfbird	*Aphriza virgata*	W	7	17, 18				
sanderling	*Calidris alba*	W	2	16, 19, 20, 22, 28	3			
red knot	*Calidris canutus*	W	6	15, 16, 17, 18	3			
ruff	*Philomachus pugna*	W	8	9, 12, 24	3			
Family Laridae (Jaegers, Gulls, Terns)								
pomarine jaeger	*Stercorarius pomarinus*	W	6	15, 21	3			
parasitic jaeger	*Sterocarius parasiticus*	W	5	15, 21	3			
long-tailed jaeger	*Stercorarius longicaudus*	W	8	21	3			
Franklin's gull	*Larus pipixcan*	W	8	9, 11, 24	3			O
little gull	*Larus minutus*	W	8	9, 11, 12, 15, 21, 24	3			
common black-headed gull	*Larus ridibundus*	W	8	21	3			
Bonaparte's gull	*Larus philadelphia*	W	2	17, 18, 21	3			O
Heermann's gull	*Larus heermanni*	W	4	17-22	3			
mew gull	*Larus canus*	W	2	17-22	3			

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ring-billed gull	*Larus delawarensis*	W	2	17-22, 24, 28	3			O
California gull	*Larus californicus*	W	5	17-22, 24, 28	3			O
herring gull	*Larus argentatus*	W	2	11, 14, 16, 17, 18, 19, 20, 22, 28	3			O
Thayer's gull	*Larus thayeri*	W	2	17, 18, 19, 20	3			
western gull	*Larus occidentalis*	W	1	17-22, 24, 28	3			
glaucous-winged gull	*Larus glaucescens*	W	1	17-22, 24, 28	3			
black-legged kittiwake	*Rissa tridactyla*	W	7	21	3			
Sabine's gull	*Xema sabini*	W	6	21	3			
Caspian tern	*Sterna caspia*	W	6	9, 12, 17-20	3			
common tern	*Sterna hirundo*	W	6	11, 12, 17, 18, 21	3			
Forster's tern	*Sterna forsteri*	W	7	6	3			
black tern	*Chlidonias niger*	W	8	9, 19, 20	3			
Arctic tern	*Sterna paradisaea*	W	6	9, 12, 14, 15, 17, 18, 19, 20	3			

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Family Alcidae (Auks and Puffins)								
common murre	*Uria aalge*	W	2	17, 18, 21	3			
pigeon guillemot	*Cepphus columba*	W	1	21	3			
marbled murrelet	*Brachyramphus marmoratus*	W	2	1, 2, 3, 21, 23	12			
ancient murrelet	*Synthliboramphus antiquus*	W	8	1, 2, 3, 21	12			
Cassin's auklet	*Ptychoramphus aleuticus*	W	8	21	3			
rhinoceros auklet	*Cerorhinca monocerata*	W	1	21	3			
tufted puffin	*Fratercula cirrhata*	W	4	21	16			
Family Columbidae (Pigeons and Doves)								
rock dove	*Columba livia*	L	1	23, 24, 27, 28	4			
band-tailed pigeon	*Columba fasciata*	L	3	1, 2, 3, 4, 6, 7, 27	11			
mourning dove	*Zenaida macroura*	L	6	6, 24, 27	11			
Families Tytonidae and Strigidae (Owls)								
barn owl	*Tyto alba*	L	1	1-3, 23, 24, 26, 27, 28	14	15	20	
western screech-owl	*Otus kennicottii*	L	1	1-3, 6, 7, 8, 23, 24, 27	14	15	12	

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Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Ht. (ft.)	Min. dbh (in.)	Use of Down Logs[3]
great horned owl	*Bubo virginianus*	L	1	1-3, 6, 23, 24, 27, 28	12			
snowy owl	*Nyctea scandiaca*	L	7	9, 10, 17-20, 24, 28	5			O
northern pygmy-owl	*Glaucidium gnoma*	L	6	1- , 6, 7	14	30	15	
barred owl	*Strix varia*	L	7	1- , 6, 9, 11, 12	14	30	20	F
long-eared owl	*Asio otus*	L	6	3, 6, 28	11			
short-eared owl	*Asio flammeus*	L	1	9, 14, 24, 28	7			
northern saw-whet owl	*Aegolius acadicus*	L	7	1, 2, 3, 6	17, 18			
Family Caprimulgidae (Nightjars)								
common nighthawk	*Chordeiles minor*	L	6	23, 24, 27	6			R,O
Family Apodidae (Swifts)								
black swift	*Cypseloides niger*	L	6	23	4			
Vaux's swift	*Chaetura vauxi*	L	3	1-7, 23	17, 18	31	27	
Family Trochilidae (Hummingbirds)								
Anna's hummingbird	*Calypte anna*	L	7	1-8				
rufous hummingbird	*Selasphorus rufus*	L	3	1, 2, 3, 27	11			

[1]**Seasonal Abundance**
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3. Common Summer Resident
4. Common Summer and Fall Visitor
5. Common Migrant
6. Uncommon Species
7. Rare Species
8. Very Rare Species

[2]**Habitat Types**
1. Structurally Complex Forest
2. Fully Functional Older Forest
3. Closed Canopy Forest
4. Dense Pole Forest
5. Regeneration Forest
6. Mature Deciduous Forest
7. Young Deciduous Forest
8. Scrub-shrub
9. Freshwater Marsh
10. Wet Meadow
11. Drainage Ditches/Sloughs
12. Ponds
13. Sitka Spruce Bog
14. Salt Marsh
15. Coastal Lagoon
16. Mud Flat
17. Rocky/Cobble Beach
18. Rocky/Sand Beach
19. Cobble/Sand Beach
20. Gravel/Sand Beach
21. Marine Subtidal
22. Dune Natives
23. Bluff
24. Grassland
25. Orchards
26. Disturbed Area
27. Landscaped Area
28. Structures and Transportation

[3]**Type Use of Logs**
C. Cover
R. Reproduction
N. Nesting
O. Other

Table 2. Birds Potentially Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Ht. (ft.)	Min. dbh (in.)	Use of Down Logs[3]
Family Alcedinidae (Kingfishers)								
belted kingfisher	*Ceryle alcyon*	L	1	9, 15, 17, 18, 19, 20, 21	23			
Family Picidae (Woodpeckers)								
red-breasted sapsucker	*Sphyrapicus ruber*	L	1	1, 2, 3, 6	16			
yellow-bellied sapsucker	*Sphyrapicus varius*	L	1	1, 2, 3, 6				
downy woodpecker	*Picoides pubescens*	L	1	1, 2, 3, 6, 27	13	15	6	
hairy woodpecker	*Picoides villosus*	L	1	1-3, 6	16	15	10	
northern flicker	*Colaptes auratus*	L	1	1-3	13	6	15	F
pileated woodpecker	*Dryocopus pileatus*	L	1	1, 2	13	31	27	F,O
Family Tyrannidae (Tyrant Flycatchers)								
olive-sided flycatcher	*Contopus borealis*	L	3	1-3, 13	10			F
western wood-pewee	*Contopus sordidulus*	L	3	6, 7	11			F
willow flycatcher	*Empidonax traillii*	L	3	6, 7, 8, 11	7			F
Hammond's flycatcher	*Empidonax hammondii*	L	3	1-4, 13	11			F
Pacific-slope flycatcher	*Empidonax difficilis*	L	3	1-4, 6, 7, 13	11			

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[3]**Type Use of Logs**
C. Cover
R. Reproduction
N. Nesting
O. Other

Table 2. **Birds Potentially Occurring at NAS Whidbey Island.**

Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Ht. (ft.)	Min. dbh (in.)	Use of Down Logs[3]
western kingbird	*Tyrannus verticalis*	L	6	11, 12, 16, 24, 27	11			F,O
Family Alaudidae (Larks)								
horned lark	*Eremophila alpestris*	L	1	14, 20, 21, 22, 24, 28	5			
Family Hirundinidae (Swallows)								
purple martin	*Progne subis*	L	8	6, 7, 9, 10, 11, 12, 24, 25				
tree swallow	*Tachycineta bicolor*	L	6	9, 11, 24, 28	14	15	10	
violet-green swallow	*Tachycineta thalassina*	L	3	6, 7, 25, 27, 28	14	15	10	
northern rough-winged swallow	*Stelgidopteryx serripennis*	L	3	8	16			
bank swallow	*Riparia riparia*	L	6	11, 23	16			
cliff swallow	*Hirundo pyrrhonota*	L	3	9, 23, 24, 27, 28	4			
barn swallow	*Hirundo rustica*	L	3	9, 23, 24, 27, 28	4			
Family Corvidae (Jays and Crows)								
Steller's jay	*Cyanocitta stelleri*	L	1	23	11			F,O
blue jay	*Cyanocitta cristata*	L	7	27	9			F,O

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Table 2. Birds Potentially Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Ht. (ft.)	Special Habitat Needs: Snag Use by Cavity Nesters: Min. dbh (in.)	Special Habitat Needs: Use of Down Logs[3]
northwestern crow	*Corvus caurinus*	L	1	1, 2, 3, 6, 7, 24, 25, 26, 27, 28	11			
common raven	*Corvus corax*	L	1	1, 2, 3, 17, 18, 23, 28	4			
Family Paridae (Chickadees)								
black-capped chickadee	*Parus atricapillus*	L	1	1, 2, 3, 5, 20, 27	14	6	4	F,R
chestnut-backed chickadee	*Parus rufescens*	L	1	1-7, 13, 25	14	6	4	F,R
Family Aegithalidae (Bushtits)								
bushtit	*Psaltriparus minimus*	L	1	6, 7, 25, 27	8			F
Family Sittidae (Nuthatches)								
red-breasted nuthatch	*Sitta canadensis*	L	1	1-5, 13	13			F
white-breasted nuthatch	*Sitta carolinensis*	L	6	1-6, 13	13	15	12	F
Family Certhiidae (Creepers)								
brown creeper	*Certhia americana*	L	1	1-7, 13	14	15	10	F
Family Troglodytidae (Wrens)								
Bewick's wren	*Thryomanes bewickii*	L	1	6, 7, 8, 11, 24, 25				
house wren	*Troglodytes aedon*	L	1	1-6, 24, 25, 27	14, 18	6	10	C,F,R, O

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7. Rare Species
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N. Nesting
O. Other

Table 2. Birds Potentially Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Ht. (ft.)	Special Habitat Needs: Snag Use by Cavity Nesters: Min. dbh (in.)	Special Habitat Needs: Use of Down Logs[3]
winter wren	*Troglodytes troglodytes*	L	1	1-5, 7, 8, 25	3			C.F.R. O
marsh wren	*Cistothorus palustris*	L	1	9, 12, 13, 14, 24	3			
Family Muscicapidae (Thrushes)								
golden-crowned kinglet	*Regulus satrapa*	L	1	1-8, 25	10			
ruby-crowned kinglet	*Regulus calendula*	L	3	1-8, 25	10			
Swainson's thrush	*Catharus ustulatus*	L	3	1-7, 25	8			C,F,R
hermit thrush	*Catharus guttatus*	L	3	1-8, 25	5			C,F,R
varied thrush	*Ixoreus naevius*	L	1	1-8, 25	11			
American robin	*Turdus migratorius*	L	1	1-7, 26, 27, 28	7			
blue-gray gnatcatcher	*Polioptila caerulea*	L	9	1-8, 25	12			
mountain bluebird	*Sialia currucoides*	L	8	10, 24	14	6	10	F,R
Townsend's solitaire	*Myadestes townsendi*	L	8	1-4, 6, 7, 25	6			F,R
Family Motacillidae (Pipits and Wagtails)								
American pipit	*Anthus rubescens*	L	5	24	5			
white wagtail	*Motacilla alba*	L	8	24				

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Table 2. Birds Potentially Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Ht. (ft.)	Special Habitat Needs: Snag Use by Cavity Nesters: Min. dbh (in.)	Special Habitat Needs: Use of Down Logs[3]
black-backed wagtail	*Motacilla lugens*	L	8	24				
Family Laniidae (Shrikes)								
northern shrike	*Lanius excubitor*	L	6	6, 7, 24	7			F
Family Bombycillidae (Waxwings)								
bohemian waxwing	*Bombycilla garrulus*	L	6	1-5	8			
cedar waxwing	*Bombycilla cedrorum*	L	3	1-6, 27, 28	9			
Family Sturnidae (Starlings)								
European starling	*Sturnus vulgaris*	L	1	24-27, 28	14	6	10	R
Family Vireonidae (Vireos)								
Solitary vireo	*Vireo solitarius*	L	3	1-5	11			
Hutton's vireo	*Vireo huttoni*	L	3	6-8, 25				
warbling vireo	*Vireo gilvus*	L	3	6, 7, 25	11			
red-eyed vireo	*Vireo olivaceus*	L	6	6, 7, 25, 27	11			
Family Emberizidae (Warblers and Sparrows)								
orange-crowned warbler	*Vermivora celata*	L	3	1 - 8, 13, 25	6			
Nashville warbler	*Vermivora ruficapilla*	L	8	1 - 8, 13, 25	6			C,F

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Table 2. Birds Potentially Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs		
						Snag Use by Cavity Nesters		
						Min. Nesting Ht. (ft.)	Min. dbh (in.)	Use of Down Logs[3]
yellow warbler	*Dendroica petechia*	L	6	6, 7, 8, 25, 27	11			
yellow-rumped warbler	*Dendroica coronata*	L	3	1-7, 13, 25	8			
black-throated gray warbler	*Dendroica nigrescens*	L	3	1-5	10			
Townsend's warbler	*Dendroica townsendi*	L	3	1-5	10			
MacGillivray's warbler	*Oporornis tolmiei*	L	3	6-8, 25	7			
common yellowthroat	*Geothlypis trichas*	L	3	6, 7, 8, 9, 24, 25	3			
Wilson's warbler	*Wilsonia pusilla*	L	3	4, 6, 7, 8, 11, 25	5			C,F,R
black-headed grosbeak	*Pheucticus melanocephalus*	L	3	1-9,12, 13, 25	5			
Rufous-sided towhee	*Pipilo erythrophthalmus*	L	1	6, 7, 8, 25	11			C,F,R, O
chipping sparrow	*Spizella passerina*	L	7	6, 7, 23, 24, 25, 27	7			C,F,R, O
Savannah sparrow	*Passerculus sandwichensis*	L	3	14, 24, 28	7			
fox sparrow	*Passerella iliaca*	L	1	1-8, 24, 25, 27	9			C,F,O
song sparrow	*Melospiza melodia*	L	1	6, 7, 8, 24, 25, 27	9			C,F,R, O

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Table 2. **Birds Potentially Occurring at NAS Whidbey Island.**

Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Ht. (ft.)	Min. dbh (in.)	Use of Down Logs[3]
Lincoln's sparrow	*Melospiza lincolnii*	L	3	6, 7, 8	6			C,F,O
white-throated sparrow	*Zonotrichia albicollis*	L	7	1-7, 24, 25, 27	7			C,F,O
golden-crowned sparrow	*Zonotrichia atricapilla*	L	5	6, 7, 8, 25	5			C,F,O
white-crowned sparrow	*Zonotrichia leucophrys*	L	1	6, 7, 8, 24, 25	7			C,F,O
Harris' sparrow	*Zonotrichia querula*	L	7	1-8, 25, 26, 27	6			
dark-eyed junco	*Junco hyemalis*	L	1	1-5, 8, 27	5			C,F,R, O
Lapland longspur	*Calcarius lapponicus*	L	6	19, 20, 24	5			
snow bunting	*Plectrophenax nivalis*	L	7	17, 18, 19, 20, 24, 28	5			
red-winged blackbird	*Agelaius phoeniceus*	L	1	6, 7, 8, 9, 24	7			O
western meadowlark	*Sturnella neglecta*	L	1	24, 28	5			
yellow-headed blackbird	*Xanthocephalus xanthocephalus*	L	1	9, 13	7			
Brewer's blackbird	*Euphagus cyanocephalus*	L	1	24, 27, 28	7			

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Table 2. **Birds Potentially Occurring at NAS Whidbey Island.**

Common Name	Scientific Name	Water & Shore Birds (W)/Land Based Birds (L)	Seasonal Abund. at NAS Whidbey[1]	Occurs in Habitat Type[2]	Life Form	Special Habitat Needs		
						Snag Use by Cavity Nesters		Use of Down Logs[3]
						Min. Nesting Ht. (ft.)	Min. dbh (in.)	
brown-headed cowbird	*Molothrus ater*	L	3	1-7, 24, 27, 28	7			
northern oriole	*Icterus galbula*	L	6	1-7	9			
western tanager	*Piranga ludoviciana*	L	6	1-5	10			
Family Passeridae (Weavers)								
purple finch	*Carpodacus purpureus*	L	1	1-5, 27	11			
house finch	*Carpodacus mexicanus*	L	1	27	9			
red crossbill	*Loxia curvirostra*	L	6	1 - 5	10			
pine siskin	*Carduelis pinus*	L	1	1, 2, 3, 6, 7, 8	11			
American goldfinch	*Carduelis tristis*	L	1	7, 8, 24	8			O
evening grosbeak	*Coccothrauste s verpertinus*	L	1	1, 2, 3, 6, 7, 25, 27	11			
house sparrow	*Passer domesticus*	L	1	24, 27	14			

Sources: National Fish and Wildlife Foundation, undated and USDA Forest Service, 1991.

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[3]**Type Use of Logs**
C. Cover
R. Reproduction
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Table 3. Terrestrial and Aquatic Mammal Species Potentially Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Occurs in Habitat Types[1]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Hght. (ft.)	Special Habitat Needs: Snag Use by Cavity Nesters: Min. dbh (in.)	Special Habitat Needs: Use of Down Logs[2]
Family Didelphidae (Opossums)						
opossum	*Didelphis virginianus*	6, 7, 8, 24, 28	5	6	20	C,R,O
Family Soricidae (Shrews)						
masked shrew	*Sorex cinereus*	1-9, 24	15			
vagrant shrew	*Sorex vagrans*	1-6, 23	15			C,F,R,O
Pacific water shrew	*Sorex bendirii*	1-7, 9,11	16			C,F,R
Trowbridge's shrew	*Sorex trowbridgii*	1, 2, 3	15			
Family Talpidae (Moles)						
shrew-mole	*Neurotrichus gibbsii*	1-8	15			
Townsend's mole	*Scapanus townsendii*	24, 27	15			
coast mole	*Scapanus orarius*	1-7	15			C,F
Family Vespertilionidae (Evening Bats)						
little brown myotis	*Myotis lucifugus*	23, 27	14	6	12	
Keen's myotis	*Myotis keenii*	1, 2, 3, 4, 27	14			
long-eared myotis	*Myotis evotis*	1-5, 27	14	6	12	
long-legged myotis	*Myotis volans*	1-6, 27	14	6	12	
Yuma myotis	*Myotis yumanensis*	11, 12, 27	14	6	12	
silver-haired bat	*Lasionycteris noctivagans*	1-6, 27	14	15	12	
big brown bat	*Eptesicus fuscus*	1-5, 23, 27	14	15	12	
hoary bat	*Lasiurus cinereus*	1, 5	11			

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[2] **Type Use of Logs**
C. Cover
R. Reproduction
N. Nesting
O. Other

Table 3. Terrestrial and Aquatic Mammal Species Potentially Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Occurs in Habitat Types[1]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Hght. (ft.)	Special Habitat Needs: Snag Use by Cavity Nesters: Min. dbh (in.)	Special Habitat Needs: Use of Down Logs[2]
Pacific western big-eared bat	*Plecotus townsendii townsendii*	27	14			
Family Leporidae (Rabbits and Hares)						
brush rabbit	*Sylvilagus bachmani*	6, 8, 26, 27	5			
eastern cottontail rabbit	*Sylvilagus floridanus*	1-8, 24-27	5			
European rabbit	*Oryctolagus cuniculus*	7, 8, 24-27	15			
Family Sciuridae (Squirrels)						
Townsend's chipmunk	*Eutamias townsendii*	1-7, 27	14			
Douglas squirrel	*Tamiasciurus douglasii*	1-5	10			
Family Geomyidae (Pocket Gophers)						
western pocket gopher	*Thomomys mazama*	24	15			
Family Cricetidae (New World Rats and Mice)						
deer mouse	*Peromyscus maniculatus*	6, 7, 8, 23, 24-27	15	6	10	
bushy-tailed woodrat	*Neotoma cinerea*	1-5, 23	4	6	15	C,F,R,O
meadow vole	*Microtus pennsylvanicus*	6, 7, 9, 23, 27	15			
Townsend's vole	*Microtus townsendii*	11, 12, 24, 27	15			
creeping vole	*Microtus oregonihouse*	1-8, 24	15			
muskrat	*Ondatra zibethicus*	6-14	16			O

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Table 3. **Terrestrial and Aquatic Mammal Species Potentially Occurring at NAS Whidbey Island.**

Common Name	Scientific Name	Occurs in Habitat Types[1]	Life Form	Special Habitat Needs: Snag Use by Cavity Nesters: Min. Nesting Hght. (ft.)	Special Habitat Needs: Snag Use by Cavity Nesters: Min. dbh (in.)	Special Habitat Needs: Use of Down Logs[2]
Family Muridae (Old World Rats and Mice)						
common rat	*Rattus norvegicus*	24, 27	15			
house mouse	*Mus musculus*	24, 27	15			
Family Zapodidae (Jumping Mice)						
Pacific jumping mouse	*Zapus trinotatus*	6-12, 24	3			C,R,O
Family Canidae (Wolves, Foxes, and Coyote)						
coyote	*Canis latrans*	23-27, 28	15			F
red fox	*Vulpes vulpes*	6, 7, 8, 23, 24, 26, 28	15			C,F
Family Procyonidae (Raccoons)						
raccoon	*Procyon lotor*	1-11, 24-27, 28	14	6	20	C
Family Mustelidae (Weasels, Skunks, Badgers, Otters, and Allies)						
short-tailed weasel	*Mustella erminea*	7-12	15	6	12	C,F,R,O
river otter	*Lutra canadensis*	6, 7, 9-20	16			O
Family Felidae (Cats)						
feral house cat	*Felis libyea domestica*	1-11, 15, 22-28	5			C,F,O
Family Cervidae (Deer)						
black-tailed deer	*Odocoileus hemionus columbianus*	1-11, 13-20, 22-28	5			O

Source of Special Habitat Needs Info.: USDA Forest Service 1991.

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[2] **Type Use of Logs**
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Table 4. Reptiles and Amphibians Potentially Occurring at NAS Whidbey Island.

Common Name	Scientific Name	Occurs in Habitat Type[1]	Life Form	Use of Down Logs[2]
REPTILES				
Family Emydidae (Pond Turtles)				
northwestern pond turtle	*Clemmys marmorata*	9, 11, 12	3	
Family Anguidae (Anguid Lizards)				
northern alligator lizard	*Elgaria coerulea principis*	1, 2, 3, 4, 5	5	
Family Colubridae (Colubrid Snakes)				
wandering garter snake	*Thamnophis elegans vagrans*	5, 6, 7, 8, 9	5	C
Puget Sound garter snake	*Thamnophis sirtalis pickeringi*	1, 2, 3, 4, 10, 11, 24, 26, 27	3	C
northwestern garter snake	*Thamnophis ordinoides*	1-5, 7, 8, 10, 24, 26, 27	5	C
AMPHIBIANS				
Family Salamandridae (Newts)				
rough-skinned newt	*Taricha granulosa*	1-9, 11, 12	2	
Family Ambystomidae (Mole Salamanders)				
northwestern salamander	*Ambystoma gracile*	1-12, 24	2	
western long-toed salamander	*Ambystoma macrodactylum macrodactylum*	1-5, 9-12, 24, 27	2	C,F
Family Plethodontidae (Lungless Salamanders)				
ensatina	*Ensatina eschscholtzii*	3, 6, 7	15	C,F
western red-backed salamander	*Plethodon vehiculum*	1-7, 9-11	5	C,F
Family Ranidae (True Frogs)				
northern red-legged frog	*Rana aurora aurora*	1-9, 11-13	1	
bullfrog	*Rana catesbeiana*	9, 11, 12	1	
Family Bufonidae (Toads)				
western toad	*Bufo boreas*	1-9	2	C,F
Family Hylidae (Treefrogs)				
Pacific treefrog	*Pseudacris regilla*	1-12	2	C,F,O

Source of Use of Downed Logs Info.: USDA Forest Service 1991.

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[2]**Type Use of Logs**
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N. Nesting
O. Other

Table 5. Marine Animal Species of Northern Puget Sound.

Common Name	Scientific Name	Occurring in Habitat Type[1]
	MARINE MAMMALS	
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	21
sea otter	*Enhydra lutris*	14-21
Dall's porpoise	*Phocoenoides dalli*	21
harbor porpoise	*Phocoena phocoena*	21
California sea lion	*Zalophus californianus*	17-22
northern sea lion	*Eumetopias jubatus*	17-22
harbor seal	*Phoca vitulina*	17-22
northern elephant seal	*Mirounga angustirostris*	17-22
orca	*Orcinus orca*	21
minke whale	*Balaenoptera acutorostrata*	21
gray whale	*Eschrichtius robustus*	21
humpback whale	*Megaptera novaeangliae*	21
short-finned pilot whale	*Globicephala macrorhynchus*	21
	MARINE FISHES	
spiny dogfish	*Squalus acanthias*	21
big skate	*Raja binoculata*	21
starry skate	*Raja stellulata*	21
Pacific electric ray	*Torpedo californica*	21
ratfish	*Hydrolagus colliei*	21
green sturgeon	*Acipenser medirostris*	11, 21
Pacific herring	*Clupea harengus*	20, 21
northern anchovy	*Engraulis mordax*	21
chinook salmon	*Oncorhynchus tshawytscha*	21

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Table 5. Marine Animal Species of Northern Puget Sound.

Common Name	Scientific Name	Occurring in Habitat Type[1]
chum salmon	*Oncorhynchus keta*	21
coho salmon	*Oncorhynchus kisutch*	21
pink salmon	*Oncorhynchus gorbuscha*	21
sockeye salmon	*Oncorhynchus nerka*	21
cutthroat trout	*Oncorhynchus clarki*	11, 15, 21
steelhead trout	***Oncorhynchus mykiss***	11, 21
longfin smelt	*Spirinchus thaleichthys*	21
surf smelt	*Hypomesus pretiosus*	19, 20, 21
capelin	*Mallotus villosus*	21
plainfin midshipman	*Porichthys notatus*	21
northern clingfish	*Gobiesox maeandricus*	17, 18, 21
Pacific cod	*Gadus macrocephalus*	21
Pacific tomcod	*Microgadus proximus*	19, 20, 21
walleye pollock	*Theragra chalcogramma*	21
red brotula	*Brosmophycis marginata*	21
blackbelly eelpout	*Lycodopsis pacifica*	21
tube-snout	*Aulorhynchus flavidus*	17, 18, 21
threespine stickleback	*Gasterosteus aculeatus*	11, 21
bay pipefish	*Syngnathus griseolineatus*	21
kelp perch	*Brachyistius frenatus*	14, 17
pile perch	*Rhacochilus vacca*	15, 18, 20, 21
shiner perch	*Cymatogaster aggregata*	19, 20, 21
striped seaperch	*Embiotoca lateralis*	17, 18, 21
white seaperch	*Phanerodon furcatus*	21

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Table 5. Marine Animal Species of Northern Puget Sound.

Common Name	Scientific Name	Occurring in Habitat Type[1]
Pacific sandfish	*Trichodon trichodon*	21
northern ronquil	*Ronquilus jordani*	17, 18, 19, 20, 21
high cockscomb	*Anoplarchus purpurescens*	17, 18, 21
decorated warbonnet	*Chirolophis polyactocephalus*	17, 18, 21
mosshead warbonnet	*Chirolophi nugator*	17, 18, 21
black prickleback	*Xiphister atropurpureus*	21
ribbon prickleback	*Phyticchthys chirus*	21
rock prickleback	*Xiphister mucosus*	17, 18, 21
snake prickleback	*Lumpenus sagitta*	15, 16, 19, 20, 21
crescent gunnel	*Pholis laeta*	17, 18, 21
penpoint gunnel	*Apodichthys flavidus*	17, 18, 21
rockweed gunnel	*Xererpes fucorum*	17, 18, 21
saddleback gunnel	*Pholis ornata*	17, 18, 21
wolf eel	*Anarrhichtyhs ocellatus*	21
Pacific sand lance	*Ammodytes hexapterus*	19, 20, 21
bay goby	*Lepidogobius lepidus*	15, 16, 21
blackeye goby	*Coryphopterus nicholsi*	17, 18, 21
black rockfish	*Sebastes melanops*	17, 18, 21
brown rockfish	*Sebastes auriculatus*	17, 18, 21
canary rockfish	*Sebastes pinniger*	21
China rockfish	*Sebastes nebulosus*	21
copper rockfish	*Sebastes caurinus*	21
Puget Sound rockfish	*Sebastes emphaeus*	21
quillback rockfish	*Sebastes maliger*	17, 18, 21

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Table 5. **Marine Animal Species of Northern Puget Sound.**

Common Name	Scientific Name	Occurring in Habitat Type[1]
tiger rockfish	*Sebastes nigrocinctus*	21
widow rockfish	*Sebastes entamelas*	17, 18, 21
yelloweye rockfish (red snapper)	*Sebastes ruberrimus*	21
yellowtail rockfish	*Sebastes flavidus*	21
bocaccio	*Sebastes paucispinis*	21
kelp greenling	*Hexagrammos decagrammus*	21
rock greenling	*Hexagrammos lagocephalus*	21
painted greenling	*Oxylebius pictus*	21
whitespotted greenling	*Hexagrammos stelleri*	21
lingcod	*Ophiodon elongatus*	21
cabezon	*Scorpaenichthys marmoratus*	14, 17
buffalo sculpin	*Enophrys bison*	14, 17, 20
calico sculpin	*Clinocottus embryum*	14, 17
darter sculpin	*Radulinus boleoides*	14, 17
fluffy sculpin	*Oligocottus snyderi*	14, 17
great sculpin	*Myoxocephalus polyacanthocephalus*	14, 17, 20
grunt sculpin	*Rhamphocottus richardsoni*	14, 17
longfin sculpin	*Jordania zonope*	14, 17
manacled sculpin	*Synchirus gilli*	14, 17
mosshead sculpin	*Clinocottus globiceps*	14, 17
northern sculpin	*Icelinus borealis*	14, 17
Pacific staghorn sculpin	*Leptocottus armatus*	14, 17, 20
padded sculpin	*Artedius fenestralis*	14, 17, 20
Puget Sound sculpin	*Artedius meanyi*	14, 17

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Common Name	Scientific Name	Occurring in Habitat Type[1]
ribbed sculpin	*Triglops pingeli*	17, 18, 21
rosylip sculpin	*Ascelichthys rhodorus*	14, 17
roughback sculpin	*Chitonotus pugetensis*	15, 16, 19, 20, 21
saddleback sculpin	*Oligocottus rimensis*	14, 17
sailfin sculpin	*Nautichthys oculofasciatus*	17, 18, 19, 20, 21
scalyhead sculpin	*Artedius harringtoni*	14, 17
sharpnose sculpin	*Clinocottus acuticeps*	14, 17
silverspotted sculpin	*Blepsias cirrhosus*	14, 17
slim sculpin	*Radulinus asprellus*	17, 18, 19, 20, 21
smoothhead sculpin	*Artedius lateralis*	14, 17
soft sculpin	*Gilbertidia sigalutes*	14, 17
tadpole sculpin	*Psychrolutes paradoxus*	14, 17
tidepool sculpin	*Oligocottus maculosus*	14, 17, 20
red Irish lord	*Hemilepidotus hemilepidotus*	14, 17
blackfin poacher	*Bathyagonus nigripinnis*	21
blacktip poacher	*Xeneretmus latifrons*	21
fourhorn poacher	*Hypsagonus quadricornis*	21
northern spearnose poacher	*Agonopsis emmelane*	21
pygmy poacher	*Odontopyxis trispinosa*	21
sturgeon poacher	*Agonus acipenserinus*	21
tubenose poacher	*Pallisina barbata aix*	11, 14, 17, 20
warty poacher	*Occella verrucosa*	21
rockhead	*Bothragonus swani*	14, 17
marbled snailfish	*Liparis dennyi*	21

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Pacific spiny lumpsucker	*Eumicrotremus orbis*	21
ribbon snailfish	*Liparis cyclopus*	21
ringtail snailfish	*Liparis rutteri*	21
showy snailfish	*Liparis pulchellus*	19, 20, 21
slimy snailfish	*Liparis mucosus*	21
spotted snailfish	*Liparis callyodon*	21
tidepool snailfish	*Liparis florae*	21
Pacific sanddab	*Citharichthys sordidus*	21
speckled sanddab	*Citharichthys stigmaeus*	19, 20, 21
butter sole	*Isopsetta isolepsis*	15, 16, 21
C-O sole	*Pleuronichthys coenosus*	17, 18, 19, 20, 21
Dover sole	*Microstomus pacificus*	15, 16, 21
English sole	*Parophrys vetulus*	19, 20, 21
flathead sole	*Hippoglossoides elassodon*	19, 20, 21
rex sole	*Glyptocephalus zachirus*	19, 20, 21
rock sole	*Lepidopsetta bilineata*	19, 20, 21
sand sole	*Psettichthys melanostictus*	20
slender sole	*Lyopsetta exilis*	20
starry flounder	*Platichthys stellatus*	20
Pacific halibut	*Hippoglossus stenolepis*	21
MARINE INVERTEBRATES		
Common Coelenterates		
burrowing anemone	*Anthopleura artemisia*	15, 16, 19, 21
cloning anemone	*Anthopleura elegantissima*	17

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small green anemone	*Epiactis prolifera*	17, 18, 21
white plumed anemone	*Metridium senile*	17, 18, 21
sea pen	*Ptilosarcus gurneyi*	15, 16, 19, 20, 21
jellyfish	*Aurelia ssp., Cyanea spp.*	11-20, 21
Common Crustaceans		
acorn barnacle	*Balanus glandula*	17, 18
horse barnacle	*Semibalanus cariosus*	17, 18
goose neck barnacle	*Pollicipes polymerus*	17, 18, 21
Dungeness crab	*Cancer magister*	11, 15, 16, 19, 20, 21
graceful kelp crab	*Pugettia gracilis*	21
hermit crab	*Pagurus hirsutiusculus*	11, 17, 18, 21
red rock crab	*Cancer productus*	17, 18, 21
kelp crab	*Crangon spp.*	20
purple shore crab	*Hemigrapsus nudus*	17, 18
hairy shore crab	*Hemigrapsus oregonensis*	17, 18, 19, 20
opossum shrimp	*Archaeomysis spp.*	20
coonstripe shrimp	*Panalus danae*	21
ghost shrimp	*Callianassa californiensis*	15, 16, 19, 20, 21
mud shrimp	*Upogebia pugettensis*	15, 16, 19, 20, 21
isopods	*Exosphaeroma spp., Excirolana spp.*	20
gammarid amphipods	*Paramoera spp., Allorchestes angusta, Corophium salmonis*	20
sand flea	*Traskorchestia traskiana*	17, 18, 19, 20
gribble	*Limnoria lignorum*	16, 17, 18, 19, 20

[1] **Habitat Types**
1. Structurally Complex Forest
2. Fully Functional Older Forest
3. Closed Canopy Forest
4. Dense Pole Forest
5. Regeneration Forest
6. Mature Deciduous Forest
7. Young Deciduous Forest
8. Scrub-shrub
9. Freshwater Marsh
10. Wet Meadow
11. Drainage Ditches/Sloughs
12. Ponds
13. Sitka Spruce Bog
14. Salt Marsh
15. Coastal Lagoon
16. Mud Flat
17. Rocky/Cobble Beach
18. Rocky/Sand Beach
19. Cobble/Sand Beach
20. Gravel/Sand Beach
21. Marine Subtidal
22. Dune Natives
23. Bluff
24. Grassland
25. Orchards
26. Disturbed Area
27. Landscaped Area
28. Structures and Transportation

Table 5. Marine Animal Species of Northern Puget Sound.

Common Name	Scientific Name	Occurring in Habitat Type[1]
Common Mollusks		
giant gumboot chiton	*Cryptochiton stelleri*	17, 18, 21
leather chiton	*Katharina tunicata*	14
hairy chitons	*Mopalia spp.*	17, 18
butter clam	*Saxidomus giganteus*	15, 16, 19, 20
littleneck clam	*Protothaca staminea*	15, 16, 19, 20
bent nosed clam	*Macoma nasuta*	15, 16, 19, 20
polluted macoma	*Macoma inquinata*	20, 21
mud clam	*Mya arenaria*	15, 16, 19, 20
heart cockle	*Clinocardium nuttali*	15, 16, 19, 20
horse clam	*Tresus capax*	20, 21
scallop	*Chlamys spp.*	21
tellen clams	*Tellina sp.*	21
geoduck clam	*Panope generosa*	19, 20
limpets	*Diodora spp., Collisella spp., Acmaea spp.*	17, 18
California mussel	*Mytilus californianus*	17, 18
blue mussel	*Mytilus edulis*	17, 18
octopus	*Octopus spp.*	17, 18, 21
Pacific oyster	*Crassostrea gigas*	16, 17, 18, 19, 20
scallops	*Chlamys spp.*	15-20, 21
olive shell	*Olivella biplicata*	19, 20
drill snails	*Nucella spp.*	17, 18
moon snail	*Polinices lewisii*	20, 21

[1] **Habitat Types**
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24. Grassland
25. Orchards
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27. Landscaped Area
28. Structures and Transportation

Table 5. Marine Animal Species of Northern Puget Sound.

Common Name	Scientific Name	Occurring in Habitat Type[1]
periwinkles	*Littorina spp.*	17, 18
whelks	*Thais spp.*	20, 21
Common Echinoderms		
purple seastar	*Pisaster ochraceus*	17, 18
short-spined pisaster	*Pisaster brevispinus*	21
six-rayed star	*Leptasterias hexactis*	17, 18
sunflower star	*Pycnopodia helianthoides*	16, 19, 20, 21
brittle stars	*Class Ophiuroidea*	15, 18, 20, 21
red sea cucumber	*Cucumaria miniata*	17, 18, 21
giant cucumber	*Stichopus californicus*	16, 19, 20, 21
sand dollar	*Dendraster excentricus*	19, 20
green sea urchin	*Strongylocentrotus droebachiensis*	17, 18, 19, 20, 21

Sources: Flora & Fairbanks 1977, Hart 1980, Kozloff 1973, Somerton & Murray 1976, USDA Forest Service 1991.

[1] **Habitat Types**
1. Structurally Complex Forest
2. Fully Functional Older Forest
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20. Gravel/Sand Beach
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22. Dune Natives
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24. Grassland
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APPENDIX G. Historic Installation Bald Eagle Data and Research

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MOVEMENTS AND RANGES OF NESTING BALD EAGLES AT NAVAL AIR STATION WHIDBEY ISLAND AS DETERMINED BY SATELLITE TELEMETRY

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Washington Department of Fish and Wildlife, 600 Capitol Way N., Olympia, WA 98501

Final Report
July, 1997

EXECUTIVE SUMMARY

To assess movements of bald eagles (*Haliaeetus leucocephalus*) from Naval Air Station Whidbey Island (NASWI) in northwest Washington, 11 eagles were trapped and banded from July 1994 to June 1995. Satellite transmitters were attached to 2 territorial adult females, at Polnell Point, and at Crescent Harbor, to follow their migratory movements. During 26 months of monitoring, 1012 satellite locations were received for both birds. Eagles migrated up to 870 km north along coastal British Columbia, and the Fraser River Valley to Williston Lake in interior British Columbia. The Polnell Point adult remained on the territory during the first year of study, migrated during the second year of the study, but did not return to the territory following migration. Migration of both eagles was initiated from May to August, and the Crescent Harbor adult returned to her territory in October following migration in two consecutive years. Timing of migration and flight corridors were similar to those observed for other eagles from western Washington. Literature review and circumstantial evidence suggest Washington eagles migrate northward in association with spawning salmon along coastal British Columbia to southeast Alaska.

Home ranges and core areas were estimated from satellite locations to supplement behavioral data previously collected by NASWI for bald eagle management planning. Home ranges of the Polnell Point and Crescent Harbor eagles were determined from 38 and 65 locations, respectively, that were accurate within 1 km. Ranges (95% Harmonic Mean Contours) were 27.7 km^2, and 13.2 km^2, for the respective pairs. Range shape and size were probably influenced by the error associated with satellite locations, nest failure (i.e. Polnell Point) or inactivity (i.e. Crescent Harbor), as well as the establishment of a new nesting territory in west Crescent Harbor. The Polnell Point adult was replaced by a new female in 1997.

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INTRODUCTION

Recent development of satellite technology has provided the opportunity to study long-range movements of several large raptor species (Meyburg and Meyburg 1995). Understanding long-range movements is important for raptors that winter in areas distant from breeding grounds since wintering areas may present the most serious threats to survival. For example, satellite telemetry has facilitated the identification of wintering areas for some nesting populations of peregrine falcons (*Falco peregrinus*) (Howey and Ambrose 1994) and Swainson's hawks (*Buteo swainsoni*) (Woodbridge et al. 1995) in Mexico and South America, where pesticide use has been implicated as the cause of impaired productivity and reduced survival (Cade et al. 1988, Woodbridge et al. 1995).

Bald eagles (*Haliaeetus leucocephalus*) that nest in northern latitudes may migrate to southern latitudes in winter (Dunstan 1973, Gerrard et al. 1974, Gerrard et al. 1978, Griffin et al. 1980, Hodges et al. 1987). For example, some bald eagles that breed in western Canadian Provinces and Alaska winter in Washington state (Servheen and English 1979, Hunt et al. 1980, Hunt and Johnson 1981, Hunt et al. 1992*a*, Watson and Pierce 1997). Bald eagles that breed and summer in western Washington, and northern California, may migrate to coastal British Columbia and southeast Alaska in the fall (Hunt et al. 1992b, Watson et al. 1995).

In 1996, a bald eagle management plan (BEMP) was prepared at Naval Air Station, Whidbey Island (NASWI) through the cooperative efforts of the U.S. Navy, EDAW Inc., and the Washington Department of Fish and Wildlife (WDFW) (EDAW Inc. 1996). Here, we present the results of the WDFW contribution to that effort. Our purpose was to assess the migratory movements of breeding eagles from NASWI using satellite telemetry.

Acknowledgements.--We thank M. Klope, S. Penix, K. Livezey, R. Tressler, J. Bernatowicz, S. Negri, and S. Ament for logistical and field support. J. Talmadge provided graphics support. M. Klope and S. Penix commented on an earlier draft report. Satellite data retrieval in 1996 was accomplished through funding provided by the Naval Air Station Whidbey Island under contract No. N68711-96-LT-60004 to the Washington Department of Fish and Wildlife.

STUDY AREA AND METHODS

At least four bald eagle territories were present on NASWI during trapping in 1995, including Rocky Point, Polnell Point, Maylor Point, and Crescent Harbor (Fig. 1). Polnell Point (WDFW #114) and Rocky Point (WDFW #319) had a productivity history, whereas territories at Crescent Harbor and Maylor Point were first identified in 1995. We trapped one adult eagle at each territory and attached radiotransmitters to each bird. Two birds were fitted with VHF transmitters that were used for local monitoring for other phases of the study (EDAW, Inc. 1996). The other two were outfitted with satellite transmitters and VHF units with the primary objective of ascertaining long-range movements.

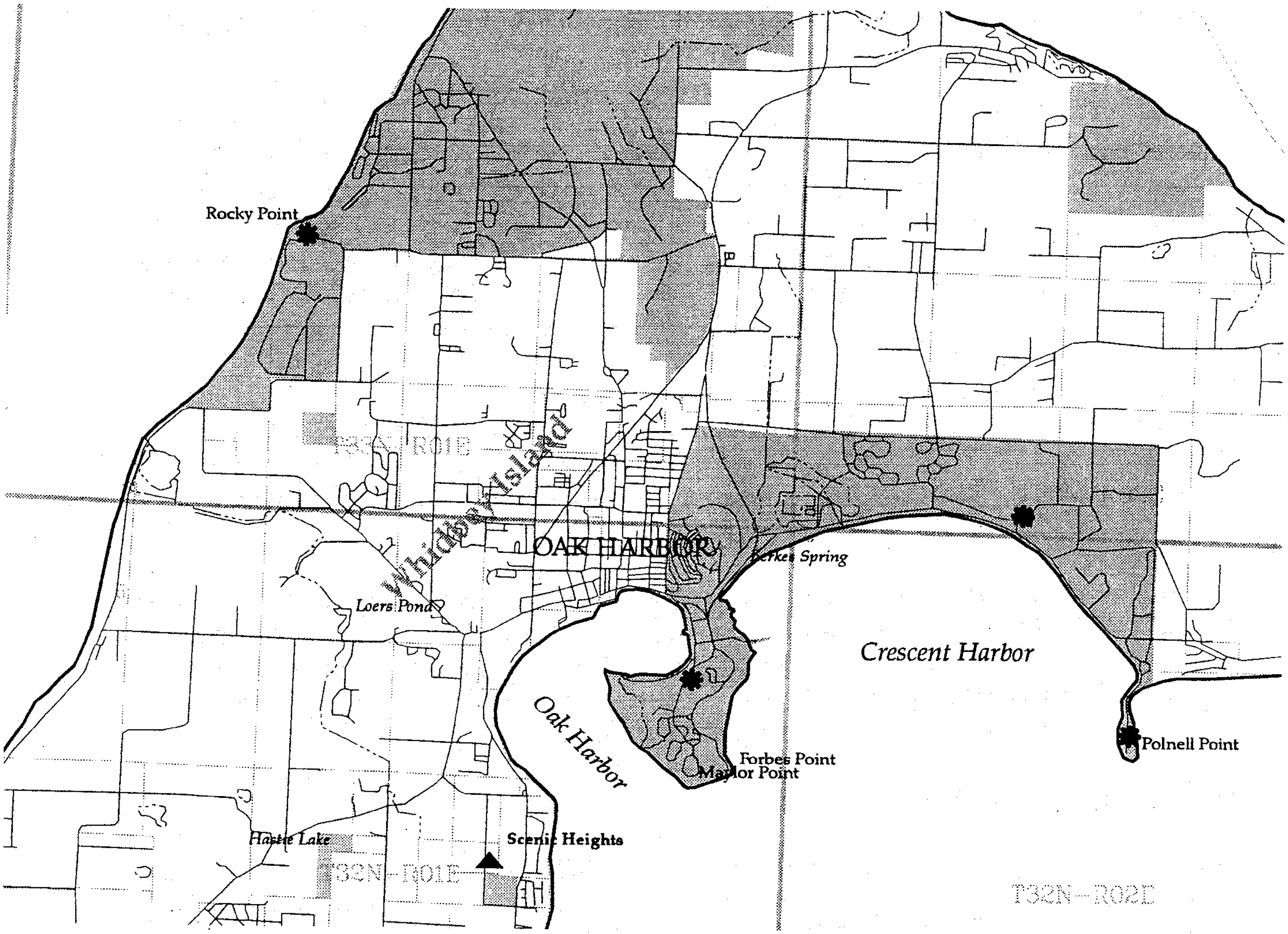
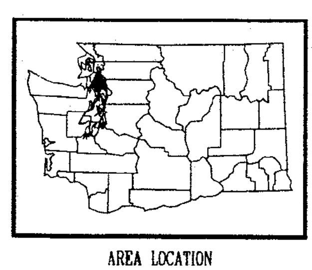


Figure 1. Nest locations (✱) of eagles trapped and telemetered on Naval Air Station Whidbey Island.



We captured eagles using floating noosed-fish (Cain and Hodges 1989). Gender of captured eagles was determined by applying beak depth and hallux claw measurements to the formula described by Bortolotti (1984). We trapped other eagles incidentally or during the the testing of capture techniques near the Air Station. Eagles were aged as adults with full white heads and tails, or as immatures. Eagles were banded with USFWS bands and vinyl band-markers (McCollough 1990). Yellow markers were used in 1994, and yellow and teal blue markers in 1995 to enhance visibility. Markers were coded with three alpha-numeric digits identifying the general location of origin, trapping year, and sequential order of capture. Target eagles were outfitted with backpacks securing either VHF transmitters from *Advanced Telemetry Systems, Inc.*, or satellite transmitters with piggy-backed VHF units from *Microwave Telemetry, Inc.* Estimated life of the former VHF transmitters and satellite units was 2 years. Piggy-backed VHF transmitters were expected to last 8 months to 1 year. Most eagles were released at capture locations within 1 hour following capture.

Satellite transmitters were pre-programmed to transmit for 8 hours every four days. Because the two NOAA satellites that retrieve data orbit the earth approximately every 2 hours at the latitude of the study area, a potential of eight, but most often three or four locations were obtained during a given transmission period. Each location was coded during down-loading into one of seven classes (Service Argos, Inc. 1994) based on varying quality of the data received: location class 3 accurate <150m; 2 <350m; 1 <1000m; 0>1000m (i.e. no more accurate than 1000 m); A (no accuracy); B (no accuracy); Z (invalidated location). Field testing to estimate error of class 0 locations in northwestern Washington calculated error bias of 1.7±2.2 km for latitude coordinants, and 4.4±4.8 km for longitude coordinants (Watson et al. 1995). Thus, locations for classes 1-3 were considered useful for interpretation of long-distance movements, and theoretically described a geographic location <1 km of the actual location.

Plotting of locations was accomplished with program HOME RANGE (Ackerman et al. 1989) and GIS mapping (WDFW, Wildlife Resource Data Systems). Although the primary purpose of satellite locations was to assess long range movements, we also estimated home ranges (95% harmonic mean contours; Dixon and Chapman 1980) and core areas (maximum areas where the observed utilization distribution exceeds a uniform distribution) of telemetered eagles. Range calculations were based on perch frequencies of sequential class 1-3 locations. No attempt was made to account for differences in estimated accuracy among these classes, and all locations were considered to be <1000 m from the true location (i.e. class 1 error bias). Because sequential locations were separated by at least 1.5 hours, and most often 96 hours, locations were considered to be independent based on a minimum 2-hour interval necessary to eliminate serial correlation from bald eagle data sets (J. Watson, unpubl. data). The home range of one territorial eagle of a pair was representative of the home range for both adults since paired adult eagles use many of the same perches and occupy virtually identical ranges (Watson and Anthony 1986). Activity centers, describing the single most important point in the home range (Ackerman et al. 1989), were identified for both eagles.

RESULTS

We trapped and banded 11 bald eagles on or near NASWI between July 1994 and June 1995, including 9 adults and 2 immatures (Appendix, Table 1). We received no reports of band sightings or marker recoveries of any eagles away from NASWI.

Satellite transmitters were affixed to adult female eagles at Polnell Point and Crescent Harbor. These eagles were each monitored for over 25 months, during which time 466 and 546 satellite locations were received, respectively (Table 1). Movements and ranges of the two adults were assessed from subsets of all the satellite locations based on their theoretical accuracy (Table 1).

The Polnell Point adult remained on her territory throughout the first 15 months of monitoring from February, 1995 through May, 1996. She dispersed from her territory on May 20, 1996 to the San Juan Islands, upper Fraser River, and Williston Lake in north-central British Columbia (Fig. 2). The northernmost extent of her movement from the territory was 870 km, and the quickest movement during migration was 433 km in 4 days (108 km/day). She moved throughout the interior lakes of British Columbia until October 12, when the activity sensor indicated the transmitter was stationary at Williston Lake. The last quality location (i.e. class 2), received on August 28, was 2 km inland from the Lake, and about 500 m in elevation above the Lake (M. Wood, pers. comm.). The transmitter continued to function until March, 1997. Boat reconnaissance at Polnell Point in June, 1997, found a non-banded adult female tending young at the nest, suggesting the telemetered female did not return and had been replaced at this territory.

The Crescent Harbor adult migrated and returned to her territory twice during time she was monitored (May, 1995 through October, 1996). She dispersed from her territory in mid-June, 1995, remained in the vicinity of Whidbey Island until August 12, and then migrated 700 km up coastal British Columbia to the north end of Princess Royal Island, northwest of Bella Coola (Fig. 3). She spent 68 days away from the territory, reaching her northernmost location on September 2. She returned to her territory in late October via local tributaries (i.e. Jim Creek and the Stillaguamish River). On July 21, 1996, she again migrated along coastal British Columbia following the same corridor as in the previous year to Khutzeymateen Channel, northeast of Prince Rupert and 875 km north of Whidbey Island (Fig. 4). She spent 86 days away from the territory, reaching her northernmost location on August 28. She returned to her territory in mid-October again via Jim Creek. The quickest movement by the eagle during both migrations was 505 km in 4 days (126 km/day).

Home ranges of the Polnell Point and Crescent Harbor eagles were assessed from 38 and 65 satellite locations of class 1-3 accuracy, respectively (Table 1). Although locations had a theoretical accuracy < 1 km, several locations were over the water at distances > 1 km from land (Figs. 5 and 6). Ranges and core areas for the two territories were similar in location, encompassing the Seaplane Base in Crescent Harbor, as well as other portions of NASWI. Orientation of the range and core area of the Polnell Point bird was south of the Crescent Harbor

Table 1. Satellite location accuracy used in defining bald eagle movements and ranges on and from Naval Air Station, Whidbey Island.

Territory and Application	Location[a] Class	No.	%	Inclusive Dates
Polnell Point All Locations	0	167	35.8	2/15/95-3/16/97
	1	38	8.2	
	2	11	2.4	
	3	4	0.9	
	A	87	18.7	
	B	73	15.7	
	Z	86	17.7	
	Total	466		
Polnell Point Movements	0	68	58.1	2/15/95-8/28/96
	1	34	29.1	
	2	11	9.4	
	3	4	3.4	
	Total	117		
Polnell Point Home Range	1	28	73.7	2/15/95-5/11/96[b]
	2	6	15.8	
	3	4	10.5	
	Total	38		
Crescent Harbor All Locations	0	248	45.4	5/10/95-6/24/97
	1	57	10.4	
	2	12	2.2	
	3	7	1.3	
	A	74	13.6	
	B	90	16.5	
	Z	58	10.6	
	Total	546		
Crescent Harbor Movements	0	70	61.4	5/10/95-10/14/96
	1	30	26.3	
	2	9	7.9	
	3	5	4.4	
	Total	114		
Crescent Harbor Home Range	1	46	70.8	5/10/95-6/17/96; 10/19/95-7/17/96; 10/18/96-6/24/97[b]
	2	11	16.9	
	3	8	12.3	
	Total	65		

[a]Location class accuracy-:3<150m; 2<350m; 1<1000m; 0>1000m (i.e. nomore accurate than 1000 m); A (no accuracy); B (no accuracy); Z (invalidated location).

[b]Periods used for home range estimate excluded locations when eagle first departed from territory in migration, to when it first returned.

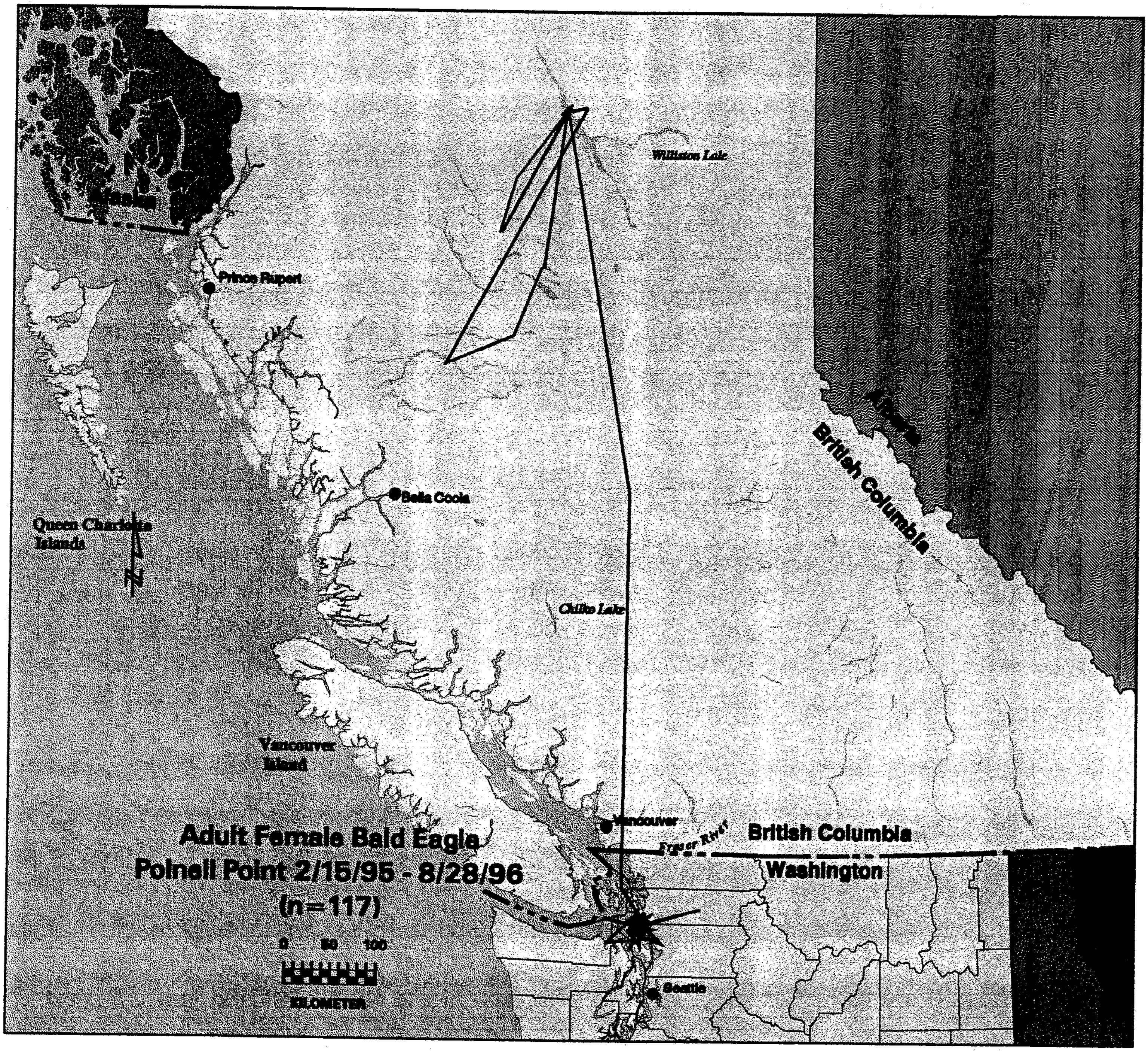


Figure 2. Movements of the Polnell Point female bald eagle at and from the Naval Air Station, Whidbey Island. Movements were based on satellite locations recieved every four days. Concentrated movements associated with Whidbey Island include those within the home range, and excursions from the territory prior to migration. Northward migration began in May, 1996. The last locations were recieved at Williston Lake in October, 1996.

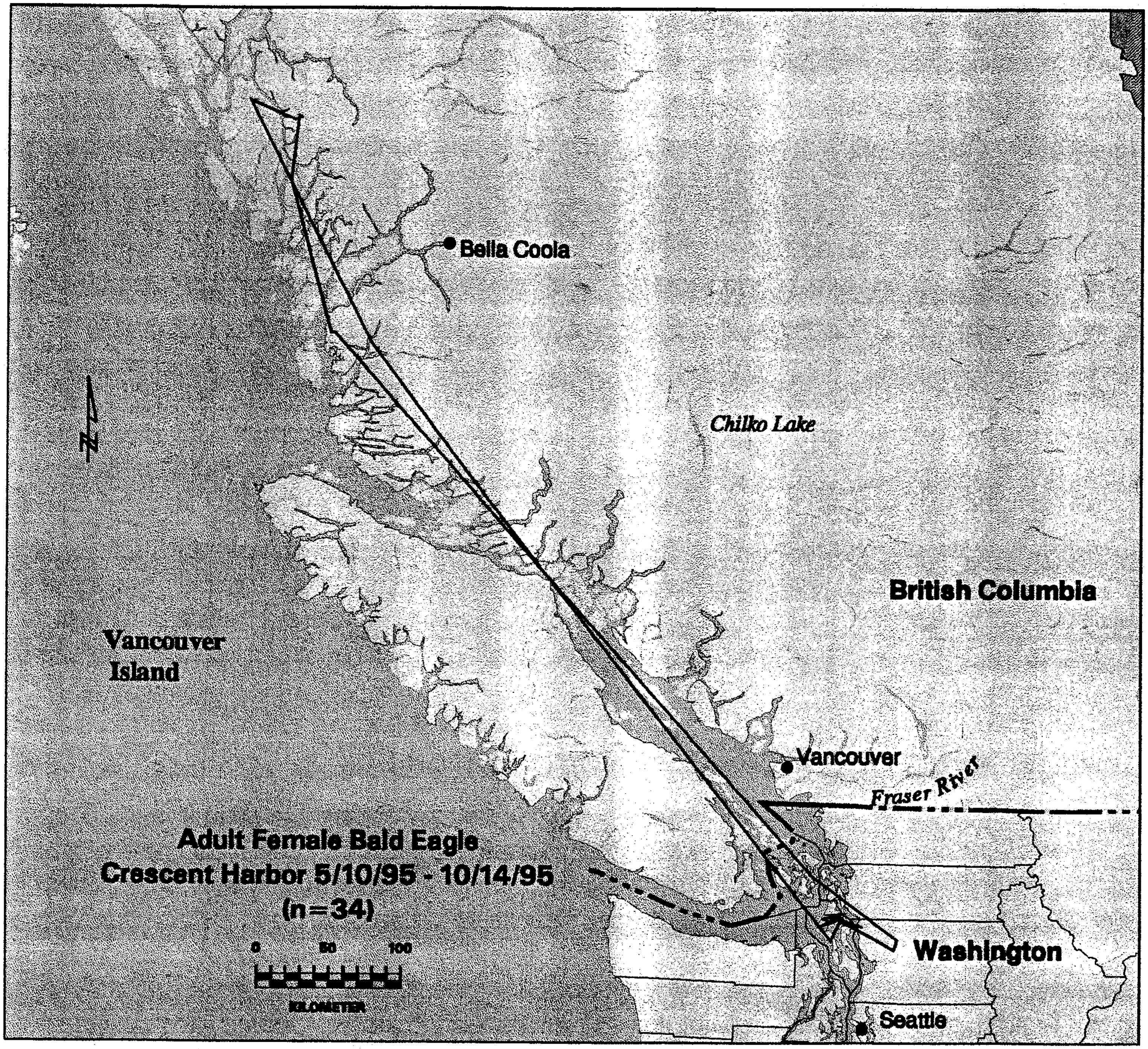


Figure 3. Movements of the Cresent Harbor female bald eagle from the Naval Air Station, Whidbey Island. Movements were based on satellite locations recieved every four days. Concentrated movements associated with Whidbey Island include those within the home range, and excursions from the territory prior to migration. Northward migration began in August, 1995, and ended when the eagle returned to her territiory in October, 1995.

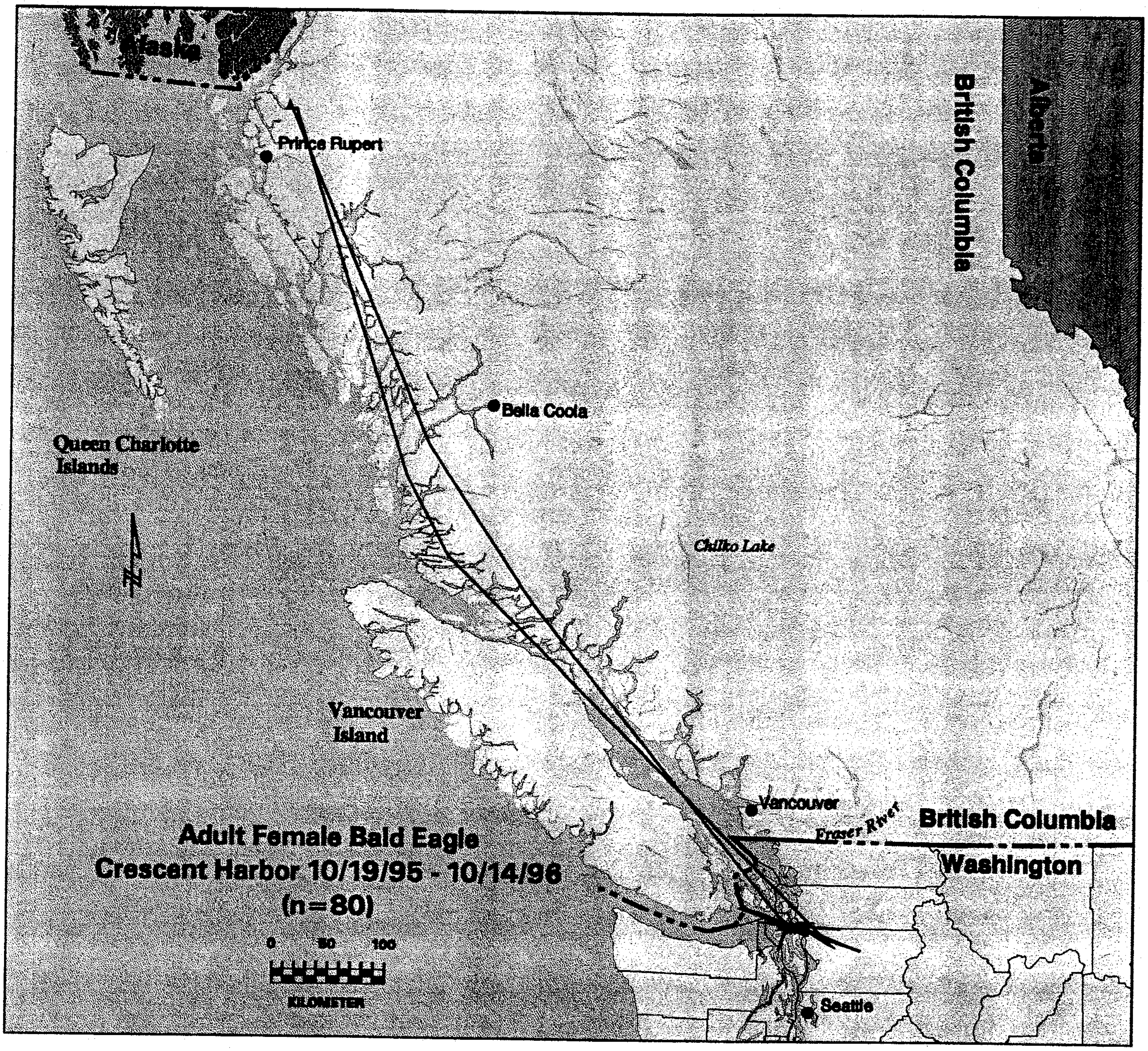


Figure 4. Movements of the Cresent Harbor female bald eagle from the Naval Air Station, Whidbey Island. Movements were based on satellite locations recieved every four days. Concentrated movements associated with Whidbey Island include those within the home range, and excursions from the territory prior to migration. Northward migration began in July, 1996, and ended when the eagle returned to her territiory in October, 1996.

adult, and the activity centers were separated by 3.2 km. The activity center for the Polnell Point eagles was adjacent to Polnell Point where the nest was located, while the activity center of the Crescent Harbor eagle was in a timbered area of the NASWI, associated with perch locations but no known nest (M. Klope, pers. comm.). General perch use for the Polnell Point bird was from east Crescent Harbor to Strawberry Point, whereas the Crescent Harbor adult frequented perches north of Crescent Harbor 2-3 km inland from the shoreline.

Range size and core area of the Polnell Point adult were over twice that of the Crescent Harbor adult (Table 2). Lengths of shoreline encompassed by the respective ranges also reflected a two-fold difference in size (Table 2). The extreme locations of the Polnell Point adult on Camano Island, and south of Coupeville, were recorded in late fall and winter, 1995-96, during the time the bird had been expected to migrate northward, but remained on the territory.

Table 2. Home range statistics of bald eagles on the Naval Air Station, Whidbey Island, as determined from satellite locations.

Territory	95% Harmonic Mean Contour	Shoreline Length in Home Range (km)	Core Area (km^2)	% Core Area	Shoreline Length In Core Area (km)
Polnell Point	27.7	71.5	8.2	54	21.0
Crescent Harbor	13.2	31.4	4.4	63	11.0

DISCUSSION

Long-range movements of the two adult eagles from NASWI were consistent in timing and orientation with 7 other eagles monitored from western Washington (Watson et al. 1995). The general pattern is for non-breeding and breeding eagles to depart breeding areas in western Washington from May through August, and return from October through January. The relatively early dispersal of the Polnell Point adult in May, and the Crescent Harbor adult in July and early August, was likely related to the fact that neither bird nested successfully during the study (EDAW Inc., 1996), so the birds were more nomadic earlier in the year. In western Washington, adults initiate breeding activities no later than January and young fledge by the end of August (Watson and Cunningham 1995).

Northward migration of adult eagles from NASWI through interior and coastal British Columbia mirrored the two migration corridors of other eagles from western Washington to British Columbia and southeast Alaska (Watson et al. 1995). Fall movement of eagles from the Pacific Coast to British Columbia appears to be a functional migration in response to increased salmon carcass availability along coastal rivers (Hunt et al. 1992b, Watson et al. 1995). The coast of British Columbia, within 200 km of the shoreline, has a relatively high abundance of wintering eagles (Blood and Anweiler 1994). Autumn concentrations in the same zone are generally less than 50 birds (Campbell et a. 1990). The stopover point of the Crescent Harbor at Rivers Inlet, west of Bella Coola, was in the area that has been identified as a winter concentration point for

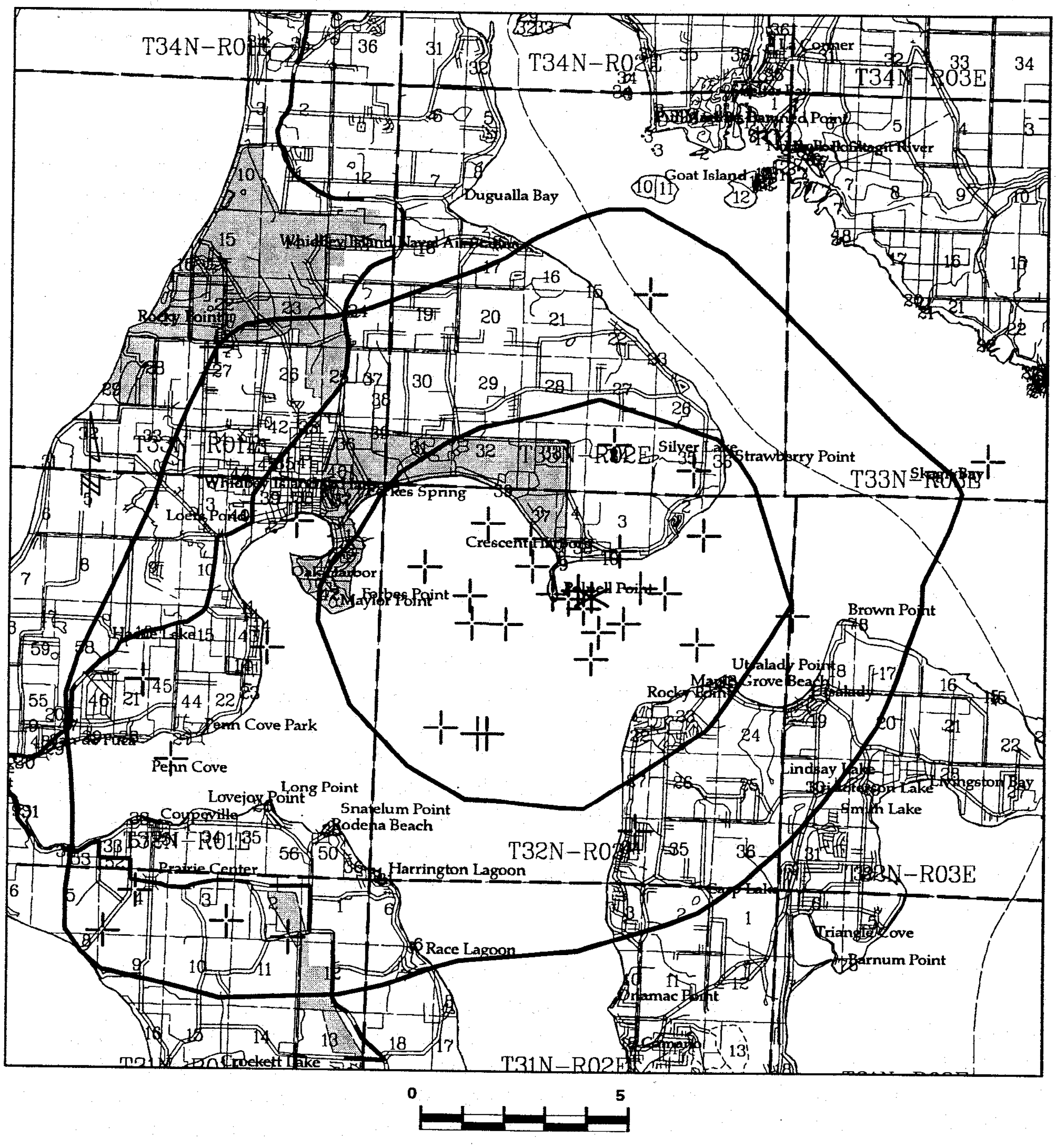


Figure 5. Home range (95 percent harmonic mean contour, 27.7 square kilometers) and core area (54 percent inner contour, 8.2 square kilometers) of the Polnell Point bald eagles at Naval Air Station, Whidbey Island (shaded). Contours were based on class 1 –3 satellite locations (n = 38, crosses), theoretically less than 1 kilometer from true locations. The star represents the activity center.

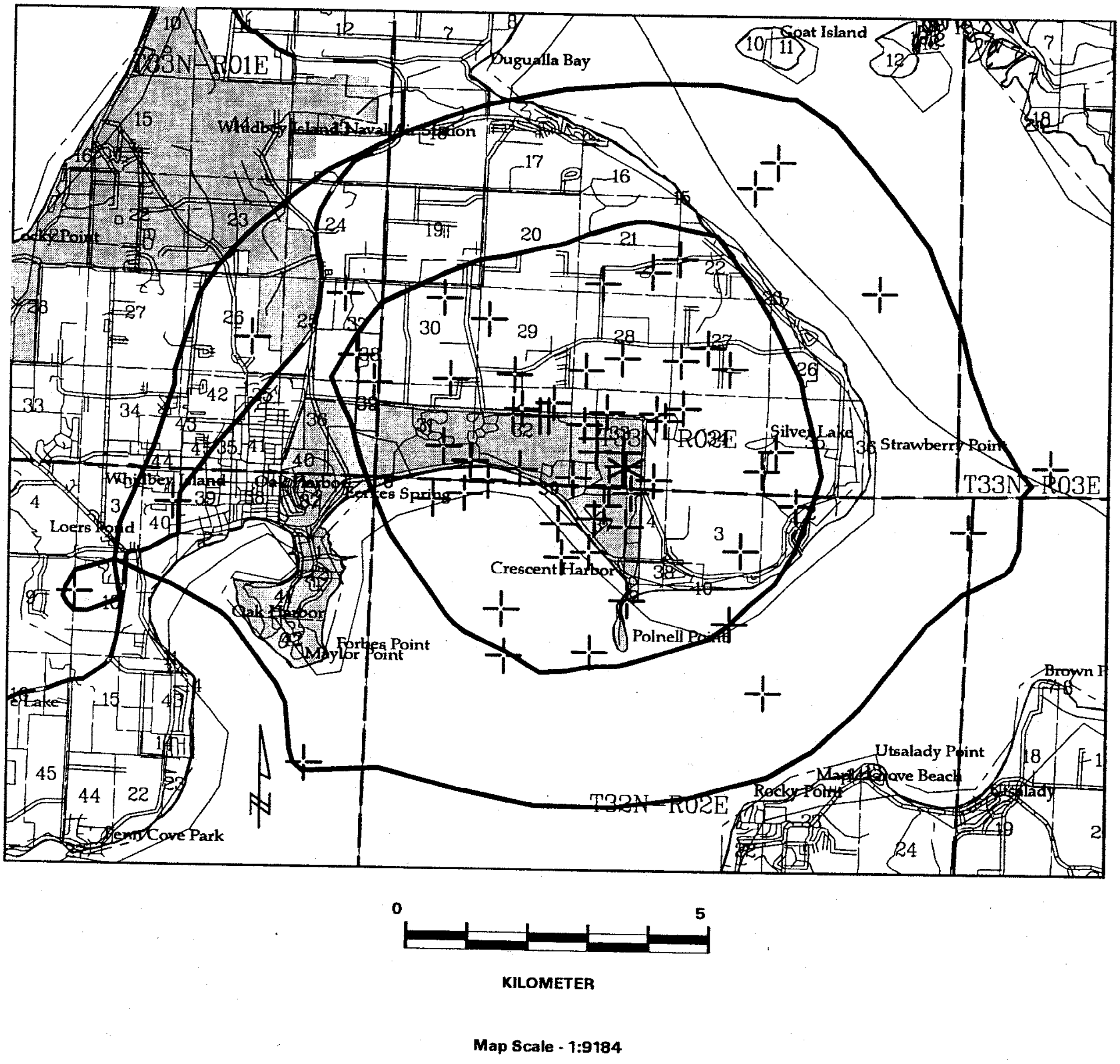


Figure 6. Home range (95 percent outer harmonic mean contour, 13.2 square kilometers) and core area (63 percent inner contour, 4.4 square kilometers) of the Cresent Harbor bald eagles at Naval Air Station, Whidbey Island (shaded). Contours were based on class 1 –3 satellite locations (n = 65, crosses), theoretically less than 1 kilometer from true locations. The star represents the activity center.

>1000 eagles (Campbell et a. 1990). The northernmost location in 1996, near the Nass River, is where up to 1000 eagles are found in the spring (Campbell et a. 1990). Winter abundance in interior British Columbia along the Fraser River corridor to Williston Lake, where the Polnell Point adult travelled, is low or sporatic (Blood and Anweiler 1994). Ice forms on the Lake in December, and a nesting population consisting of at least 74 territories returns to initiate clutches in mid to late April (M. Wood pers. comm.).

There was nearly identical orientation of migration of the Crescent Harbor adult during two consecutive years to destinations separated by 180 km, suggesting traditional movement to established feeding areas. Her return to the territory both years was via local tributaries (i.e. Jim Creek and the Stillaguamish River). Pink salmon (*Oncorhynchus gorbuscha*) were spawning in record numbers on these local tributaries in 1996 (C. Kraemer pers. comm.). A lack of migration, such as demonstrated by the Polnell Point female in fall, 1995, may indicate a seasonal abundance of local prey. Out of nine eagles monitored by satellite telemetry in western Washington, this bird was the only eagle that failed to migrate (Watson et al. 1995). Although large flocks of waterfowl were present within the Polnell Point territory, their importance in the diet of these eagles in 1995 was unknown. Perhaps bird health and levels of competion for nest sites also play a part in determining whether coastal eagles migrate. On 4 April, 1995, we inadvertently recaptured the Polnell Point female. She showed recent facial and talon scarring from an agonistic encounter with a larger female witnessed a few weeks earlier (M. Klope pers. comm.). This was followed by her disappearance and subsequent replacement on the territory.

Home ranges were larger than mean 95% harmonic mean contours estimated for 50 bald eagle territories in western Washington ($\bar{x} = 6.80 \pm 11.60$ km^2, J. Watson unpubl. data), and for core areas estimated for 70 eagle pairs ($\bar{x} = 1.53 \pm 4.44$ km^2; J. Watson unpubl. data). Differences in comparative ranges may reflect greater size of ranges on NASWI, but probably also resulted from location errors of satellite locations that inflated ranges. The establishment of a new territorial pair in west Crescent Harbor in 1995 (EDAW Inc. 1996) had unknown effects on the range size and shape of the two telemetered eagles.

Ranges estimated for the Polnell Point and Crescent Harbor eagles, using the minimum convex polygon method and estimated from VHF locations, were also smaller than satellite estimates (2.0 km^2 and 1.8 km^2, respectively; EDAW Inc, 1996). Satellite locations did, however, reflect the general perch areas that were identified specifically for both eagles by VHF telemetry. Other differences in range estimates from VHF and satellite telemetry, were the absence of overlap in the ranges estimated by VHF telemetry, and the relatively short length of shoreline encompassed by these ranges (i.e. 4.8 km) compared to satellite estimates (i.e. 17.5 and 31.4 km). Different methodologies used in estimating ranges partially account for this variation. The true range sizes and locations probably fall between the ranges estimated by satellite and VHF telemetry. VHF locations may fail to detect locations on the extreme portions of ranges outside of the signal range, which would underestimate range size and suggest a lack of range overlap. Overlap of home ranges is typical for eagles nesting adjacent to each other, while the defended territories within the ranges are exclusive (Stalmaster 1987).

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PERSONAL COMMUNICATIONS

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Appendix. Table 1. Bald eagles captured on or near NASWI in western Washington, 1994-95.

Date	Age[a]	Status[b]	Sex	Location	Band	Marker color/code[c]	Transmitter VHF	Transmitter Sat
071594	Ad	B	M	Polnell Point	629-08919	-	-	-
071594	Ad	B	F	Mariner's Cove	629-08920	-	-	-
072294	Ad	B	M	North Bluff	629-08924	Y/I4C	-	-
072294	Ad	B	F	Long Point	629-08922	Y/I4A	-	-
072294	Ad	B	M	Long Point	629-08923	Y/I4B	-	-
020495	Ad	B	F	Rocky Point	629-08930	YB/I5A	x	-
020995	Imm	NB	M	Rocky Point	629-08931	YB/I5B	-	-
021495	Ad	B	F	Polnell Point	629-08932	YB/I5C	x	x
022395	Imm	NB	F	Polnell Point	629-08933	YB/I5D	-	-
050595	Ad	B[d]	F	Crescent Harbor	629-04071	YB/I5E	x	x
050595	Ad	B	M	Maylor Point	629-04072	YB/I5F	x	-

[a]Ad=adult; Imm=immature.
[b]NB=nonbreeder; B=breeder.
[c]Y=yellow; YB=yellow and teal blue.
[d]no nest located.

Appendix A. Eagle Location Record - 22170

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
2/14/95	1300	BIRD CAPTURED AND RELEASED					Polnell Point
2/15/95	1635	48.276	122.530	1	x	x	Polnell Point
2/19/95	1644	48.266	122.570	0			
	1825	48.220	122.842	B			
	2003 (R)	48.273	122.553	3	x	x	Polnell Point
2/23/95	1836	48.072	122.658	0	x	x	Greenbank
	2018 (R)	48.350	122.415	A			
(2/24)	0031 (R)	NO LOCATION		Z			
2/27/95	1148	48.212	122.497	B			
	1329	48.288	122.588	0			
	1510	48.288	122.642	1	x	x	Maylor Point
	1648	NO LOCATION		Z			
	1721	NO LOCATION		Z			
3/3/95	0411 (R)	48.244	122.553	B			*Scenic Heights*
	0534	48.290	122.441	B			
	0547	NO LOCATION		Z			
	0714	48.227	122.692	0	x	x	
	0856	48.268	122.562	0	x		
	1033	48.151	122.515	B			
	1040	48.183	122.338	A			
3/7/95	0909	48.275	122.522	3	x	x	Polnell Point
	1051	NO LOCATION		Z			
	1140	NO LOCATION		Z			
	1316	48.261	122.655	0			
	1457	48.238	122.504	0			
3/12/95	1412	48.240	122.495	0			Polnell Point
	1548	48.358	122.351	B			
	1625	48.352	122.482	0			
	1811	48.271	122.548	2	x	x	
3/16/95	1738	48.254	122.559	0			Polnell Point
	1921	48.273	122.585	1	x	x	
	2101 (R)	48.382	122.631	A			
	0007 (R)	48.484	122.693	A			
3/20/95	1806	48.243	122.578	1	x		Polnell Point
	1944	48.274	122.558	1	x	x	
	2124 (R)	48.278	122.572	0			
3/24/95	0203 (R)	48.277	122.584	0	x	x	Polnell Point
	0344 (R)	48.286	122.591	0	x		
	0620	47.920	122.746	A			
	0800	48.256	122.495	0			
3/28/95	0629	48.327	123.027	0	x		Polnell Point
	0811	NO LOCATION		Z			
	0950	48.416	123.389	B			
	1113	48.277	122.553	0	x	x	
	1251	48.278	122.548	0	x		

Appendix A. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
4/1/95	1349	48.238	122.345	0	x		Polnell Point
	1530	48.212	122.472	B			
	1635	48.169	122.868	B			
	1808	48.266	122.567	0	x	x	
	1954	48.245	122.523	0	x		
4/6/94	2104 (R)	48.209	122.511	A	x	x	*West Camano Is.*
	0221 (R)	NO LOCATION		Z			
4/10/95	0140 (R)	NO LOCATION		Z			Polnell Point
	0321 (R)	48.280	122.526	0	x	x	
	0502	48.316	122.529	A			
4/14/95	0806	48.275	122.584	0	x	x	Shoreline Crescent Harbor
	0943	48.270	122.562	0	x		
4/18/95	0959	48.279	122.567	0			Crescent Harbor
	1135	48.382	122.790	B			
	1143	NO LOCATION		Z			
	1327	48.280	122.564	0			
	1507	48.244	122.593	1	x	x	
	1650	NO LOCATION		Z			
4/23/95	1605	48.271	122.478	A			Shoreline Strawberry Point (bird retrapped 4/21/95-see notes)
	1717	48.275	122.570	0	x		
	1856	48.276	122.506	0	x	x	
	2037 (R)	48.291	122.505	B			
4/27/95	0156 (R)	48.226	122.494	A			Shoreline Crescent Harbor
	0339 (R)	48.279	122.584	0	x	x	
5/1/95	0437	48.315	122.603	0	x	x	Shoreline Crescent Harbor
	0615	48.403	122.525	B			
	0652	48.778	123.987	A			
	0835	48.283	122.521	A			
	1016	48.282	122.540	A			
5/5/95	1029	48.449	122.587	A	x	x	*Skagit Bay*
	1206	NO LOCATION		Z			
5/10/95	2027 (R)	48.277	122.602	0	x	x	Shoreline Crescent Harbor
5/14/95	2041 (R)	48.288	122.500	B			
	0217 (R)	48.284	122.558	0	x	x	Shoreline Crescent Harbor
	0355 (R)	48.270	122.585	0			
5/18/95	0313 (R)	48.284	122.577	0			Saratoga Passage
	0456 (R)	NO LOCATION		Z			
	0634	NO LOCATION		Z			
	0727	48.243	122.581	2	x	x	
	0909	48.306	122.629	0			

Appendix A. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
5/22/95	0920	48.291	122.557	A			Utsalady
	1057	48.258	122.461	0	x	x	
	1221	48.268	122.540	A			
	1401	48.273	122.575	0	x		
	1542	48.326	122.528	0	x		
5/26/95	1739	48.296	122.562	0			Polnell Point
	1919	48.266	122.543	1	x	x	
	2059 (R)	48.261	122.581	A			
5/31/95	0235 (R)	48.280	122.565	1	x	x	Polnell Point
	0414 (R)	48.270	122.529	0			
6/4/95	0758	48.262	122.546	0	x	x	Polnell Point
	0939	48.281	122.561	0	x		
	1120	NO LOCATION		Z			
	1141	48.665	122.614	A			
6/8/95	1130	NO LOCATION		Z			Polnell Point
	1238	48.275	122.578	0	x	x	
	1418	48.287	122.593	0	x		
	1556	NO LOCATION		Z			
	1754	48.238	122.541	0	x		
6/13/95	1808	48.311	122.576	0	x	x	Crescent Harbor
	1948	48.294	122.527	A			Shoreline (center)
	2131 (R)	NO LOCATION		Z			
6/17/95	0109 (R)	48.315	122.556	A			Shoreline E. Polnell
	0252 (R)	48.268	122.535	1	x	x	Pt.
	0430 (R)	48.270	122.569	0			
	0612	NO LOCATION		Z			
6/21/95	0529	NO LOCATION		Z			Shoreline W. Polnell
	0829	48.282	122.580	0	x	x	Pt.
	1011	NO LOCATION		Z			
	1149	NO LOCATION		Z			
	1157	48.370	122.479	A			
6/25/95	1254	48.278	122.511	A			Polnell Point
	1437	48.264	122.511	2	x	x	
	1618	48.560	122.695	A			
	1646	NO LOCATION		Z			
	1825	48.258	122.567	0			
6/30/95	1839	48.289	122.580	1	x	x	E. Shoreline Crescent
	2018 (R)	48.279	122.402	A			Harbor
	0209 (R)	48.241	122.221	0			
7/4/95	0308 (R)	48.356	122.590	0	x		Inland, central
	0446 (R)	48.268	122.369	0	x	x	shoreline Crescent
	0626	48.181	122.267	B			Harbor
	0843	48.398	122.975	Z			

Appendix A. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
7/8/95	0857	NO LOCATION		Z			Camp Grande
	1035	48.254	122.595	A			
	1218	48.223	122.529	1	x	x	
	1357	48.285	122.564	0			
	1534	48.390	121.956	A			
7/13/95	1718	48.548	122.746	A			*Polnell Point*
	1856	48.259	122.554	A	x	x	
	2038	NO LOCATION		Z			
7/17/95	0231(R)	48.241	122.810	A			Polnell Point
	0411(R)	48.270	122.551	0	x	x	
7/21/95	0504	48.655	123.231	A			Crescent Hbr.
	0734	48.348	122.628	A			Shoreline, West
	0916	48.298	122.623	0	x	x	
7/25/95	1234	48.287	122.579	0	x	x	Crescent Hbr.
	1413	NO LOCATION		Z			Shoreline, East
	1555	48.290	122.552	0			
	1737	48.213	122.580	B			
	1912	48.123	122.727	B			
7/30/95	1926	48.276	122.586	0	x	x	Crescent Hbr.
	0149(R)	48.217	122.522	A			Shoreline, East
8/3/95	0244(R)	48.273	122.508	0	x	x	E. Polnell Pt.
	0429(R)	48.265	122.534	A			
	0606	NO LOCATION		Z			
8/7/95	0806	48.271	122.562	0	x	x	Polnell Pt.
	0947	48.280	122.541	0	x		
	1124	48.307	122.535	0	x		
	1155	48.305	122.672	0	x		
	1336	48.275	122.478	0	x		
	1513	48.275	122.534	0	x		
8/11/95	1430	48.283	122.364	A			E. Polnell Pt.
	1612	48.290	122.087	B			shoreline
	1801	48.238	122.859	B			
	1943	48.295	122.498	0	x	x	
	2121(R)	48.217	122.470	B			
8/16/95	0107(R)	48.259	122.603	0	x	x	Polnell Pt.
	0246(R)	48.269	122.564	0	x		
8/20/95	0403(R)	48.251	122.571	0	x	x	Polnell Pt.
	0924	48.254	122.578	0	x		
	1105	48.275	122.574	A			
8/24/95	1018	48.201	122.460	B			Crescent Hbr.
	1154	NO LOCATION		Z			Shoreline, East
	1208	NO LOCATION		Z			
	1350	48.243	122.656	A			
	1535	48.282	122.587	0	x	x	

Appendix A. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
8/28/95	1655	48.178	122.575	B			E. Polnell Pt.
	1831	NO LOCATION		Z			
	2015(R)	48.284	122.537	1	x	x	
	2154(R)	NO LOCATION		Z			
9/2/95	0225(R)	48.289	122.551	0	x	x	Polnell Pt.
	0403(R)	48.274	122.506	0	x		
9/6/95	0714	48.239	122.577	A			Polnell Pt.
	0853	NO LOCATION		Z			
	1028	NO LOCATION		Z			
	1132	48.431	122.608	B			
	1312	48.274	122.553	0	x	x	
9/10/95	0206(R)	48.430	121.727	0			
	0509	48.272	122.563	0	x	x	Polnell Pt.
	0651	48.272	122.563	0	x		
9/15/95	1906	48.256	122.580	A			Polnell Pt.
	2047(R)	48.260	122.545	2	x	x	
	0144(R)	48.346	122.569	A			
9/19/95	0346(R)	48.260	122.473	0	x	x	Polnell Pt.
	0523	48.271	122.560	B			
	0833	NO LOCATION		Z			
9/23/95	1023	48.284	122.518	0			E. of Polnell Pt.
	1203	48.326	122.540	A			shoreline
	1251	NO LOCATION		Z			
	1428	48.302	122.514	1	x	x	
	1612	48.285	122.546	0			
9/27/95	1428	48.306	122.418	2	x	x	Mouth, S. Fk. Skagit
	1922	48.131	122.225	A			
	2104	48.331	122.485	B			
10/2/95	2119(R)	NO LOCATION		Z			
	0341(R)	NO LOCATION		Z			
10/6/95	0257(R)	48.267	122.573	1	x	x	Polnell Pt.
	0441(R)	48.293	122.566	A			
	0621	NO LOCATION		Z			
	0800	48.261	122.589	0			
	0941	48.383	122.574	A			
10/10/95	1000	48.465	121.361	B			Polnell Pt.
	1132	48.286	122.566	1	x	x	
	1208	48.233	122.453	0			
	1345	48.257	122.563	A			
10/14/95	1443	48.342	122.987	B			*E. Polnell Pt.*
	1810	48.276	122.514	B	x	x	*Shoreline*

Appendix A. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
10/19/95	2003 (R)	48.263	122.592	0	x	x	Polnell Pt.
	2008 (R)	48.270	122.567	0			
	2150 (R)	48.244	122.647	B			
	0217 (R)	48.308	122.497	B			
10/23/95	0315 (R)	48.260	122.553	0			Polnell Pt.
	0459 (R)	48.267	122.584	1	x	x	
	0636	48.223	122.457	B			
	0649	48.320	122.448	B			
	0831	48.270	122.562	0			
10/27/95	0805	48.251	122.356	B			West of Oak Harbor
	0944	48.287	122.697	0	x	x	
	1127	48.187	122.546	0	x		
	1301	47.597	124.296	Z			
	1321	48.228	122.682	0	x		
	1506	48.240	122.800	0	x		
10/31/95	1223	48.273	122.405	A			Shore E. Polnell Pt.
	1405	48.293	122.514	0			
	1742	48.279	122.545	0			
	1920	48.288	122.515	1	x	x	
11/5/95	1755	48.275	122.550	1	x	x	Polnell Point
	1939	48.272	122.546	B			
	2355 (R)	NO LOCATION		Z			
11/9/95	2452 (R)	48.277	122.563	0	x	x	Polnell Point
	0230 (R)	48.253	122.427	0	x		
	0409 (R)	NO LOCATION		Z			
11/13/95	0330 (R)	48.296	122.525	0	x	x	Shore E. Polnell Pt.
	0509	48.351	122.488	0	x		
	0630	NO LOCATION		Z			
	0813	48.299	122.621	0	x		
	0955	48.271	122.475	0	x		
11/17/95	0826	48.268	122.544	0			S. Oak Harbor
	1007	48.043	122.666	A			
	1239	48.279	122.607	1	x	x	
	1420	48.257	122.667	B			
11/21/95	1434	48.283	122.553	A	x	x	*Polnell Point*
	1826	48.273	122.578	B			
11/26/95	1838	48.323	122.387	A			Polnell Point
	0110 (R)	48.298	122.574	0	x	x	
11/30/95	0204 (R)	48.371	122.401	1	x	x	N. Fk. Skagit River
	0349 (R)	48.363	122.474	0			
	0527	48.704	122.068	A			
	0703	48.356	122.487	1	x		(Skagit Bay)

Appendix A. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
12/4/95	0445(R)	NO LOCATION		Z			North of Penn Cove
	0718	48.280	122.348	0			
	0858	48.260	122.652	1	x	x	
	1036	NO LOCATION		Z			
	1113	48.364	122.319	B			
12/8/95	1313	48.331	122.783	A			Penn Cove
	1449	48.235	122.682	1	x	x	
	1632	48.854	122.396	A			
12/12/95	1311	48.808	124.759	B			N. Penn Cove
	1451	48.169	122.769	A			
	1727	48.271	122.664	0	x	x	
	1908	48.225	122.636	A			
12/17/95	1923	48.372	122.513	A	x	x	*Skagit Bay*
	0039	NO LOCATION		Z			

[a]Presumed night roost locations from 2000-0500 h are identified with (R).
[b]Location class accuracy-:3<150m; 2<350m; 1<1000m; 0>1000m (i.e. no more accurate than 1000 m); A (no accuracy); B (no accuracy); Z (invalidated location).
[c]Best location(s) on given date.
[d]Location used for location estimate; locations based on classes A and B are italicized.

Appendix B. Eagle Location Record - 22171

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
5/5/95	1005	BIRD CAPTURED AND RELEASED					Crescent Harbor
	1203	NO LOCATION		Z			
	1207	NO LOCATION		Z			
5/10/95	1710	NO LOCATION		Z			Shoreline Crescent Harbor
	1847	48.291	122.558	1			
	2031(R)	48.278	122.585	2	x	x	
	2210(R)	48.278	122.645	B			
5/14/95	0219(R)	48.270	122.606	0	x	x	Shoreline Crescent Harbor (NW)
	0358(R)	48.268	122.458	B			
	0539	48.314	122.535	0	x		
5/18/95	0500(R)	NO LOCATION		Z			Shoreline Crescent Harbor (NW)
	0633	47.874	122.280	B			
	0728	48.278	122.576	0	x		
	0905	48.345	122.911	0	x		
	1045	48.329	122.577	B			
	1126	NO LOCATION		Z			
5/22/95	1221	NO LOCATION		Z			
	1400	48.251	122.717	0	x	x	S. Oak Harbor
	1622	48.311	122.543	0	x		
	2045(R)	48.280	122.599	B			
5/26/95	1916	48.315	122.536	1	x	x	Strawberry Pt.
	2058(R)	48.263	122.464	A			
	0235(R)	48.325	122.613	0			
5/31/95	0234(R)	48.316	122.553	0			Shoreline Crescent
	0412(R)	48.294	122.563	1	x	x	Harbor (NE)
	0555	48.242	122.453	0			
	0744	48.300	122.631	0			
	0924	48.276	122.507	B			
6/4/95	0937	48.284	122.525	0	x	x	Shoreline Strawberry Point
	1142	48.269	122.604	B			
	1320	48.298	122.532	A			
	1501	48.315	122.674	0	x		
6/9/95	1420	48.464	121.881	B			N. of Oak Harbor
	1605	NO LOCATION		Z			
	1757	48.317	122.649	0	x	x	
	1934	48.319	122.543	0	x		
6/13/95	2133(R)	NO LOCATION		Z			Skagit Bay (Davis Slough)
	0149(R)	47.909	125.385	A			
	0346(R)	48.256	122.374	0	x	x	
6/17/95	0431(R)	48.315	122.619	1	x	x	North of Central
	0614	NO LOCATION		Z			Crescent Hbr.
	0815	48.296	122.557	1	x	x	(Shoreline W. Polnell)
	0955	48.306	122.578	0			
	1102	NO LOCATION		Z			

Appendix B. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
6/21/95	1011	48.310	122.581	A	x	x	*North of Central*
	1258	48.286	122.571	B			*Crescent Harbor*
6/26/95	1829	48.324	122.527	0	x	x	Strawberry Point
	2006 (R)	48.335	122.635	0	x		
6/30/95	0212 (R)	48.301	122.585	B			North of central
	0355 (R)	48.311	122.615	1	x	x	Crescent Hbr.
	0535	48.344	122.686	B			
7/4/95	0843	NO LOCATION		Z			Oak Harbor
	0847	48.297	122.669	0	x	x	
	1028	48.280	122.641	0	x		
	1121	48.291	122.676	B			
	1256	48.346	122.220	B			
	1437	48.315	122.890	0	x		
7/8/95	1537	48.362	122.655	0			North of central
	1704	48.228	122.709	0			Crescent Hbr.
	1843	48.307	122.584	1	x	x	
	2024	48.303	122.579	0			
7/13/95	0314 (R)	48.301	122.520	0			North of central
	0452 (R)	48.295	122.594	1	x	x	Crescent Hbr.
7/17/95	0553	NO LOCATION		Z			Shoreline N. of Marina
	0725	48.272	122.592	B			
	0903	48.307	122.621	0	x	x	
	1044	NO LOCATION		Z			
	1218	48.478	122.466	A			
7/21/95	1317	48.268	122.507	0	x	x	S. Strawberry Pt.
	1457	48.303	122.557	A			
	1643	48.246	122.665	B			
	1721	48.473	122.564	A			
	1722	48.218	122.578	0	x		
	1901	48.270	122.571	A			
7/26/95	1958	48.332	122.585	B	x	x	North of central
	2056 (R)	48.336	122.521	A			E. Polnell Pt.
	0200 (R)	48.276	122.538	0	x	x	
7/30/95	0330 (R)	48.323	122.731	B			N. of Central
	0740	48.302	122.582	0	x	x	Crescent Hbr.
	0922	48.303	122.602	0	x		
8/3/95	1236	48.245	122.574	A			Strawberry Pt.
	1419	48.303	122.529	0	x	x	
8/8/95	1752	48.275	122.513	B			Long Point
	1933	NO LOCATION		Z			
	2114 (R)	48.153	122.624	0	x	x	
8/12/95	0153 (R)	50.352	125.398	B	x	x	*Nodales Channel*
		NO LOCATION		Z			*N. Vancouver Is.*

Appendix B. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
8/16/95	0248 (R)	50.312	122.549	0			Wakeman River
	0427 (R)	51.104	126.512	B			
	0632	NO LOCATION		Z			
	0809	51.086	126.504	1	x	x	
	0951	51.067	126.523	1	x		
8/20/95	1102	51.790	127.259	0			Rivers Inlet
	1357	NO LOCATION		Z			
	1536	51.742	127.421	1	x	x	
8/24/95	1534	51.797	127.277	A	x	x	*Rivers Inlet*
	1824	51.915	127.365	A	x		*(Chuckwalla River)*
	2002 (R)	51.865	127.180	A	x		
8/29/95	0307 (R)	53.047	128.418	A	x	x	*Graham Reach,*
	0449 (R)	53.076	128.373	A	x		*Tolme Channel*
9/2/95	0404 (R)	53.170	128.883	0	x	x	N. End Princess Royal
	0739	53.112	128.435	A			Island
	0917	53.109	128.326	B			
9/6/95	1033	NO LOCATION		Z			Graham Reach, Tolmie
	1314	53.082	128.405	0	x	x	Channel
	1454	53.067	128.338	B			
9/11/95	1751	NO LOCATION		Z			
	1935	53.101	128.350	1	x	x	Graham Reach, Tolmie Channel
9/15/95	0144 (R)	53.088	128.156	A			Graham Reach, Tolmie
	0326 (R)	53.108	128.373	0	x	x	Channel
9/19/95	0600	52.651	128.131	B			Finlayson Channel
	0730	52.739	128.260	B			(S. Princ. Royal Is.)
	0910	52.700	128.383	0	x	x	
	1048	NO LOCATION		Z			
	1231	52.682	128.089	0	x		
9/23/95	1331	51.777	127.829	2	x	x	Fitz Hugh Sound
		51.785	127.806	0			(Uganda Pt.)
		NO LOCATION		Z			
9/28/95	1923	51.782	127.795	0	x	x	Fitz Hugh Sound
	2103 (R)	51.760	127.790	0	x		(Uganda Pt.)
10/2/95	0625	48.558	122.820	0	x	x	Lopez Sound
	0825	48.548	122.816	0	x		
10/6/95	0438 (R)	48.170	122.081	0			Jim Creek, Arlington
	0618	48.112	122.061	B			(humpies spawning)
	0803	48.168	122.010	1	x	x	
	0939	48.230	122.275	0			(Lower Stillaguamish)
10/10/95	1206	48.008	122.038	0			S. Fk. Pilchuck Ck.
	1347	48.176	122.065	0			
	1426	48.106	122.037	1	x	x	

Appendix B. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
10/14/95	1605	NO LOCATION		Z			Inland, N. Polnell Pt.
	1634	NO LOCATION		Z			
	1814	48.289	122.554	0	x	x	
	1954	48.296	122.634	0	x		
	2135(R)	48.347	122.782	B			
10/19/95	0218(R)	48.318	122.541	2			Shoreline E. Polnell
	0359(R)	48.295	122.520	3	x	x	Pt.
10/23/95	0319(R)	48.291	122.517	0	x	x	Shoreline E. Polnell
	0458(R)	NO LOCATION		Z			Pt.
	0653	48.311	122.495	A			
	0831	48.319	122.650	0			(S. Oak Harbor)
10/27/95	0845	48.301	122.544	0			West of Oak Harbor
	1022	48.259	122.667	0			
	1224	48.278	122.679	3	x	x	
	1402	48.303	122.621	0			
10/31/95	1222	48.296	122.636	0	x	x	Crescent Hbr. Shore
	1401	48.338	122.493	0	x		West
	1403	48.390	122.394	B			
	1540	48.307	122.805	B			
	1603	48.270	122.503	A			
	1742	48.268	122.608	0	x		
11/5/95	1758	48.313	122.455	0	x	x	Skagit Bay
	1937	48.313	122.563	0	x		
	2119(R)	NO LOCATION		Z			
11/9/95	0233(R)	48.261	122.266	B	x	x	*Stanwood*
	0409(R)	NO LOCATION		Z			
11/13/95	0330(R)	48.313	122.584	2	x	x	Inland Crescent Hbr.
	0513	48.321	122.573	B			
	0632	48.313	122.556	0			
	0814	48.282	122.598	0			
11/17/95	0831	48.272	122.565	1	x	x	Polnell Point
	1005	48.318	122.552	B			
	1239	48.303	122.582	0			
	1418	48.302	122.559	1	x		(Inland Crescent Hbr.)
11/21/95	1433	48.301	122.592	0	x	x	Inland Crescent Hbr.
	1612	NO LOCATION		Z			
	1745	NO LOCATION		Z			
11/26/95	1838	48.308	122.480	B			*Skagit Bay*
	2020(R)	48.388	122.527	A	x	x	
11/30/95	0211(R)	48.314	122.554	0	x	x	West of Strawberry
	0348(R)	48.364	122.551	0	x		Point

Appendix B. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
12/4/95	0306(R)	48.321	122.590	1	x	x	N. of Crescent Harbor
	0443(R)	NO LOCATION		Z			
	0720	48.339	122.476	0			
	0859	48.269	122.503	0			
12/8/95	0730	48.315	122.590	A			Skagit Bay
	0906	48.279	122.475	0	x	x	
	1048	48.347	122.625	0	x		
	1210	48.312	122.552	0	x		
12/12/95	1127	48.259	122.606	0	x	x	Maylar Point
	1307	48.298	122.598	0	x		
	1449	48.228	122.734	B			
	1547	NO LOCATION		Z			
12/16/95	1406	48.299	122.636	B			Inland Crescent Hbr.
	1546	NO LOCATION		Z			
	1601	NO LOCATION		Z			
	1740	48.304	122.535	A			
	1923	48.302	122.602	0	x	x	

[a]Presumed night roost locations from 2000-0500 h are identified with (R).
[b]Location class accuracy-:3<150m; 2<350m; 1<1000m; 0>1000m (i.e. no more accurate than 1000 m); A (no accuracy); B (no accuracy); Z (invalidated location).
[c]Best location(s) on given date.
[d]Location used for location estimate; locations based on classes A and B are italicized.

Appendix B. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
12/4/95	0306 (R)	48.321	122.590	1	x	x	N. of Crescent Harbor
	0443 (R)	NO LOCATION		Z			
	0720	48.339	122.476	0			
	0859	48.269	122.503	0			
12/8/95	0730	48.315	122.590	A			Skagit Bay
	0906	48.279	122.475	0	x	x	
	1048	48.347	122.625	0	x		
	1210	48.312	122.552	0	x		
12/12/95	1127	48.259	122.606	0	x	x	Maylar Point
	1307	48.298	122.598	0	x		
	1449	48.228	122.734	B			
	1547	NO LOCATION		Z			
12/16/95	1406	48.299	122.636	B			Inland Crescent Hbr.
	1546	NO LOCATION		Z			
	1601	NO LOCATION		Z			
	1740	48.304	122.535	A			
	1923	48.302	122.602	0	x	x	

[a]Presumed night roost locations from 2000-0500 h are identified with (R).
[b]Location class accuracy-:3<150m; 2<350m; 1<1000m; 0>1000m (i.e. no more accurate than 1000 m); A (no accuracy); B (no accuracy); Z (invalidated location).
[c]Best location(s) on given date.
[d]Location used for location estimate; locations based on classes A and B are italicized.

Appendix A. Table 1. Eagle Location Record - 22170 (Polnell Point).

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
12/4/95	0445(R)	NO LOCATION		Z			North of Penn Cove
	0718	48.280	122.348	0			
	0858	48.260	122.652	1	x	x	
	1036	NO LOCATION		Z			
	1113	48.364	122.319	B			
12/8/95	1313	48.331	122.783	A			Penn Cove
	1449	48.235	122.682	1	x	x	
	1632	48.854	122.396	A			
12/12/95	1311	48.808	124.759	B			N. Penn Cove
	1451	48.169	122.769	A			
	1727	48.271	122.664	0	x	x	
	1908	48.225	122.636	A			
12/17/95	1923	48.372	122.513	A	x	x	*Skagit Bay*
	0039(R)	NO LOCATION		Z			
12/21/95	0142(R)	48.387	122.501	3	x	x	Swinomish Slough
	0325(R)	48.366	122.513	0			
12/25/95	0619	48.173	122.476	0	x	x	Camano Is., Cavalero
	0758	48.981	121.637	B			Bch.
	1049	48.280	122.281	0	x		(Stanwood)
12/29/95	0814	48.340	122.531	1	x	x	Ika Island
	1322	48.355	122.507	0			
	1508	48.367	122.457	0			
1/2/96	1422	48.364	122.508	0	x	x	Ika Island
	1633	NO LOCATION		Z			
	1812	48.339	122.449	A			
1/7/91	1646	48.179	122.697	0	x	x	Penn Cove
	1827	48.241	122.687	0	x		
1/11/96	0113(R)	48.230	122.508	B			Penn Cove
	0256(R)	48.240	122.683	0	x	x	
1/15/96	0209(R)	48.259	122.751	0			Penn Cove
	0352(R)	48.241	122.645	0			
	0532	48.326	122.662	B			
	0702	48.252	122.692	1	x	x	
1/19/96	0446(R)	NO LOCATION		Z			
	0716	48.146	122.637	A	x	x	Penn Cove
	0852	48.164	122.577	A	x		
1/23/96	0909	48.246	122.522	B			Polnell Point
	1217	48.300	122.535	0	x	x	
	1357	48.285	122.555	A			

Appendix A. Table 1. Cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
1/27/96	1313	48.339	122.503	0	x	x	Skagit Bay
	1453	48.166	122.513	0	x		
	1552	NO LOCATION		Z			
	1725	48.180	122.568	0	x		
	1906	48.164	122.495	0	x		
1/31/96	1553	48.164	122.677	0			Penn Cove
	1740	48.191	122.712	0			
	1919	48.206	122.699	1	x	x	
	2100(R)	48.701	122.832	0			(N. Shore Orcas Is.)
2/5/96	1934	48.185	122.621	A			
	0144(R)	48.197	122.702	1	x	x	Point Partridge
2/9/96	0103(R)	48.151	122.596	B			Marysville
	0241(R)	48.097	122.211	0	x	x	
	0425(R)	48.239	122.670	A			
	0621	48.234	122.987	B			
2/13/96	0629	48.194	122.491	B			Skagit Bay
	0810	48.271	122.482	1	x	x	
	0947	48.267	122.682	0			
	1012	48.373	122.686	A			
	1153	48.230	122.496	0			
2/17/96	1247	48.318	122.539	0	x	x	Skagit Bay
	1429	48.242	122.508	A			
	1629	48.290	122.488	B			
2/21/96	1526	48.277	122.549	A			Skagit Bay
	1643	48.333	122.548	0	x	x	
	1821	48.278	122.579	0	x		
	2004(R)	48.274	122.575	A			
2/26/96	0120(R)	48.287	122.625	0	x	x	Inland Crescent Hbr.
	0259(R)	48.267	122.526	0	x		
3/1/96	0034(R)	NO LOCATION		Z			Crescent Harbor Shore NW
	0215(R)	48.284	122.584	0	x	x	
	0355(R)	48.273	122.526	0	x		
	0519	48.279	122.588	B			
	0700	48.285	122.594	0			
3/5/96	0453(R)	NO LOCATION		Z			Crescent Harbor Shore NW
	0712	48.280	122.585	0	x	x	
	0854	48.304	122.488	0			
	1000	48.193	122.714	0			
	1100	48.317	122.349	0			
3/9/96	1222	48.308	122.557	0	x	x	Polnell Point
	1402	48.326	122.547	0	x		

Appendix A. Table 1. Cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
3/14/96	1726	48.197	122.645	1	x	x	Long Point
	1906	48.202	122.666	1	x	x	
	2048(R)	NO LOCATION		Z			
3/18/96	1920	48.145	121.814	A	x		*N. Oak Harbor*
	0051(R)	48.297	122.646	A	x	x	
3/22/96	0005(R)	NO LOCATION		Z			Penn Cove
	0146(R)	48.212	122.721	0	x	x	
	0328(R)	48.194	122.651	A			
	0600	48.211	122.854	0	x		
	0737	NO LOCATION		Z			
3/27/96	0614	48.404	122.618	A			Skagit Bay
	0754	48.344	122.553	0	x	x	
	0929	48.368	122.522	B			
	1059	48.401	122.978	A			

[a]Presumed night roost locations from 2000-0500 h are identified with (R).
[b]Location class accuracy-:3<150m; 2<350m; 1<1000m; 0>1000m (i.e. no more accurate than 1000 m); A (no accuracy); B (no accuracy); Z (invalidated location).
[c]Best location(s) on given date.
[d]Location used for location estimate; locations based on classes A and B are italicized.

Appendix A. Table 2. Eagle Location Record - 22171 (Crescent Harbor).

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
12/4/95	0306(R)	48.321	122.590	1	x	x	N. of Crescent Harbor
	0443(R)	NO LOCATION		Z			
	0720	48.339	122.476	0			
	0859	48.269	122.503	0			
12/8/95	0730	48.315	122.590	A			Skagit Bay
	0906	48.279	122.475	0	x	x	
	1048	48.347	122.625	0	x		
	1210	48.312	122.552	0	x		
12/12/95	1127	48.259	122.606	0	x	x	Maylar Point
	1307	48.298	122.598	0	x		
	1449	48.228	122.734	B			
	1547	NO LOCATION		Z			
12/16/95	1406	48.299	122.636	B			Inland Crescent Hbr.
	1546	NO LOCATION		Z			
	1601	NO LOCATION		Z			
	1740	48.304	122.535	A			
	1923	48.302	122.602	0	x	x	
12/21/95	1758	48.141	122.680	0	x	x	Keystone
	1932	48.298	122.613	0	x		(Crescent Hbr. Shore W.)
12/25/95	0058(R)	48.402	122.568	A			Inland Crescent Hbr.
	0239(R)	NO LOCATION		Z			
	0416(R)	48.324	122.575	0	x	x	
12/29/95	0152(R)	48.346	122.790	A			Inland Crescent Hbr.
	0335(R)	48.316	122.603	0	x	x	
	0515	48.315	122.609	0	x		
	0628	NO LOCATION		Z			
	0812	48.312	122.605	B			
1/2/96	0646	48.305	122.540	0			Crescent Hbr. Shore
	0826	48.287	122.566	1	x	x	
	1006	NO LOCATION		Z			
	1101	48.168	122.641	0			
	1241	48.318	122.559	0			
1/6/96	1200	48.312	122.673	0	x	x	Inland Crescent Hbr.
	1340	48.282	122.521	0	x		
	1518	NO LOCATION		Z			
	1642	48.293	122.530	0	x		
1/10/96	1436	48.263	122.132	A			Skagit Bay
	1658	48.241	122.383	0	x	x	
	1838	48.292	122.613	0	x		
	2020(R)	48.405	122.664	A			
1/15/96	1711	48.311	122.540	0			Crescent Hbr. Shore W.
	1853	48.292	122.658	1	x	x	
	2033	48.205	122.322	B			

Appendix A. Table 2. Cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
1/19/96	0130(R)	48.297	122.562	1	x	x	Crescent Hbr. Shore
	0330(R)	48.311	122.549	0			
1/23/96	0227(R)	48.285	122.493	0	x	x	Shore S. Strawberry
	0407(R)	48.264	122.592	0	x		Pt.
	0546	48.324	122.554	B			
1/27/96	0325(R)	48.360	122.666	1	x	x	N. Rocky Pt.
	0505	NO LOCATION		Z			
	0559	48.299	122.632	B			
	0741	48.267	122.426	0			
	0919	48.290	122.427	0			
1/31/96	0615	48.124	123.008	A			Maylar Point
	0754	NO LOCATION		Z			
	0931	48.254	122.627	1	x	x	
	1050	NO LOCATION		Z			
	1226	48.174	124.513	B			
2/4/96	0942	47.663	121.669	B			Skagit Bay
	1143	48.333	122.516	A	x	x	
	1328	NO LOCATION		Z			
2/8/96	1245	48.285	122.588	0			Strawberry Point
	1428	48.300	122.528	1	x	x	
	1607	NO LOCATION		Z			
	1624	48.273	122.578	0			
	1800	48.199	122.357	B			
2/13/96	1640	48.297	122.587	0	x	x	Inland Crescent Hbr.
	1820	48.286	122.664	0	x		
	2000(R)	48.323	122.500	0	x		
2/17/96	0114(R)	48.317	122.642	1			Inland Crescent Hbr.
	0255(R)	48.312	122.598	2	x	x	
	0436(R)	48.226	122.501	B			
2/21/96	0212(R)	48.303	122.597	A			Inland Crescent Hbr.
	0353(R)	48.314	122.543	0			
	0534	48.113	122.777	A			
	0658	48.297	122.582	0			
	0838	48.280	122.557	3	x	x	
2/25/96	0709	48.307	122.576	3	x	x	Inland Crescent Hbr.
	0846	48.326	122.543	0			
	1026	NO LOCATION		Z			
	1121	48.292	122.560	B			
	1302	48.374	122.474	A			

Appendix A. Table 2. Cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
2/29/92	1048	NO LOCATION		Z			N. Strawberry Point
	1215	48.320	122.524	0	x	x	
	1357	48.278	122.535	0	x		
	1530	NO LOCATION		Z			
	1542	48.318	122.611	A			
3/4/96	1457	48.354	122.517	0			Crescent Harbor
	1718	48.292	122.565	1	x	x	Shore NE
	1901	48.306	122.568	1			
3/9/96	1915	48.305	122.548	0	x	x	Polnell Point
	2055(R)	48.132	122.611	A			
	0051(R)	48.355	122.560	B			
3/13/96	0146(R)	48.308	122.586	0	x	x	Polnell Point
	0326(R)	48.312	122.573	0	x		
	0507	48.247	122.585	0	x		
3/17/96	0244(R)	NO LOCATION		Z			N. Strawberry Pt.
	0425(R)	48.327	122.503	1	x	x	
	0602	NO LOCATION		Z			
	0613	48.387	122.506	0			
	0753	48.282	122.559	0			
	0928	48.334	122.629	0			
3/21/96	0621	NO LOCATION		Z			Polnell Point
	0804	48.284	122.537	0	x	x	
	0942	48.265	122.280	0	x		
	1329	48.327	122.504	A			
3/25/96	1106	48.236	122.517	B			Maple Grove
	1248	48.308	122.560	0	x	x	
	1431	48.212	122.908	0	x		

[a]Presumed night roost locations from 2000-0500 h are identified with (R).
[b]Location class accuracy-:3<150m; 2<350m; 1<1000m; 0>1000m (i.e. no more accurate than 1000 m); A (no accuracy); B (no accuracy); Z (invalidated location).
[c]Best location(s) on given date.
[d]Location used for location estimate; locations based on classes A and B are italicized.

Appendix A. Eagle Location Record - 22170

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
3/14/96	1726	48.197	122.645	1	x	x	Long Point
	1906	48.202	122.666	1	x	x	
	2048(R)	NO LOCATION		Z			
3/18/96	1920	48.145	121.814	A	x		*N. Oak Harbor*
	0051(R)	48.297	122.646	A	x	x	
3/22/96	0005(R)	NO LOCATION		Z			Penn Cove
	0146(R)	48.212	122.721	0	x	x	
	0328(R)	48.194	122.651	A			
	0600	48.211	122.854	0	x		
	0737	NO LOCATION		Z			
3/27/96	0614	48.404	122.618	A			Skagit Bay
	0754	48.344	122.553	0	x	x	
	0929	48.368	122.522	B			
	1059	48.401	122.978	A			
3/30/96	0947	48.291	122.642	B			Maple Grove
	1151	48.235	122.669	A			
	1334	48.182	122.558	0	x	x	
	1516	48.181	122.551	0	x		
4/3/96	1432	48.110	122.461	B			Greenbank
	1625	48.369	122.458	A			
	1805	NO LOCATION		Z			
	1947	48.058	122.539	0	x	x	
4/8/96	2111(R)	48.200	122.661	2	x	x	Penn Cove
	0305(R)	48.208	122.601	0			
4/12/96	Argos computer problems						
4/16/96	0615	48.281	122.756	B			*Skagit Bay*
	0758	48.396	122.511	A	x	x	
	0937	NO LOCATION		Z			
	1128	48.817	121.871	B			
4/20/96	1408	48.282	122.591	0	x	x	Crescent Hbr. Shoreline
	1550	48.309	122.554	A			
4/24/96	1510	NO LOCATION		Z			Lake Goodwin
	1645	NO LOCATION		Z			
	1851	48.139	122.353	B			
	1949	48.147	122.296	1	x	x	
4/29/96	2003(R)	48.096	123.023	0	x	x	Sequim
	2144(R)	NO LOCATION		Z			
5/3/96	0151(R)	NO LOCATION		Z			Skagit Bay
	0335(R)	48.403	122.588	0	x	x	
	0515	48.380	122.722	0	x		

Appendix A. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
5/7/96	0433(R)	48.307	122.549	3	x	x	Inland Crescent Harbor
	0613	48.270	122.573	B			
	0657	48.358	122.598	A			
	0838	NO LOCATION		Z			
5/11/96	0712	48.325	122.672	1	x	x	N. Oak Harbor
	0851	48.274	122.708	0			
	1027	NO LOCATION		Z			
	1200	NO LOCATION		Z			
	1339	48.297	122.589	1	x	x	Inland Crescent Harbor
5/16/96	1849	48.103	122.501	B	x	x	*N. Camano*
5/20/96	1720	NO LOCATION		Z			Strawberry Point
	1904	48.318	122.495	0	x	x	
5/24/96	0345(R)	48.650	122.849	2	x	x	Eastsound, Orcas Island
5/28/96	0406(R)	52.545	122.966	0	x	x	Fraser River, Pr. Geo.
6/10/96	1806	56.333	124.170	A			
	1809	56.362	123.966	B			
	1949	56.271	124.319	1	x	x	Williston Lake
	2129	56.411	124.183	A			
6/14/96	0239(R)	55.067	125.290	0	x	x	Takla Lake
	0421(R)	55.079	125.483	0	x		
6/18/96	0337(R)	55.056	125.342	0	x	x	Takla Lake
	0517	55.063	125.274	B			
	0639	NO LOCATION		Z			
	0822	55.063	125.288	0	x		
6/22/96	0835	55.578	125.139	0	x	x	Kwanika Creek
	1015	55.546	125.197	A			
	1152	NO LOCATION		Z			
	1245	55.270	125.703	A			

[a]Presumed night roost locations from 2000-0500 h are identified with (R).
[b]Location class accuracy-:3<150m; 2<350m; 1<1000m; 0>1000m (i.e. no more accurate than 1000 m); A (no accuracy); B (no accuracy); Z (invalidated location).
[c]Best location(s) on given date.
[d]Location used for location estimate; locations based on classes A and B are italicized.

Appendix B. Eagle Location Record - 22171

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
2/29/92	1048	NO LOCATION		Z			N. Strawberry Point
	1215	48.320	122.524	0	x	x	
	1357	48.278	122.535	0	x		
	1530	NO LOCATION		Z			
	1542	48.318	122.611	A			
3/4/96	1457	48.354	122.517	0			Crescent Harbor
	1718	48.292	122.565	1	x	x	Shore NE
	1901	48.306	122.568	1			
3/9/96	1915	48.305	122.548	0	x	x	Polnell Point
	2055(R)	48.132	122.611	A			
	0051(R)	48.355	122.560	B			
3/13/96	0146(R)	48.308	122.586	0	x	x	Polnell Point
	0326(R)	48.312	122.573	0	x		
	0507	48.247	122.585	0	x		
3/17/96	0244(R)	NO LOCATION		Z			N. Strawberry Pt.
	0425(R)	48.327	122.503	1	x	x	
	0602	NO LOCATION		Z			
	0613	48.387	122.506	0			
	0753	48.282	122.559	0			
	0928	48.334	122.629	0			
3/21/96	0621	NO LOCATION		Z			Polnell Point
	0804	48.284	122.537	0	x	x	
	0942	48.265	122.280	0	x		
	1329	48.327	122.504	A			
3/25/96	1106	48.236	122.517	B			Maple Grove
	1248	48.308	122.560	0	x	x	
	1431	48.212	122.908	0	x		
3/30/96	1631	48.307	122.586	B			N. Oak Harbor
	1813	48.325	122.623	0	x	x	
4/3/96	1828	48.325	122.552	0	x	x	N. Polnell Point
	2009(R)	48.409	122.539	0	x		
	0119(R)	48.049	122.722	A			
4/7/96	0318(R)	48.278	122.560	0			
	0455(R)	48.316	122.560	2	x	x	N. Polnell Point
	0635	NO LOCATION		Z			
4/11/96	0412(R)	48.249	122.111	B			
	0554	48.329	122.539	A			
	0627	NO LOCATION		Z			
	0807	48.300	122.559	2	x	x	N. Polnell Point
	0944	48.310	122.736	0			
	1124	NO LOCATION		Z			
4/15/96	1001	48.267	122.526	3	x	x	Polnell Point
	1321	48.303	122.545	0			
	1459	48.267	122.410	A			

Appendix B. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
4/20/96	1817	48.299	122.582	1	x	x	Inland Crescent Hbr.
	1957	48.312	122.541	0			
4/24/96	1826	48.295	122.720	A			Smith Island
	2014(R)	48.332	122.873	0	x	x	
4/28/96	0249(R)	48.327	122.565	1	x	x	Inland Crescent Hbr.
	0430(R)	48.277	122.534	1	x		
5/2/96	0344(R)	48.126	121.747	0			Maple Grove
	0528	48.155	122.527	A			
	0707	48.213	122.543	0	x	x	
	0846	NO LOCATION		Z			
5/6/96	0722	48.358	122.587	0			Inland Crescent Hbr.
	0900	48.292	122.481	2	x	x	
	1042	48.290	122.566	0			
	1255	NO LOCATION		Z			
5/10/96	1055	48.314	122.516	B			Inland Crescent Hbr.
	1350	48.296	122.554	0	x	x	
	1535	48.316	122.435	A			
5/15/96	1736	NO LOCATION		Z			
	1916	48.340	122.468	0	x	x	Skagit Bay
	2048(R)	NO LOCATION		Z			
5/19/96	1924	48.337	122.316	0	x	x	Skagit Bay
	2104(R)	48.302	122.318	B			
	0222(R)	48.236	122.586	0	x		
5/23/96	0140(R)	NO LOCATION		Z			Inland Crescent Hbr.
	0320(R)	48.309	122.575	1	x	x	
	0500(R)	48.298	122.541	A			
	0638	NO LOCATION		Z			
5/27/96	0419(R)	NO LOCATION		Z			Inland Crescent Hbr.
	0622	NO LOCATION		Z			
	0804	48.329	122.554	1	x	x	
	0942	48.292	122.567	A			
	1023	48.275	122.438	B			
5/31/96	0958	48.487	122.816	A			Inland Crescent Hbr.
	1322	48.295	122.559	0	x	x	
	1504	48.356	122.561	A			
	1621	NO LOCATION		Z			
6/4/96	1637	48.474	122.474	B			Shoreline, NW Cres.Hbr.
	1814	48.299	122.591	0	x	x	
	1952	48.307	122.607	0	x		

Appendix B. cont'd.

Date	Time[a] (PST)	Lat (N)	Long (W)	LC[b]	Best[c]	Cal[d]	Description
6/9/96	0150(R)	48.225	122.810	B			San Juan Island
	0334(R)	48.433	123.157	0	x	x	
	0412(R)	48.324	122.757	B			
6/13/96	0433(R)	48.298	122.742	A	x	x	*West Beach*
6/17/96	1339	48.336	122.529	A			Inland Crescent Hbr.
	1519	48.324	122.600	2	x	x	
6/22/96	1704	48.279	122.393	A	x	x	*Skagit Bay*
	1843	48.343	122.594	A	x		
	20^4(R)	48.336	122.545				

[a]Presumed night roost locations from 2000-0500 h are identified with (R).
[b]Location class accuracy-:3<150m; 2<350m; 1<1000m; 0>1000m (i.e. no more accurate than 1000 m); A (no accuracy); B (no accuracy); Z (invalidated location).
[c]Best location(s) on given date.
[d]Location used for location estimate; locations based on classes A and B are italicized.

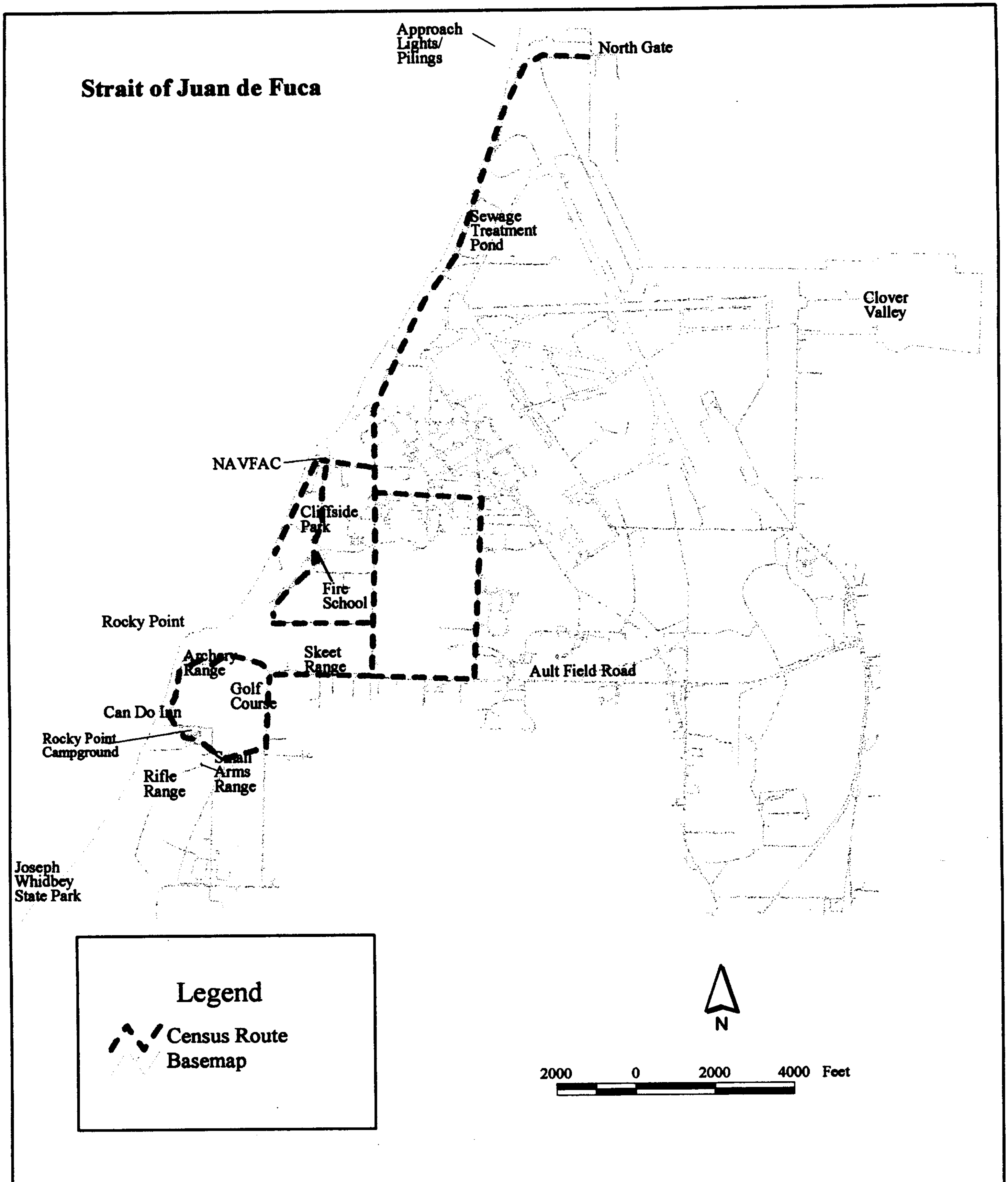


Figure 3-1. Map of Ault Field bald eagle census route.

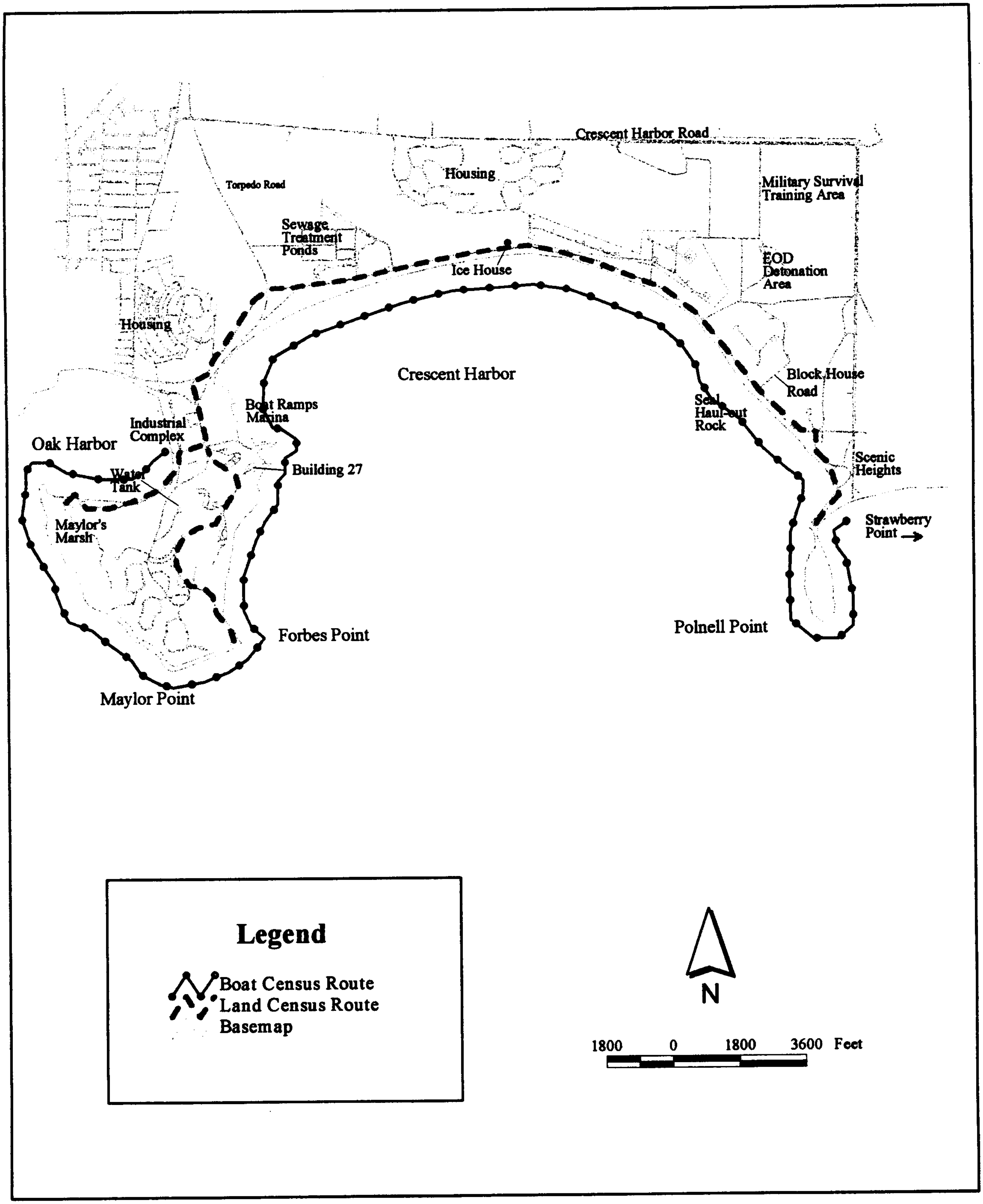


Figure 3-2. Map of the Seaplane Base bald eagle census route

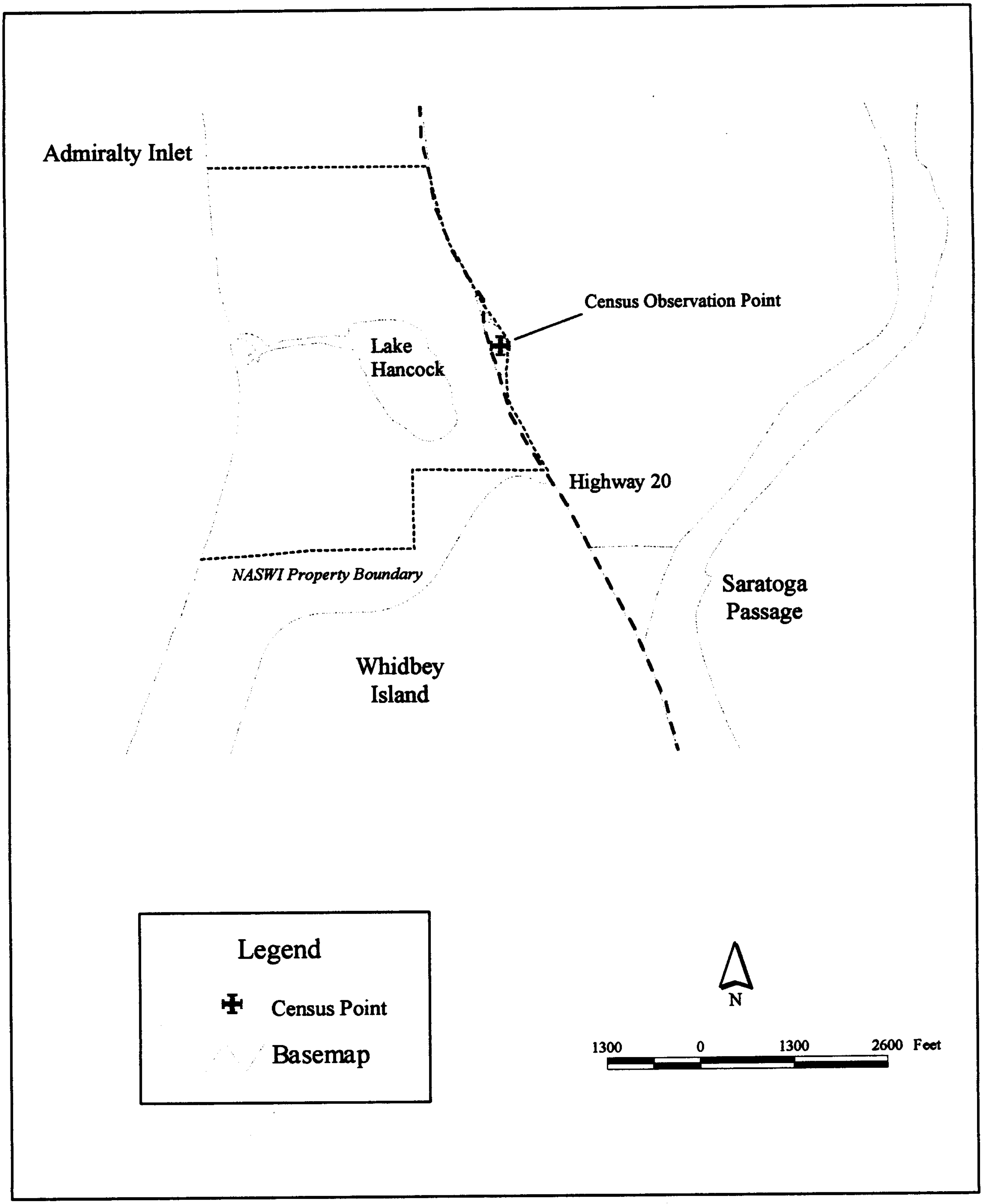


Figure 3-3. Map of Lake Hancock bald eagle census route.

Table 4-1. Territory occupancy and productivity history of the three breeding bald eagle pairs on NASWI.

	Polnell Point		Rocky Point		Forbes Point	
Year	Occupied[1]	No. Fledglings	Occupied	No. Fledglings	Occupied	No. Fledglings
1996	Yes	0	Yes	0	Yes	0
1995	Yes	0	Yes	0	No	
1994	Yes	2	No data	N/A	No	
1993	Yes	0	Yes	1	No	
1992	Yes	0	Yes	1	No	
1991	Yes	2	Yes	0	No	
1990	Yes	0	Yes	2	No	
1989	No	N/A	Yes	1	No	
1988	Yes	2	No		No	
1987	Yes	2	No		No	
1986	Yes	0	No		No	
1985	Yes	1	No		No	
1984	Yes	0	No		No	
1983	Yes	0	No		No	
1982	Yes	2	No		No	
1981	Yes	1	No		No	
1980	Yes	2	No		No	
1979	No data	N/A	No		No	
1978	No data	N/A	No		No	
1977	No data	N/A	No		No	
1976	No data	N/A	No		No	
1975	Yes	1	No		No	
1974	Yes	1	No		No	

[1] Male and female of pair are present on territory.
Source: NASWI and WDFW unpublished data.

occupied territory (USFWS 1986) and is moderate compared to bald eagle productivity reported for other regions of the United States (Stalmaster 1987). The productivity of the Rocky Point pair is slightly lower, with 5 fledglings in 6 years in which its status was known (0.83 young per year). Neither territory has had more than 2 consecutive years in which no fledglings were produced. The newly established Forbes Point territory did not produce young in 1996.

4.1.1.2 Mortality

There are many natural and human-related causes of eagle mortality. Human-caused mortality factors with significant effects on bald eagle populations include power transmission line electrocution, shooting, pesticide poisoning, and nest failure and eagles/census in September to a high of 3.4 eagles/census in November (Table 4-2; Appendix D). The number of eagles observed at Ault Field varied most during the fall and winter months, most likely due to non-resident eagles moving into and out of the area in search of prey (Figure 4-1). The number of eagles observed was most constant and slightly lower during the April to September period, when eagles were defending their nesting territories from other eagles and transient eagle populations are lower in the Puget Sound region (Table 4-2; Figure 4-1). Overall, an average of 2.4 ± 1.6 (mean ± standard deviation) eagles was recorded during the breeding season (1 February to 31 August), while an average of 3.0 ± 1.2 eagles was recorded during the non-breeding season (1 September to 31 January). These means are not significantly different ($0.10 \leq P[t_{0.05(2), 101} \geq 1.338] \leq 0.20$ [Zar 1984]). The number of eagles observed at Ault Field generally fluctuated between one and five, with three being the most common number of eagles observed (33 of 103 censuses) (Figure 4-2). Although this study did not calculate a statistically derived population estimate, Ault Field is likely used consistently by one pair of breeding eagles; several other individuals use the area on a somewhat less regular basis. The largest number of eagles observed during a given census was 9 on February 7, 1995; this peak count was not reached on any other day; the number of eagles detected generally fluctuated between 1 and 5 birds. There were only 4 censuses at Ault Field during which no eagles were observed (all in the winter months), indicating nearly constant use of the area (Figure 4-2).

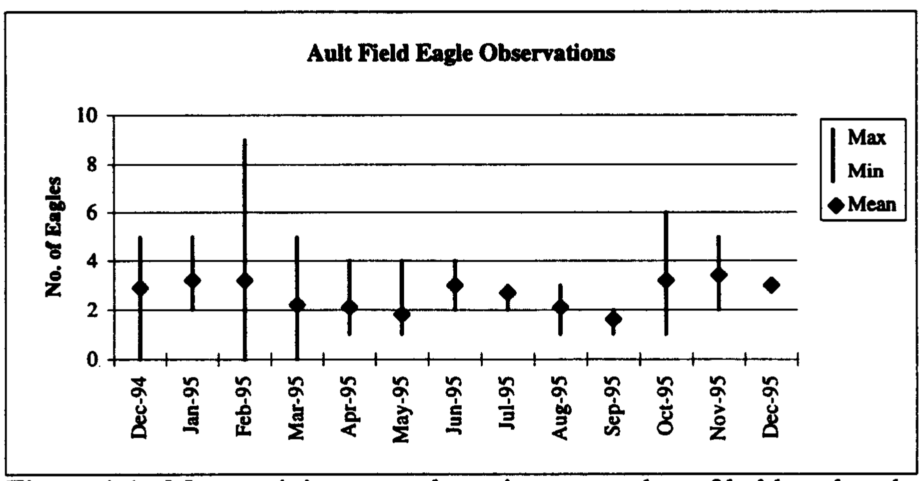


Figure 4-1. Mean, minimum, and maximum number of bald eagles observed per census each month at Ault Field.

Table 4-2. Results of general bald eagle censuses for NASWI, December 1994 - December 1995.

Census Statistics	Winter				*Winter*	Spring			*Spring*	Summer			*Summer*	Fall			*Fall*	TOTAL
	Dec-94	Jan-95	Feb-95	Mar-95	*Subtotal*	Apr-95	May-95	Jun-95	*Subtotal*	Jul-95	Aug-95	Sep-95	*Subtotal*	Oct-95	Nov-95	Dec-95	*Subtotal*	
AULT FIELD																		
No. of Censuses	8	12	11	13	***44***	12	6	8	***26***	3	7	5	***15***	9	8	1	***18***	**103**
No. of Eagles Observed	23	38	35	28	***124***	25	11	24	***60***	8	15	8	***31***	29	27	3	***59***	**274**
Mean No. of Eagles Observed/Census	2.9	3.2	3.2	2.2	***2.8***	2.1	1.8	3.0	***2.3***	2.7	2.1	1.6	***2.1***	3.2	3.4	-	***3.3***	**2.7**
Standard Deviation	1.6	0.8	2.7	1.5	***1.8***	1.1	1.2	0.8	***1.1***	0.6	0.9	0.5	***0.8***	1.4	1.2	-	***1.2***	**1.5**
Median	3.0	3.0	3.0	2.0	***3.0***	2.0	1.5	3.0	***2.0***	3.0	2.0	2.0	***2.0***	3.0	3.0	3.0	***3.0***	**3.0**
Minimum No. Observed during Single Census	0	2	0	0	***0***	1	1	2	***1***	2	1	1	***1***	1	2	3	***1***	**0**
Maximum No. Observed during Single Census	5	5	9	5	***9***	4	4	4	***4***	3	3	2	***3***	6	5	3	***6***	**9**
SEAPLANE BASE																		
No. of Censuses	9	9	11	7	***36***	8	6	5	***19***	7	8	6	***21***	4	5	1	***10***	**86**
No. of Eagles Observed	36	43	70	77	***226***	53	47	28	***128***	32	20	8	***60***	13	21	3	***37***	**451**
Mean No. of Eagles Observed/Census	4.0	4.8	6.4	11.0	***6.1***	6.6	7.8	5.6	***6.7***	4.6	2.5	1.3	***2.9***	3.3	4.2	-	***3.7***	**5.2**
Standard Deviation	2.2	2.9	2.7	4.5	***3.9***	4.7	3.7	0.9	***3.7***	2.2	1.3	0.8	***2.0***	1.5	1.6	-	***1.5***	**3.6**
Median	4.0	4.0	6.0	9.0	***5.5***	7.0	6.5	5.0	***6.0***	5.0	2.0	1.5	***2.0***	3.0	4.0	3.0	***3.5***	**5.0**
Minimum No. Observed during Single Census	1	1	3	7	***1***	1	5	5	***1***	1	1	0	***0***	2	2	3	***2***	**0**
Maximum No. Observed during Single Census	8	9	12	18	***18***	16	15	7	***16***	8	4	2	***8***	5	7	3	***7***	**18**
LAKE HANCOCK																		
No. of Censuses	2	7	6	5	***21***	6	2	1	***9***	0	0	2	***2***	2	5	1	***8***	**40**
No. of Eagles Observed	5	30	11	17	***63***	16	3	5	***24***	-	-	2	***2***	3	12	1	***16***	**105**
Mean No. of Eagles Observed/Census	2.5	4.3	1.8	2.8	***3.0***	2.7	1.5	5.0	***2.7***	-	-	1.0	***1.0***	1.5	2.4	1.0	***2.0***	**2.6**
Standard Deviation	3.5	1.7	0.8	1.7	***1.8***	0.8	0.7	-	***1.2***	-	-	0.0	***0.0***	0.7	0.9	-	***0.9***	**1.6**
Median	2.5	4.0	2.0	3.0	***3.0***	2.5	1.5	5.0	***2.0***	-	-	1.0	***1.0***	1.5	2.0	1.0	***2.0***	**2.0**
Minimum No. Observed during Single Census	0	2	1	0	***0***	2	1	5	***1***	-	-	1	***1***	1	2	1	***1***	**0**
Maximum No. Observed during Single Census	5	7	3	5	***7***	4	2	5	***5***	-	-	1	***1***	2	4	1	***4***	**7**

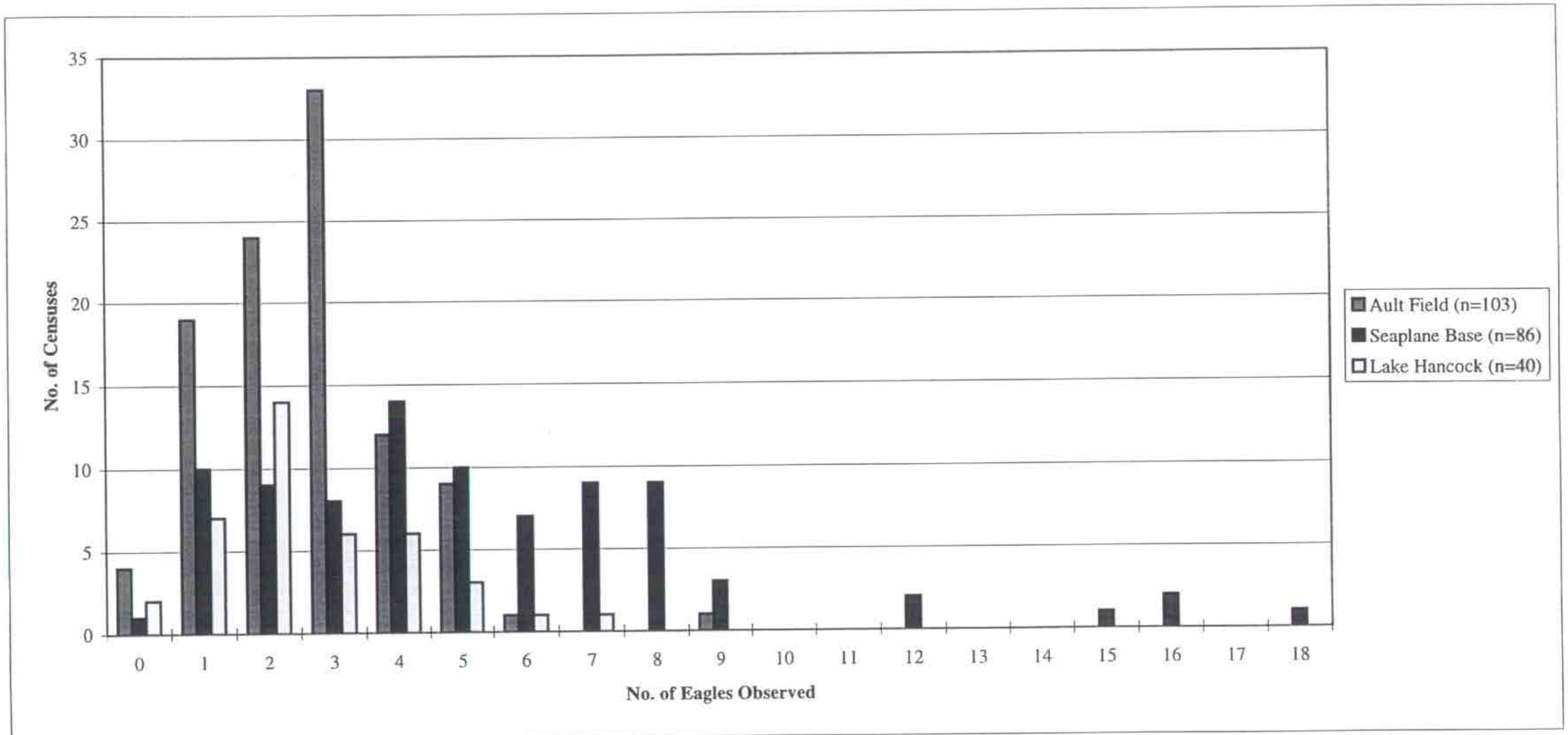


Figure 4-2. Frequency histogram of bald eagle observations during general censuses at NASWI, December 1994 through December 1995.

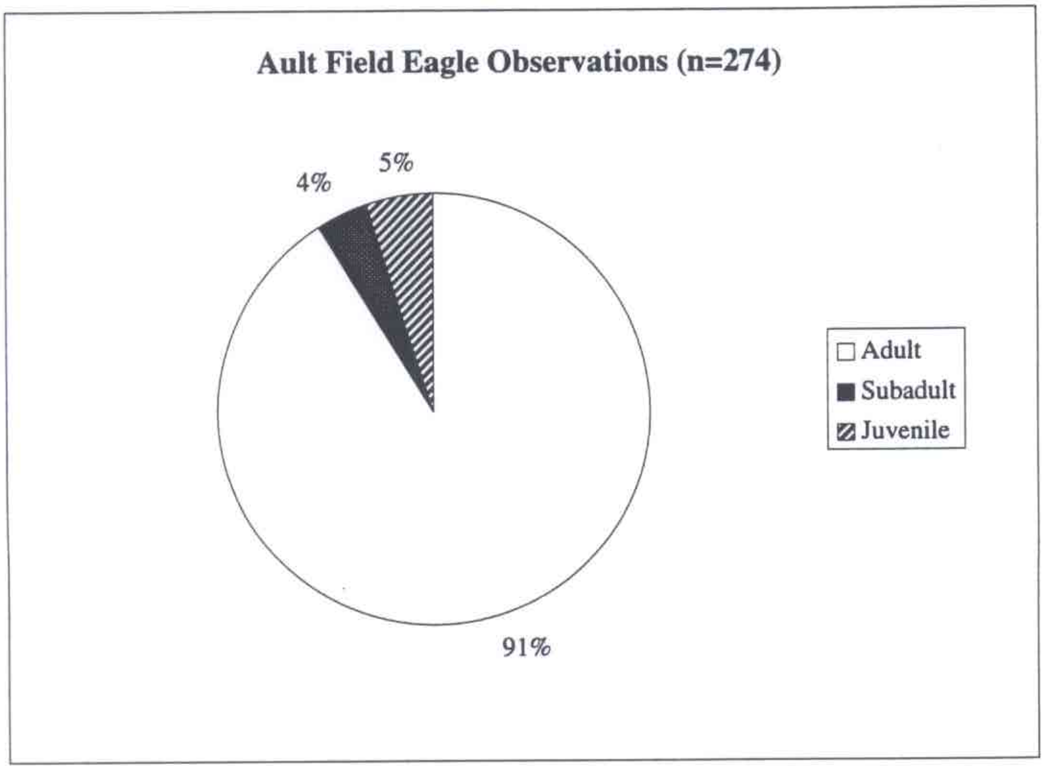


Figure 4-3. Age distribution of eagles observed during general censuses at Ault Field.

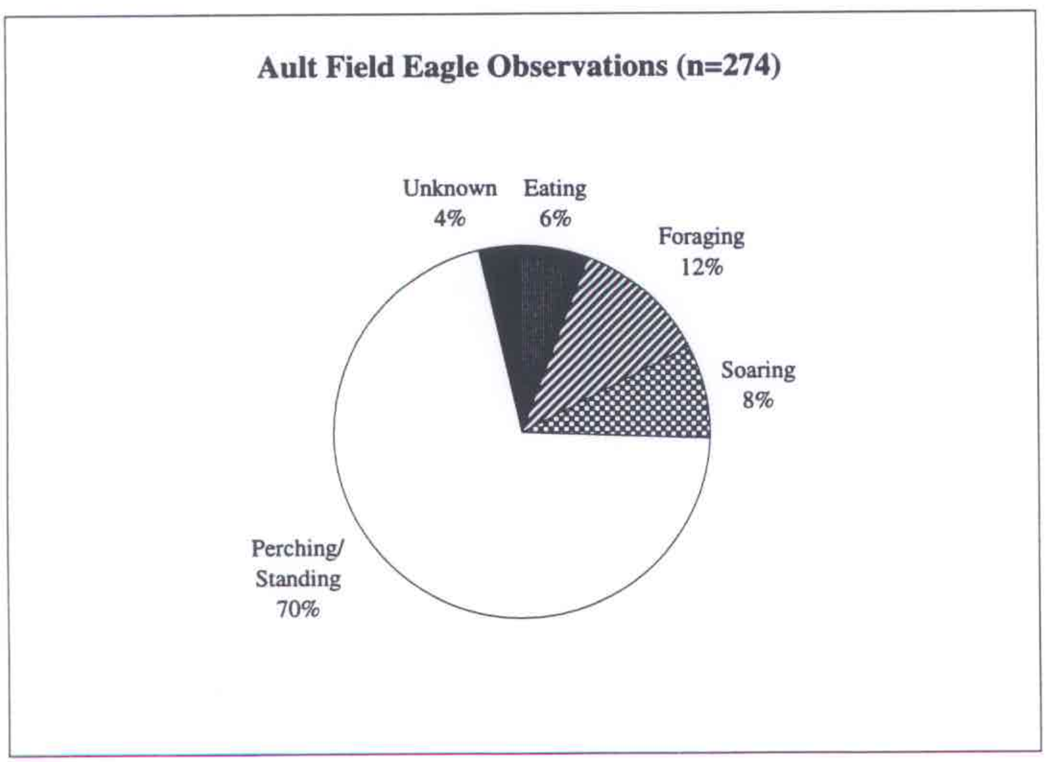


Figure 4-4. Bald eagle behaviors first observed during general censuses at Ault Field.

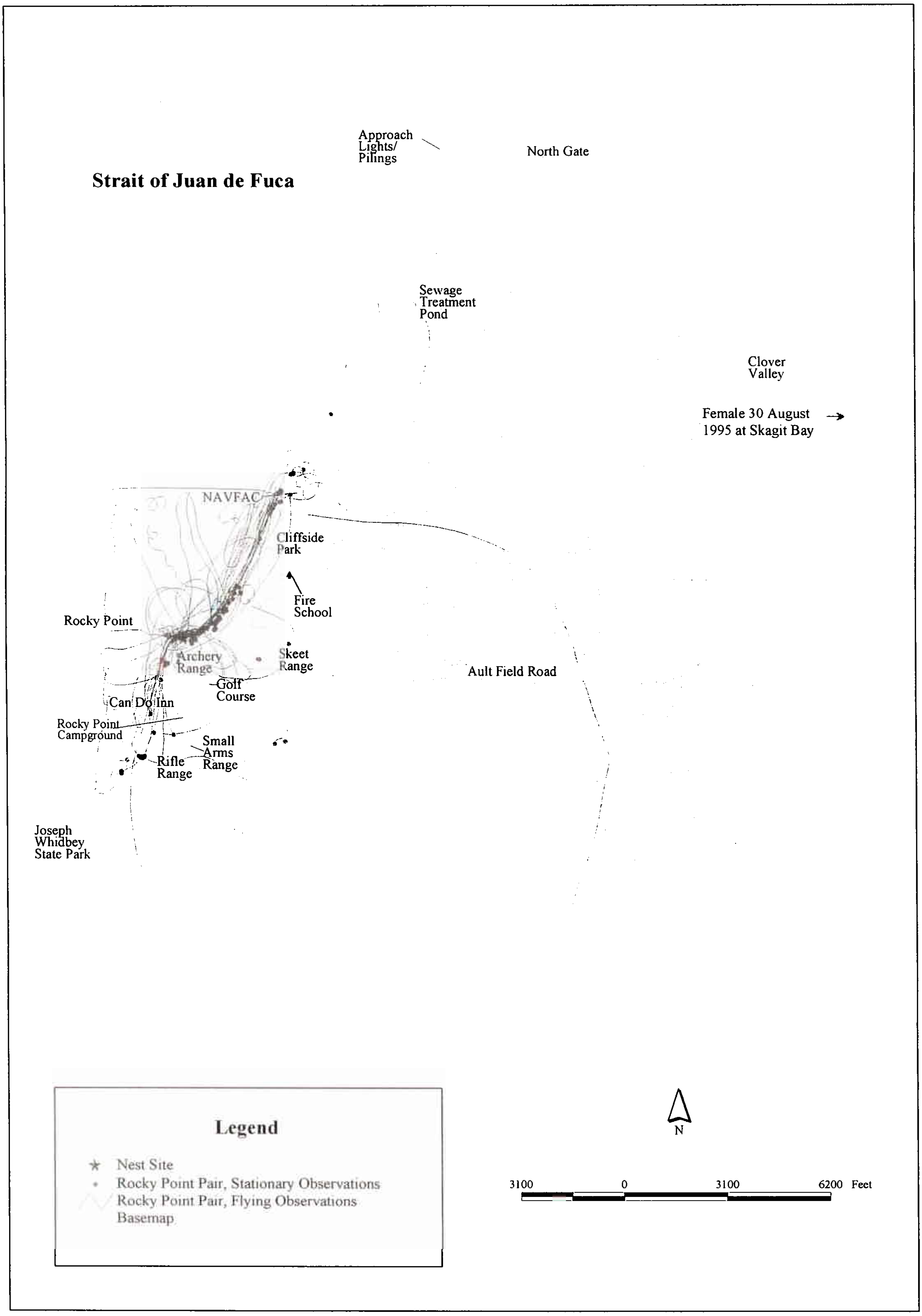


Figure 4-6. Observations of the Rocky Point bald eagle pair during the 1995 breeding season monitoring (1 March through 31 August 1995).

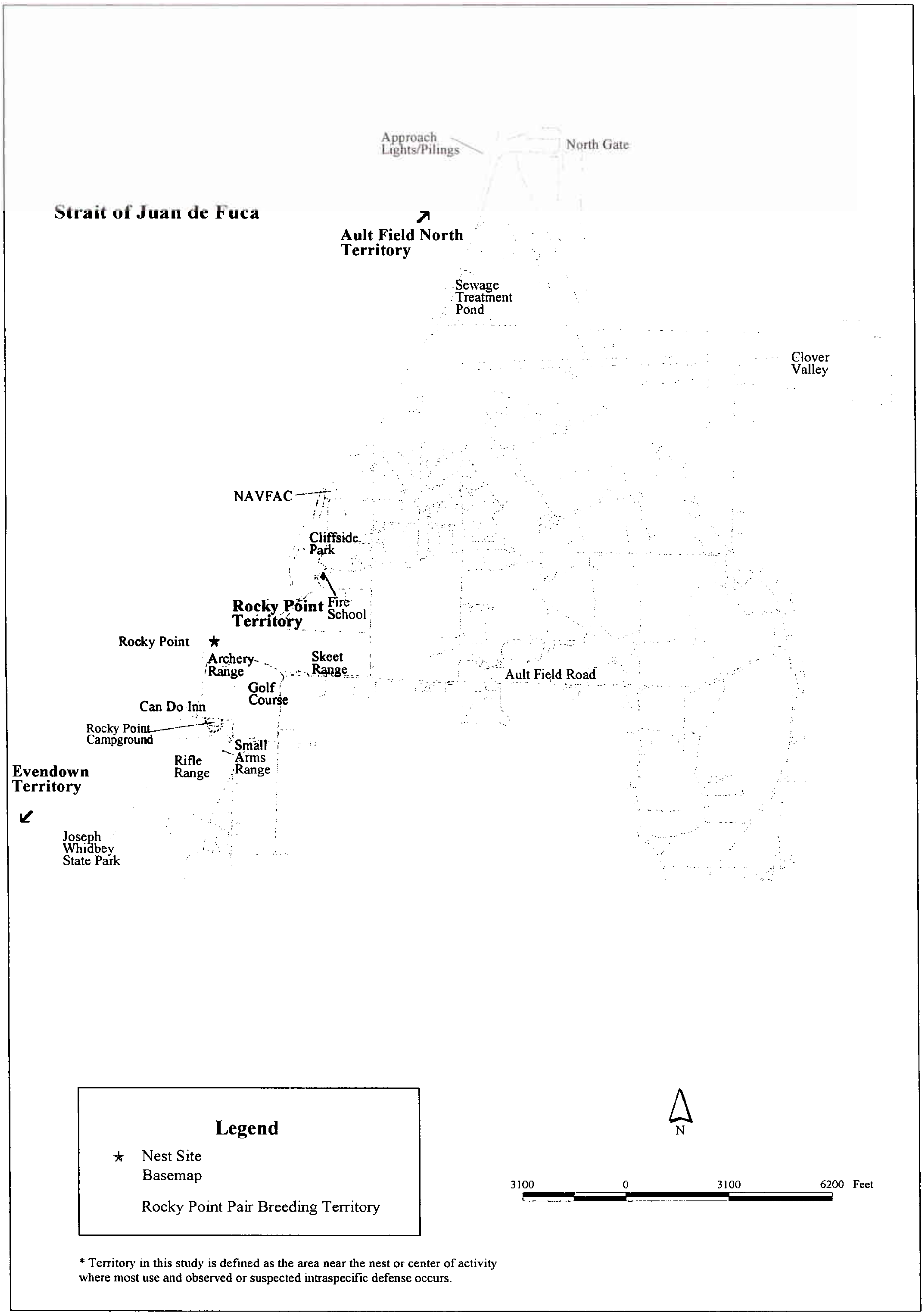


Figure 4-7. Approximate territory boundary* of the Rocky Point Pair during the 1995 breeding season monitoring (1 March to 31 August 1995).

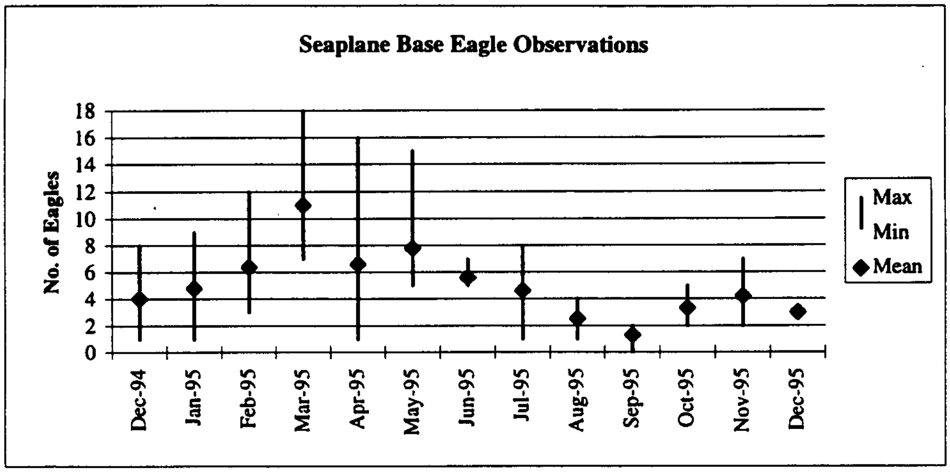


Figure 4-8. Mean, minimum, and maximum number of bald eagles observed per census each month at the Seaplane Base.

Of 451 bald eagle observations at the Seaplane Base, approximately 81 percent were of adults, indicating that the territorial pairs on and near the Seaplane Base likely use the area the most (Figure 4-9). The proportion of subadults was greatest during the winter and spring, when 21 percent of 360 observations were of subadults and juveniles; only 5 percent of eagle observations were of subadults and juveniles during the summer and fall. The peak subadult/juvenile population coincided with the overall peak on 18 March when 12 of the 18 eagles (67 percent) present were subadults (Appendix D).

Most (77 percent) of the eagles were observed during general censuses either perching or standing. Soaring, foraging (attempting to catch prey), and eating (ingesting a prey item) behaviors were also observed (Figure 4-10).

Distribution

The general censuses indicated that bald eagles use large portions of the Seaplane Base shoreline and selected inland sites (Figure 4-11). Use was especially heavy (104 observations [25 percent]) at Polnell Point where the Polnell Point pair nests, Forbes Point (67 observations [16 percent]) (note: as many as nine eagles were observed perched on Forbes Point at one time during censuses conducted in February-March 1996), the eastern half of Crescent Harbor (58 observations) and trees adjacent to Building 27 and east to the industrial complex (42 observations at each site). There were approximately 28 observations of eagles perching or foraging in the Maylor's Marsh/Maylor Point area. A total of 33 observations were recorded between the boat ramp and the sewage treatment ponds. The forested region near the water tank was also used regularly by perching eagles (19 eagle observations). Eagles were observed perching and/or roosting on at least eight occasions in the forested area in the eastern portion of the Seaplane Base (military survival training area). Only one of the eight observations in the military survival training area was

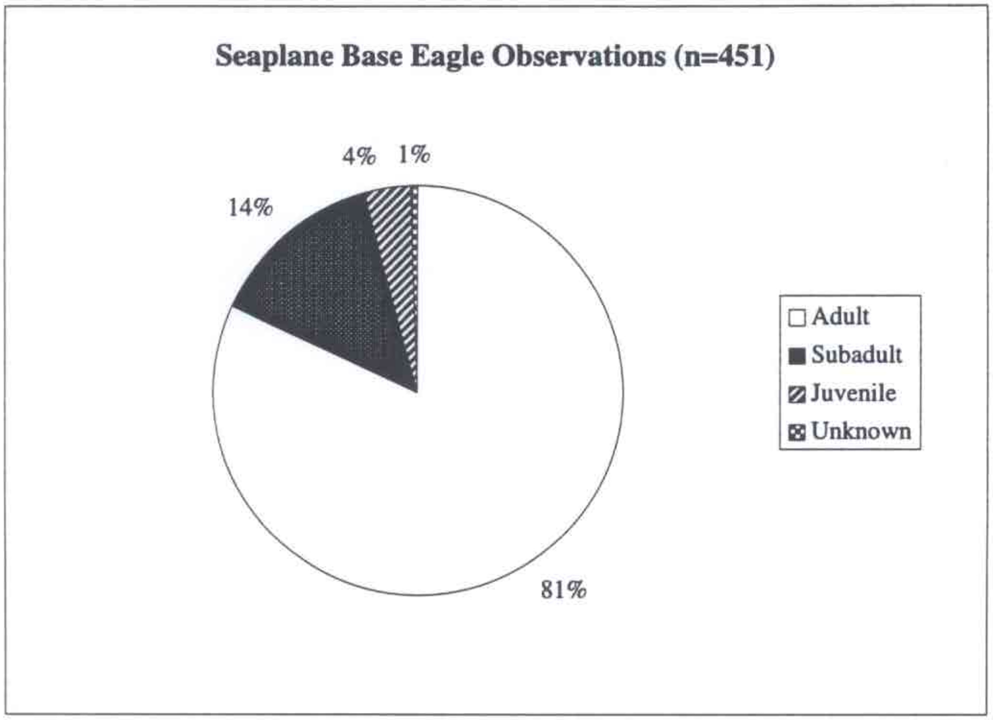


Figure 4-9. Age distribution of eagles observed during general censuses at the Seaplane Base.

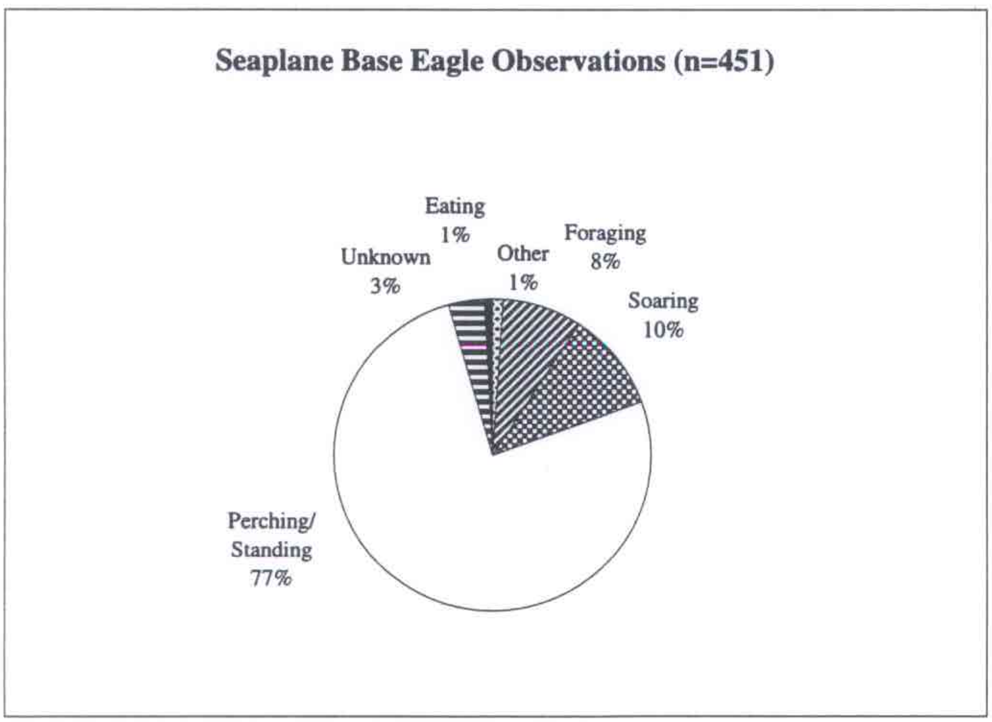


Figure 4-10. Bald eagle behaviors first observed during general censuses at the Seaplane Base.

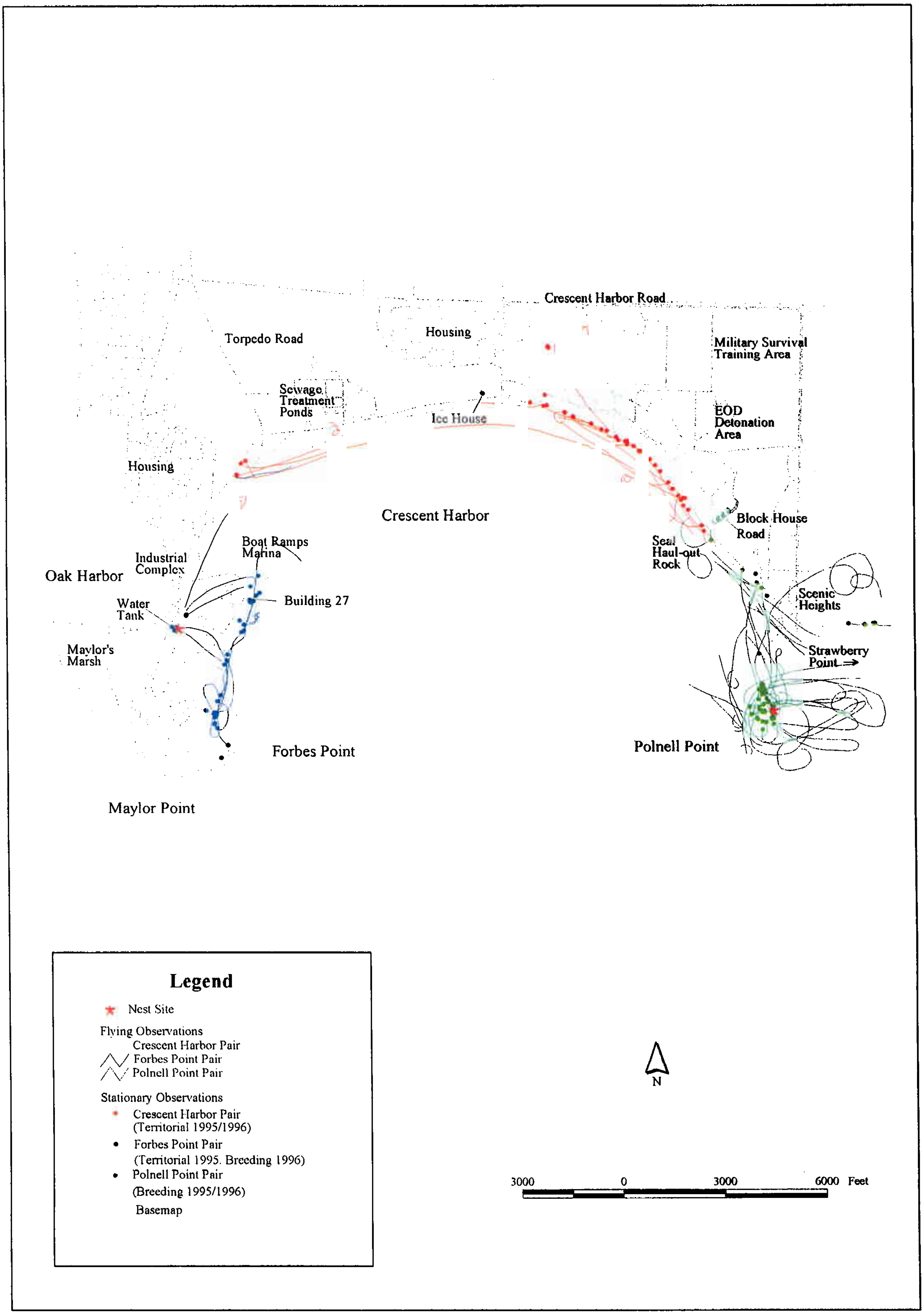
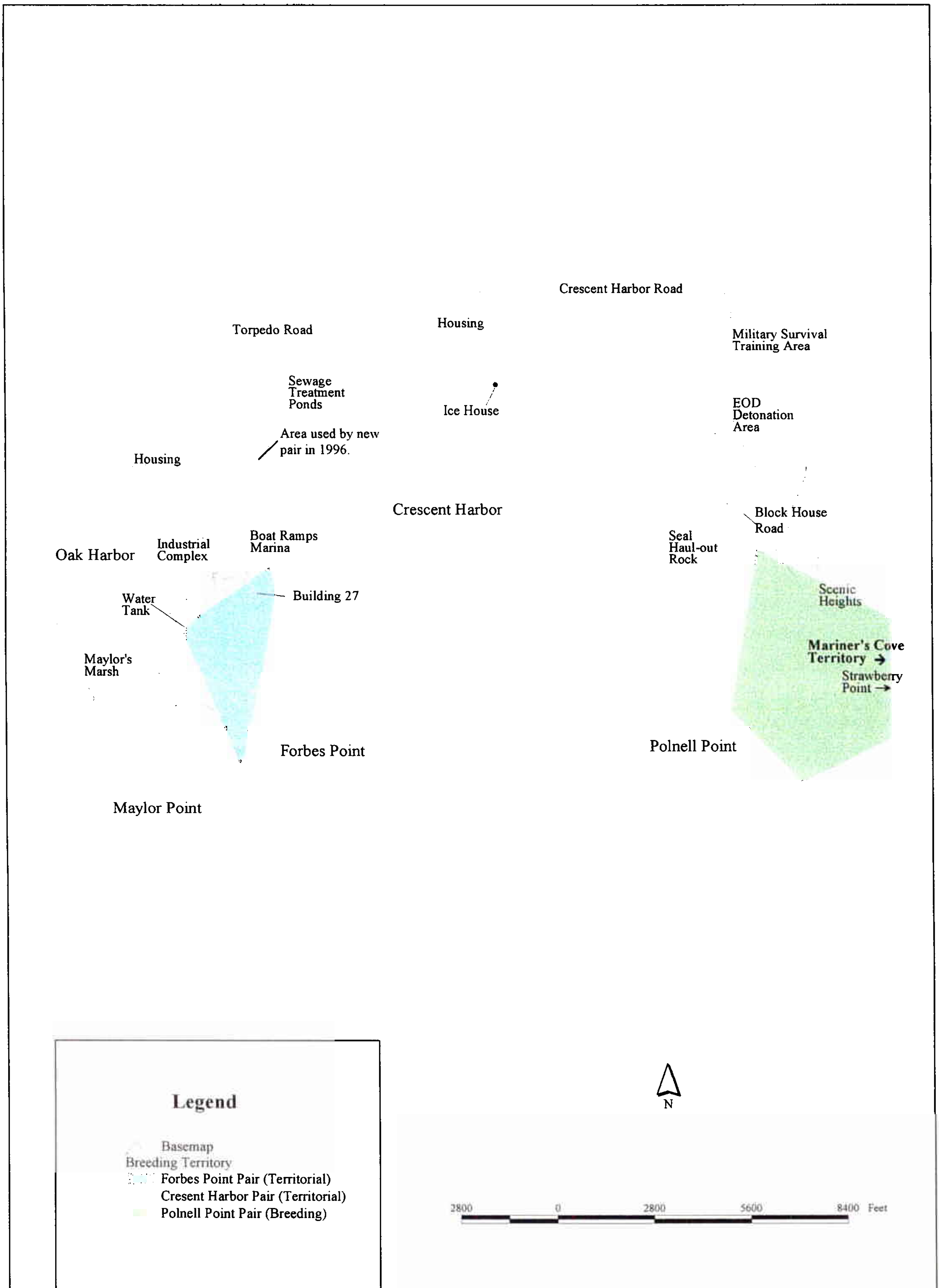


Figure 4-12. Observations of breeding or territorial pairs of bald eagles at the Seaplane Base during the breeding season (1 March through 31 August 1995).



* Territory in this study is defined as the area near the nest or center of activity where most use and observed or suspected intraspecific defense occurs.

Figure 4-13. Approximate territory boundaries* of territorial and breeding eagles at the Seaplane Base (1 March to 31 August 1995).

≥ 0.637] > 0.50). The variability in number of eagles observed may have been partially due to differences in observer abilities (Table 4-2, Figure 4-14; Appendix D). There were two eagles present during 14 of the 39 censuses (36 percent) of Lake Hancock, and three or four birds were seen during six censuses (15 percent) each (Figure 4-2).

Approximately 97 percent of the 105 bald eagle observations at Lake Hancock were of adults, indicating that territorial pair(s) near Lake Hancock likely comprise most of the eagle population (Figure 4-15). Subadults and juveniles were observed only three times during the winter, spring, and summer (Appendix D). No more than one subadult was seen during any one survey. When first observed, 90 percent of the eagles were perching or standing; six and four percent were foraging and soaring, respectively (Figure 4-16).

Distribution

Bald eagles were observed along most of the shoreline of Lake Hancock, as well as on several perches near Highway 20, and near the northern and southern NASWI property boundaries (Figure 4-17). There was no apparent difference in distribution between the breeding and non-breeding seasons (Figure 4-17). Approximately 73 percent of the stationary eagle observations were within 200 feet (61 m) of the Lake Hancock shoreline.

Breeding Season Use of Lake Hancock

As of April 1996, there were no bald eagle nests on NASWI property at Lake Hancock. The Greenbank pair (#296), whose nest is 2,000 feet (610 m) south of Lake Hancock, regularly use the Lake Hancock area as part of their home ranges (WDFW unpublished data).

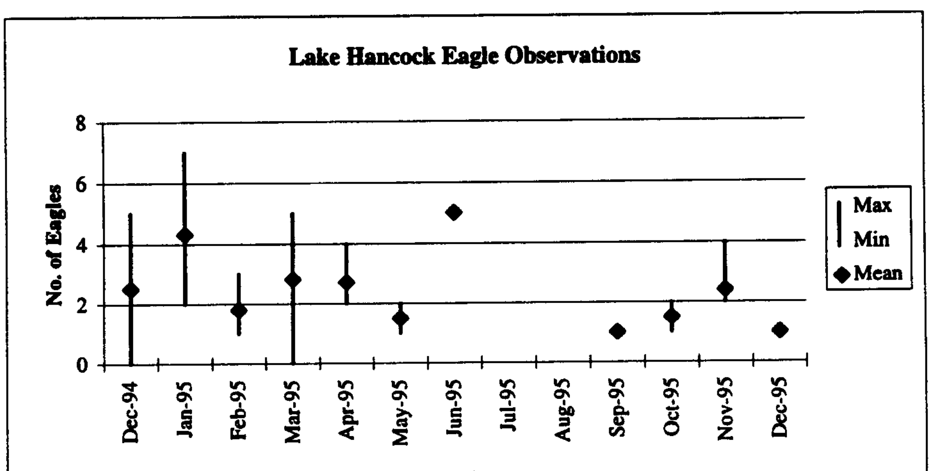


Figure 4-14. Mean, minimum, and maximum number of bald eagles observed per census each month at Lake Hancock.

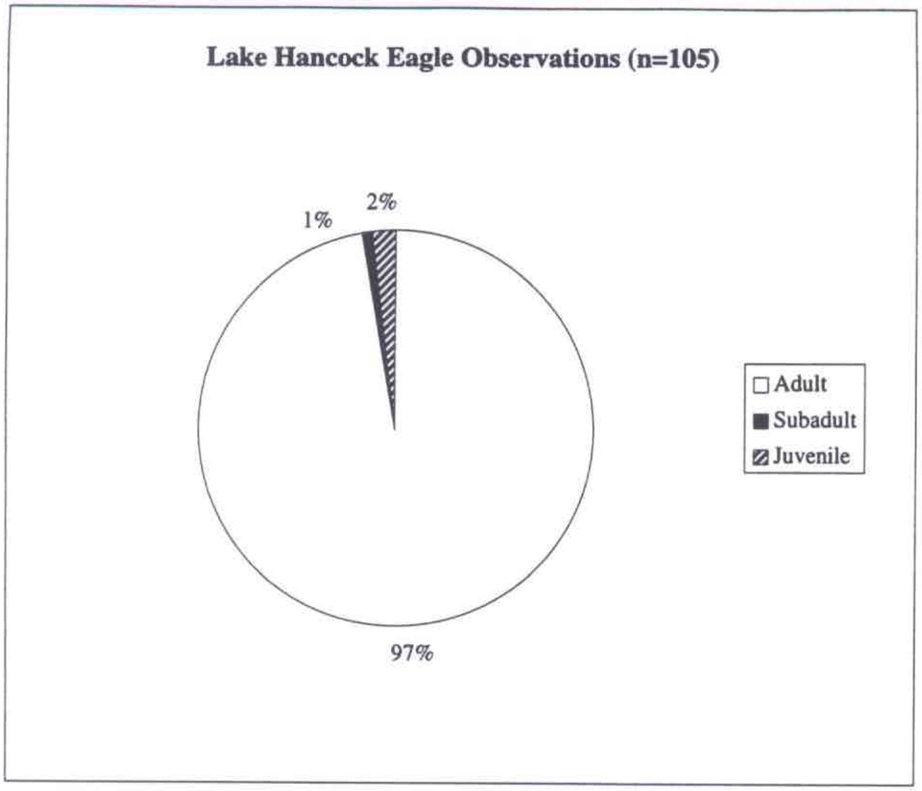


Figure 4-15. Age distribution of eagles observed during general censuses at Lake Hancock.

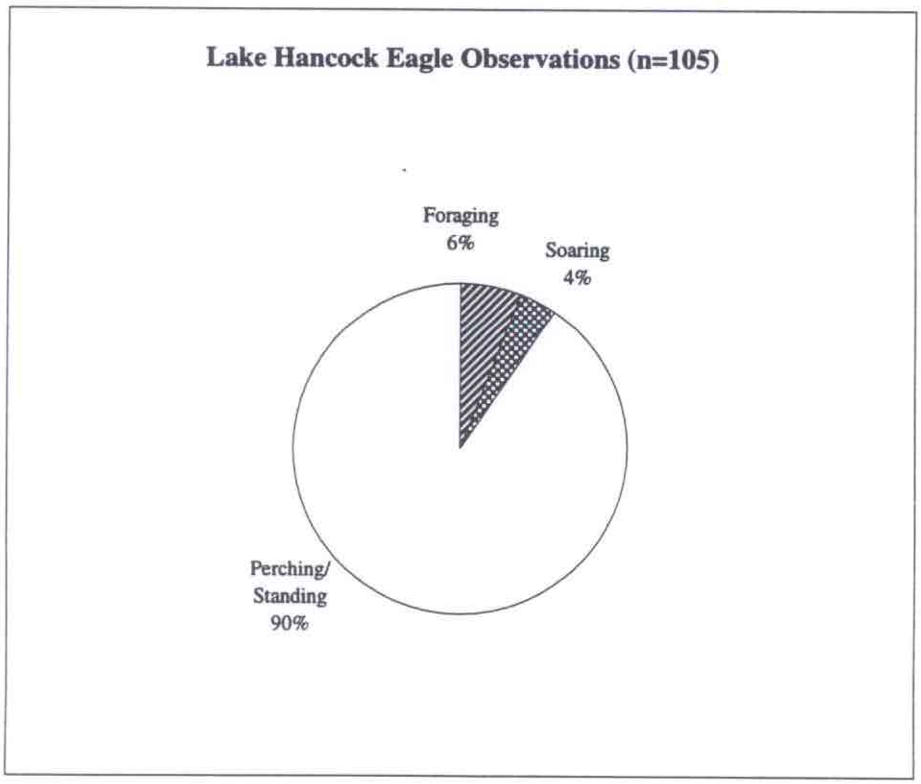


Figure 4-16. Bald eagle behaviors first observed during general censuses at Lake Hancock.

Table 4-3. Number (mean ± s.d.) of eagles observed per mile of shoreline during general censuses at NASWI.

Area	Length of Shoreline (miles)	Season				Total
		Winter	Spring	Summer	Fall	
Ault Field	4.4	0.64 ± 0.41	0.52 ± 0.25	0.48 ± 0.18	0.75 ± 0.27	0.61 ± 0.34
Seaplane Base	10.1	0.60 ± 0.39	0.66 ±0.37	0.29 ± 0.20	0.37 ± 0.15	0.51 ± 0.36
Lake Hancock	2.3	1.30 ± 0.78	1.17 ± 0.52	0.43 ± 0.00	0.87 ± 0.39	1.17 ± 0.70

1982, Stalmaster et al. 1985, USFWS 1986). Nests are usually built in live dominant or codominant trees that provide unobstructed views of an associated water body (Stalmaster 1987). Trees with deformed tops that can support the large nests are often preferred. In western Washington, 70 percent of nest trees are Douglas-fir and the mean dbh and tree height are approximately 70 inches (178 cm) and 118 feet (36 m), respectively (Anthony et al. 1982, USFWS 1986). Nests average 282 feet (86 m) from water (Grubb 1976) but can be as far as 4.5 miles (7.2 km) in some locations (Anthony and Isaacs 1989). Most commonly nests are within approximately 0.5 mile (0.8 km) of a shoreline. Snags or trees with exposed lateral limbs or dead tops are often present in nesting territories and serve as access points to and from nests (USFWS 1986). Productive nests in Washington are farther from permanent human activity than are unproductive sites (Grubb 1980).

4.2.1.1 Existing Nest Sites at NASWI

As of the 1996 nesting season, there are three known nest sites on NASWI property, one at Ault Field and two at the Seaplane Base (Figures 4-18 and 4-19). All three nest sites are in large conifer trees close to water. Over the last 22 years, the Polnell Point pair has used a number of different nest trees on Polnell Point, since storms have blown down nest trees several times. The Polnell Point nest tree used in 1995 was a 125-foot (38-m) tall, 31-inch (79-cm) dbh Douglas-fir located 165 feet (50 m) from the shoreline. The surrounding forest stand at Polnell Point is a mixed stand, with 50 to 60 percent Douglas-fir, 20 to 30 percent red alder, and 10 to 20 percent western redcedar (*Thuja plicata*) (Figure 4-19). No alternate nest sites were identified during 1995 although there are other potentially suitable nest trees on Polnell Point. The WDFW, however, concluded that the

Table 4-4. Regularly used bald eagle perch trees and structures at NASWI.

Type	**Ault Field**		**Seaplane Base**		**Lake Hancock**		**Total**	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Natural Structures								
Live tree	19	54.3%	38	58.5%	3	50.0%	60	56.6%
Dead-top tree	2	5.7%	4	6.2%	0	0.0%	6	5.7%
Snag	1	2.9%	2	3.1%	2	33.3%	5	4.7%
Brush	0	0.0%	1	1.5%	0	0.0%	1	0.9%
Driftwood/stumps	3	8.6%	4	6.2%	0	0.0%	7	6.6%
Sand bar	1	2.9%	1	1.5%	0	0.0%	2	1.9%
Subtotal	**26**	**74.3%**	**50**	**76.9%**	**5**	**83.3%**	**81**	**76.4%**
Artificial Structures								
Ammunition bunker	0	0.0%	2	3.1%	0	0.0%	2	1.9%
Concrete overflow	0	0.0%	1	1.5%	0	0.0%	1	0.9%
Posts/telephone poles	3	8.6%	7	10.8%	1	16.7%	11	10.4%
Pilings	0	0.0%	1	1.5%	0	0.0%	1	0.9%
Rock/rock jetty	0	0.0%	4	6.2%	0	0.0%	4	3.8%
Runway Lights	3	8.6%	0	0.0%	0	0.0%	3	2.8%
Old runway approach lights	3	8.6%	0	0.0%	0	0.0%	3	2.8%
Subtotal	**9**	**25.7%**	**15**	**23.1%**	**1**	**16.7%**	**25**	**23.6%**
Total	**35**	**100.0%**	**65**	**100.0%**	**6**	**100.0%**	**106**	**100.0%**

Table 4-5. Characteristics of perch trees used by bald eagles at NASWI.

Species[1]	Parameters	Mean	Minimum	Maximum	Median	Standard Deviation
Ault Field						
Douglas-fir (n=17)	height (ft)	71.2	19.7	147.6	68.9	35.2
	dbh (in)	13.9	3.9	39.4	11.8	8.8
	distance from stand edge (ft)	32.8	0.0	328.1	0.0	83.0
	distance from disturbance (ft)	304.9	0.0	1312.4	164.1	439.2
Sitka spruce (n=5)	height (ft)	102.4	75.5	124.7	108.3	24.0
	dbh (in)	8.9	5.9	11.8	7.9	2.2
	distance from stand edge (ft)	0.0	0.0	0.0	0.0	0.0
	distance from disturbance (ft)	541.4	164.1	656.2	656.2	213.9
Lake Hancock						
Red cedar (n=1)	height (ft)	98.4	98.4	98.4	98.4	--
	dbh (in)	4.7	4.7	4.7	4.7	--
	distance from stand edge (ft)	0.0	0.0	0.0	0.0	--
	distance from disturbance (ft)	0.0	0.0	0.0	0.0	--
Douglas-fir (n=2)	height (ft)	88.6	88.6	88.6	88.6	0.0
	dbh (in)	4.1	3.5	4.7	4.1	0.8
	distance from stand edge (ft)	100.1	0.0	200.1	100.1	141.5
	distance from disturbance (ft)	879.3	0.0	1758.6	879.3	1243.5
Seaplane Base						
Douglas-fir (n=33)	height (ft)	83.0	19.7	124.7	85.3	29.2
	dbh (in)	17.7	5.9	40.2	15.7	7.0
	distance from stand edge (ft)	92.5	0.0	328.1	49.2	107.2
	distance from disturbance (ft)	2399.6	0.0	6890.1	1148.3	2635.8
Madrone (n=4)	height (ft)	51.8	32.8	78.7	47.6	20.3
	dbh (in)	8.4	5.9	11.8	7.9	3.0
	distance from stand edge (ft)	0.0	0.0	0.0	0.0	0.0
	distance from disturbance (ft)	1777.2	82.0	4593.1	656.2	2455.7
Silver fir (n=1)	height (ft)	95.1	95.1	95.1	95.1	--
	dbh (in)	18.1	18.1	18.1	18.1	--
	distance from stand edge (ft)	0.0	0.0	0.0	0.0	--
	distance from disturbance (ft)	32.8	32.8	32.8	32.8	--
Sitka spruce (n=1)	height (ft)	95.1	95.1	95.1	95.1	0.0
	dbh (in)	18.1	18.1	18.1	18.1	0.0
	distance from stand edge (ft)	0.0	0.0	0.0	0.0	0.0
	distance from disturbance (ft)	32.8	32.8	32.8	32.8	0.0
Willow (n=5)	height (ft)	29.5	19.7	39.4	32.8	9.2
	dbh (in)	8.1	5.1	11.8	7.9	2.8
	distance from stand edge (ft)	0.0	0.0	0.0	0.0	0.0
	distance from disturbance (ft)	820.2	492.1	1312.3	656.2	434.0
All Trees (n=69)	height (ft)	76.4	19.7	147.6	78.7	32.5
	dbh (in)	14.3	3.5	40.2	11.8	7.8
	distance from stand edge (ft)	139.8	16.4	328.1	106.6	104.0
	distance from disturbance (ft)	535.8	32.8	6889.7	984.2	2259.2

[1] Includes live trees, dead-top trees, and snags

NASWI, although rabbit, marine mammal, and deer (*Odocoileus* sp.) carrion may, at times, be available to foraging eagles.

In most cases (66 percent), prey being hunted by bald eagles could not be identified (Table 4-6). Of those that were identified, fish were most common (16 percent), followed by common goldeneye (six percent). Mallard, western grebe (*Aechmophorus occidentalis*), unidentified waterfowl, and snake were also noted as hunted prey. The snake was hunted near the skeet range at Ault Field. Bald eagles were seen stealing prey twice from gulls and once from crows (*Corvus brachyrhynchos*). Fish were the most commonly identified food item seen ingested by bald eagles during the general censuses and breeding season monitoring. The small sample size of prey, however, precludes definitive statements regarding the use of fish by bald eagles (seven observations [38 percent]) (Table 4-7). An additional seven unidentified food items were also noted during the censuses. Common goldeneye was the next most commonly identified food item (17 percent) and one western grebe was also noted. No prey remains were collected from in or near the nests in 1995. In the nearby San Juan Islands, eagles relied on a combination of fish, rabbits, seals, birds and lamb carcasses/placentas (Retfalvi 1970). Knight et al. (1990) reported that fish are the most common prey item found in eagle nests in the San Juan Islands and Puget Sound, although numerous species of waterfowl and waterbirds were heavily represented in western Washington eagle diets. This study also found that glaucous-winged gulls and old world rabbits (*Oryctolagus cuniculus*) were also important food items.

Table 4-6. Prey observed hunted by bald eagles on the NASWI during 1995 (n=31).

Prey Species	Number	Percent
Common goldeneye	2	6
Western Grebe	1	3
Mallard	1	3
Unidentified Duck	1	3
Fish	5	16
Snake	1	3
Unknown	20	66
Total	31	100

Table 4-7. Food items seen eaten by bald eagles at NASWI during 1995 (n=18).

Food Item	Number	Percent
Common Goldeneye	3	17
Western Grebe	1	6
Fish	7	39
Unknown	7	39
Total	18	100

Bald eagles were observed hunting on 31 occasions during censuses at NASWI in 1994-1995 (Table 4-8). With the notable exception of one attempt over a pasture at the skeet range near Ault Field, all hunting observations were recorded along the coastline and over water. Rocky Point was the site of most hunting activity (seven observations), and two hunting observations during general censuses were recorded at Cliffside Park. At the Seaplane Base, the Polnell Point pair was observed twice hunting near Polnell Point. The Forbes Point pair was observed once hunting along the shore of Building 27; two hunting observations were recorded at Forbes Point during general censuses. A total of 18 observations of eagles ingesting food was recorded during the general censuses and breeding season monitoring at NASWI. Seven of 18 feeding observations were recorded at Ault Field - two on the approach lights, two at NAVFAC, two at Rocky Point, and one on a beach. Three observations of feeding were recorded at Polnell Point during general censuses. A total of five feeding observations were recorded for the Crescent Harbor territorial pair, each in a different location: Ammo Bunker Road, Block House, Crescent Harbor, Ice House, and the military survival training area.

Table 4-8. Hunting observation locations recorded during general censuses and breeding bald eagle monitoring at NASWI.

Region of NASWI	**Location (No. Observations)**	
Ault Field (n=18)	Rocky Point (7)	Skeet range (1)
	Open ocean (3)	Rifle range (1)
	Can Do Inn (2)	runway approach lights (1)
	Cliffside Park (2)	NAVFAC (1)
Seaplane Base (n=12)	Block House Rd (2)	Oak Harbor (1)
	Ice House (2)	Building 27 (1)
	Polnell Point (2)	Seal haul-out rocks (1)
	Forbes Point (2)	Torpedo Road (1)
Lake Hancock (n=1)	Lake Hancock (1)	

4.3 Land Use

Outside of the one incidence of an eagle possibly killed by aircraft at Ault Field and occasional temporary disturbance by military survival training activities, there has been little indication that operation of NASWI has resulted in negative effects to bald eagles. Nonetheless, existing and future land use activities play a major role in the ability of NASWI to provide high quality breeding and wintering bald eagle habitat. Future changes in land use can significantly affect bald eagles. The following sections summarize the land use activities that may affect eagles currently or in the future. The discussion does not address the land use in portions of NASWI not used by bald eagles.

Appendix A. Summary of NASWI general bald eagle census effort.

Survey Statistics	Ault Field					Seaplane Base[a]					Lake Hancock					TOTAL
	Winter	Spring	Summer	Fall	***Subtotal***	Winter	Spring	Summer	Fall	***Subtotal***	Winter	Spring	Summer	Fall	***Subtotal***	
Number of Surveys	44	26	15	18	***103***	36 (2)	19 (3)	21 (13)	10 (0)	***86 (18)***	21	9	2	8	***40***	**229**
Survey Effort (min)	4,089	1,526	928	1,332	***7,875***	3410 (215)	1741 (345)	1663 (1034)	817 (0)	***7631 (1594)***	1,318	491	121	221	***2,151***	**17,657**
Survey Effort (hour)	68.2	25.4	15.5	22.2	***131.3***	56.8 (3.6)	29 (5.7)	27.7 (17.2)	13.6 (0)	***127.2 (26.6)***	22.0	8.2	2.0	3.7	***35.9***	**294.3**
Mean Survey Effort (min)	92.9	58.7	61.9	74.0	***76.5***	94.7	91.6	79.2	81.7	***88.7***	62.8	54.6	60.5	27.6	***53.8***	**77.1**
Standary Deviation (min)	33.4	33.1	21.6	24.6	***33.7***	31.4	42.1	33.7	26.4	***34.2***	37.6	20.0	48.8	15.6	***33.1***	**35.7**
Median (min)	90.0	73.0	65.0	74.5	***75.0***	85.0	105.0	90.0	90.0	***90.0***	55.0	55.0	60.5	30.5	***45.0***	**76.0**
Minimum Single Survey Effort (min)	15	5	6	30	***5***	50	5	10	25	***5***	15	15	26	5	***5***	**5**
Maximum Single Survey Effort (min)	195	125	90	120	***195***	175	157	135	120	***175***	145	85	95	50	***145***	**195**

[a] Number in parentheses represents summary of surveys conducted by boat.

Appendix C. Summary of NASWI breeding bald eagle survey effort.

Survey Statistics	Rocky Point							Crescent Harbor				Forbes Point					Polnell Point							TOTAL
	Mar-95	Apr-95	May-95	Jun-95	Jul-95	Aug-95	*Subtotal*	May-95	Jul-95	Aug-95	*Subtotal*	May-95	Jun-95	Jul-95	Aug-95	*Subtotal*	Mar-95	Apr-95	May-95	Jun-95	Jul-95	August	*Subtotal*	
Number of Surveys	3	3	6	4	4	3	*23*	4	3	1	*8*	4	1	3	3	*11*	3	5	4	2	5	4	*23*	65
Survey Effort (min)	470	630	1,066	555	725	560	*4,006*	444	383	35	*862*	800	150	508	432	*1,890*	610	889	302	229	636	512	*3,178*	9,936
Survey Effort (hour)	7.8	10.5	17.8	9.3	12.1	9.3	*66.8*	7.4	6.4	0.6	*14.4*	13.3	2.5	8.5	7.2	*31.5*	10.2	14.8	5.0	3.8	10.6	8.5	*53.0*	165.6
Mean Survey Effort (min)	156.7	210.0	177.7	138.8	181.3	186.7	*174.2*	111.0	127.7	-	*107.8*	200.0	-	169.3	144.0	*171.8*	203.3	177.8	75.5	114.5	127.2	128.0	*138.2*	152.9
Standary Deviation (min)	50.3	27.8	44.4	52.5	20.2	7.6	*40.8*	47.2	54.3	-	*52.2*	42.4	-	37.5	34.0	*40.6*	20.8	40.6	51.2	9.2	52.3	52.2	*57.6*	53.2
Median (min)	150.0	215.0	189.5	142.5	175.0	185.0	*180.0*	95.0	102.0	35.0	*95.5*	205.5	150.0	190.0	160.0	*167.0*	210.0	170.0	58.5	114.5	150.0	151.0	*150.0*	165.0
Minimum Single Survey Effort (min)	110	180	115	75	165	180	*75*	74	91	35	*35*	150	150	126	105	*105*	180	118	35	108	66	50	*35*	35
Maximum Single Survey Effort (min)	210	235	220	195	210	195	*235*	180	190	35	*190*	239	150	192	167	*239*	220	220	150	121	190	160	*220*	239

Appendix D. Number of eagles observed during each general bald eagle census at NASWI.

Winter 1994/1995

Ault Field

Date	Adult	Subadult	Juvenile	Unknown	Total
12/08/94					0
12/16/94	2		1		3
12/19/94	1				1
12/20/94	2		1		3
12/21/94	4				4
12/23/94	2		2		4
12/30/94	2	1			3
12/31/94	5				5
01/03/95	2	1			3
01/04/95	1		2		3
01/06/95	2	1			3
01/07/95	3				3
01/10/95	3	1			4
01/11/95	2				2
01/13/95	2	2			4
01/17/95	2				2
01/24/95	5				5
01/25/95	1	2			3
01/27/95	3				3
01/31/95	3				3
02/03/95	4	1			5
02/04/95	4	1			5
02/07/95	9				9
02/14/95	3				3
02/17/95					0
02/18/95	1				1
02/20/95					0
02/21/95	3				3
02/24/95	3				3
02/25/95	5				5
02/28/95	1				1
03/03/95	2				2
03/04/95	1				1
03/07/95	2				2
03/10/95a	2				2
03/10/95b	1				1
03/11/95	4		1		5
03/14/95	1				1
03/17/95					0
03/18/95	1				1
03/24/95	2				2
03/25/95	4		1		5

Seaplane Base

Date	Adult	Subadult	Juvenile	Unknown	Total
12/07/94	5	3			8
12/18/94	2				2
12/19/94	4				4
12/20/94	4				4
12/21/94	1				1
12/22/94	3				3
12/27/94	6	1			7
12/28/94	3				3
12/30/94	4				4
01/01/95	5	1	1		7
01/04/95	3	1			4
01/06/95	3	3			6
01/07/95	7	2			9
01/08/95			1		1
01/14/95	7	1			8
01/15/95	4				4
01/22/95	3				3
01/28/95	1				1
02/04/95	6	1	1		8
02/05/95	5				5
02/07/95	6				6
02/10/95	3	1			4
02/11/95	8	3	1		12
02/18/95	3	1	1		5
02/20/95	2	2	3	1	8
02/24/95	4				4
02/25/95	8		1		9
02/26/95	3				3
02/26/95a	4	2			6
03/03/95	8				8
03/04/95	6	2		1	9
03/11/95	12	4			16
03/18/95	6	12			18
03/23/95	7	5			12
03/25/95	7				7
03/31/95	6	1			7
Winter Total	**169**	**46**	**9**	**2**	**226**

Lake Hancock

Date	Adult	Subadult	Juvenile	Unknown	Total
12/17/94	4		1		5
12/31/94					0
01/06/95	4				4
01/13/95	3				3
01/14/95	7				7
01/18/95	4				4
01/19/95	6				6
01/20/95	2				2
01/24/95	4				4
02/03/95	2				2
02/05/95	2				2
02/10/95	3				3
02/17/95	2				2
02/20/95	1				1
02/24/95	1				1
03/02/95	3				3
03/10/95	5				5
03/17/95	3				3
03/20/95					0
03/20/95a	4				4
03/25/95	2				2
Winter Total	**62**	**0**	**1**	**0**	**63**

Appendix D. Number of eagles observed during each general bald eagle census at NASWI.

	Ault Field						Seaplane Base						Lake Hancock				
Date	Adult	Subadult	Juvenile	Unknown	Total	Date	Adult	Subadult	Juvenile	Unknown	Total	Date	Adult	Subadult	Juvenile	Unknown	Total
03/28/95	2		1		3												
03/30/95	3				3												
Winter Total	**105**	**10**	**9**	**0**	**124**												

Appendix D. Number of eagles observed during each general bald eagle census at NASWI.

Spring 1995

Ault Field

Date	Adult	Subadult	Juvenile	Unknown	Total
04/01/95	1				1
04/05/95	2				2
04/06/95	4				4
04/12/95	2				2
04/13/95	3				3
04/14/95	1				1
04/19/95	2				2
04/20/95	2				2
04/24/95	1				1
04/25/95	1				1
04/26/95	2				2
04/27/95	3		1		4
05/04/95	1				1
05/08/95	1				1
05/09/95	1				1
05/10/95	2				2
05/18/95	4				4
05/24/95	2				2
06/01/95	4				4
06/06/95	2		1		3
06/09/95	2				2
06/12/95	3				3
06/16/95	2				2
06/21/95	4				4
06/27/95	3				3
06/29/95	3				3
Spring Total	**58**	**0**	**2**	**0**	**60**

Seaplane Base

Date	Adult	Subadult	Juvenile	Unknown	Total
04/01/95	6	1			7
04/05/95	7	1			8
04/13/95	1				1
04/15/95	8				8
04/21/95	14		2		16
04/22/95	4	1			5
04/29/95a	1				1
04/29/95b	6			1	7
05/04/95	7				7
05/06/95	4	1			5
05/08/95	6				6
05/11/95	5		1		6
05/13/95	8				8
05/27/95	11	4			15
06/10/95	4	1			5
06/16/95	4	3			7
06/21/95	2	3			5
06/24/95	6				6
06/30/95	5				5
Spring Total	**109**	**15**	**3**	**1**	**128**

Lake Hancock

Date	Adult	Subadult	Juvenile	Unknown	Total
04/01/95	2				2
04/07/95	3				3
04/14/95	2				2
04/21/95	2				2
04/27/95a	3		1		4
04/27/95b	3				3
05/07/95	2				2
05/21/95	1				1
06/04/95	5				5
Spring Total	**23**	**0**	**1**	**0**	**24**

Appendix D. Number of eagles observed during each general bald eagle census at NASWI.

Summer 1995

Ault Field

Date	Adult	Subadult	Juvenile	Unknown	Total
07/05/95	3				3
07/07/95	2				2
07/27/95	3				3
08/02/95	3				3
08/03/95	3				3
08/08/95	2				2
08/15/95	1				1
08/17/95	1				1
08/24/95	3				3
08/29/95	2				2
09/01/95	2				2
09/07/95	2				2
09/22/95	1				1
09/24/95	2				2
09/28/95	1				1
Summer Total	**31**	**0**	**0**	**0**	**31**

Seaplane Base

Date	Adult	Subadult	Juvenile	Unknown	Total
07/07/95	5		1		6
07/11/95	4				4
07/13/95	3				3
07/18/95	5				5
07/19/95	1				1
07/25/95	5		3		8
07/27/95	5				5
08/09/95	4				4
08/11/95	4				4
08/12/95	2				2
08/15/95	2				2
08/17/95	4				4
08/24/95	1				1
08/29/95	1				1
08/31/95	2				2
09/05/95	2				2
09/07/95	2				2
09/13/95					0
09/20/95	2				2
09/22/95	1				1
09/28/95	1				1
Summer Total	**56**	**0**	**4**	**0**	**60**

Lake Hancock

Date	Adult	Subadult	Juvenile	Unknown	Total
09/23/95		1			1
09/31/95	1				1
Summer Total	**1**	**1**	**0**	**0**	**2**

Appendix D. Number of eagles observed during each general bald eagle census at NASWI.

Ault Field						Seaplane Base						Lake Hancock					
Date	Adult	Subadult	Juvenile	Unknown	Total	Date	Adult	Subadult	Juvenile	Unknown	Total	Date	Adult	Subadult	Juvenile	Unknown	Total
						Fall 1995											
10/02/95	2				2	10/03/95	2				2	10/09/95	1				1
10/05/95	1				1	10/06/95	2				2	10/20/95	2				2
10/12/95	3				3	10/20/95	4				4	11/03/95	2				2
10/14/95	4				4	10/24/95	4	1			5	11/05/95	2				2
10/16/95	3				3	11/01/95	4				4	11/11/95	2				2
10/19/95	4				4	11/03/95	3				3	11/15/95	4				4
10/23/95	5		1		6	11/07/95	3				3	11/26/95	2				2
10/26/95	3				3	11/12/95	4				4	12/03/95	1				1
10/30/95	3				3	11/19/95	7				7	**Fall Total**	**16**	**0**	**0**	**0**	**16**
11/02/95	4				4	12/01/95	3				3						
11/06/95	2				2	**Fall Total**	**36**	**1**	**0**	**0**	**37**						
11/09/95	4		1		5												
11/13/95	3				3												
11/16/95	3				3												
11/20/95	3				3												
11/27/95	2				2												
11/30/95	4		1		5												
12/05/95	3				3												
Fall Total	**56**	**0**	**3**	**0**	**59**												

a and b refer to morning and evening surveys conducted on the same day.

Appendix E. Bald eagle habitat structures characterized at NASWI.

Record No.	Date	Observer(s)	Record No.	Location of Habitat	FORAGE: Type of Forage Area	NEST/ROOST/PERCH STRUCTURE: Type of Use	Height of Structure (m)	Tree: Species	Tree: dbh (cm)	Type of Structure	Location in Stand (m)	Distance from Forage Area (m)	Surrounding Vegetation/ Land Use	Distance from Distrubance (m)	Notes (by date)
10/06/95SB01	10/06/95	Penix	01	Polnell Pt.		P	38	DF	80	LT	40	100	mixed forest - beach	800	Polnell mixed forest is approx. 50-60% DF, 20-30% red alder, 10-20% red cedar; no hemlock. The area is heavily overgrown with understory. Roosting locations are unknown. Nos. 13 and 14 are most likely potential roost locations; they are the tallest live trees in center of point; birds have been seen to drop into this area, but no visuals made.
10/06/95SB02	10/06/95	Penix	02	Polnell Pt.		P	34	DF	50	LT	30	90	mixed forest/ beach	800	
10/06/95SB03	10/06/95	Penix	03	Polnell Pt.		P	27	DF	30	LT	20	80	mixed forest/ beach	800	
10/06/95SB04	10/06/95	Penix	04	Polnell Pt.		N	38	DF	80	LT	15	50	mixed forest/ beach	1400	
10/06/95SB05	10/06/95	Penix	05	Polnell Pt.		P	17	MA	30	LT	8	40	cliff/beach/ mixed forest	1400	
10/06/95SB06	10/06/95	Penix	06	Polnell Pt.		P	24	DF	30	LT	10	40	beach/mixed forest	1400	
10/06/95SB07	10/06/95	Penix	07	Polnell Pt.		P	26	DF	40	LT	15	35	beach/cliff	2000	
10/06/95SB08	10/06/95	Penix	08	Polnell Pt.		P	24	DF	35	LT	10	25	beach/cliff	2000	
10/06/95SB09	10/06/95	Penix	09	Polnell Pt.		P	24	DF	30	LT	15	35	beach	2100	
10/06/95SB10	10/06/95	Penix	10	Polnell Pt.		P	26	DF	40	DT	20	40	beach	2100	
10/06/95SB11	10/06/95	Penix	11	Polnell Pt.		P	27	DF	45	S	75	150	mixed forest	2000	
10/06/95SB12	10/06/95	Penix	12	Polnell Pt.		P	29	DF	50	S	75	150	mixed forest	2000	
10/06/95SB13	10/06/95	Penix	13	Polnell Pt.		P/R	34	DF	60	LT	75	125	mixed forest	2000	
10/06/95SB14	10/06/95	Penix	14	Polnell Pt.		P/R	37	DF	65	LT	75	125	mixed forest	2000	
11/20/95SB01	11/20/95	Klope/Penix	01	Maylor Pt./ Oak Harbor		P	37	DF	56	LT	20	30	mixed forest/ open water	700	Maylor's Pt. forest types: DF 50%, WH 35%, alder 10%, MA 5%. Scattered yews, open canopy, and small alder at Nos. 05 and 06. No. 05 throw-out found at base (seagull). Topped trees at Nos. 11 and 12; Nos. 09 thru 12 are madrone/maple stands intermixed.
11/20/95SB02	11/20/95	Klope/Penix	02	Maylor Pt./ Oak Harbor		P	1.2			drift log	in marsh	10	marsh/open water	500	
11/20/95SB03	11/20/95	Klope/Penix	03	Maylor Pt./ Oak Harbor		P	1.2			drift log	in marsh	10	marsh/open water	500	
11/20/95SB04	11/20/95	Klope/Penix	04	Maylor Pt./ Oak Harbor		P	3.7			piling	in marsh	10	marsh/open water	500	
11/20/95SB05	11/20/95	Klope/Penix	05	Maylor Pt./ watertank		P	38	DF	102	LT/DT	50	500	mixed fores/ grassland	400	
11/20/95SB06	11/20/95	Klope/Penix	06	Maylor Pt./ watertank		R?	30	DF	61	LT	75	525	mixed forest	450	
11/20/95SB07	11/20/95	Klope/Penix	07	Maylor Pt./ watertank		P	34	DF	66	LT	100	400	mixed forest/ grassland	300	
11/20/95SB08	11/20/95	Klope/Penix	08	Maylor Pt./ watertank		P	30	DF	38	LT	100	400	mixed forest/ grassland	300	
11/20/95SB09	11/20/95	Klope/Penix	09	Forbes Pt.		P	20	DF	46	LT/DT	20	100	mixed forest/ grassland	150	
11/20/95SB10	11/20/95	Klope/Penix	10	Forbes Pt.		P	14	DF	28	LT	5	25	mixed forest/ grassland	300	
11/20/95SB11	11/20/95	Klope/Penix	11	Forbes Pt.		P	12	DF	30	LT	50	25	mixed forest	350	
11/20/95SB12	11/20/95	Klope/Penix	12	Forbes Pt.		P	12	DF	36	LT	50	25	mixed forest	350	
11/20/95SB13	11/20/95	Klope/Penix	13	Forbes Pt.		P	8			tele- pole	cliff edge	20	grassland/ housing	150	

Appendix E. Bald eagle habitat structures characterized at NASWI.

Record No.	Date	Observer(s)	Record No.	Location of Habitat	FORAGE: Type of Forage Area	NEST/ROOST/PERCH STRUCTURE: Type of Use	Height of Structure (m)	Tree: Species	Tree: dbh (cm)	Type of Structure	Location in Stand (m)	Distance from Forage Area (m)	Surrounding Vegetation/ Land Use	Distance from Distrubance (m)	Notes (by date)
11/20/95SB14	11/20/95	Klope/Penix	14	Forbes Pt.		P	8			tele- pole	cliff edge	20	beach	150	
11/20/95SB15	11/20/95	Klope/Penix	15	Forbes Pt./ radar dome		P	24	DF	38	LT	scattered	25	grassland/ beach		
11/20/95SB16	11/20/95	Klope/Penix	16	Forbes Pt./ radar dome		P	27	DF	46	LT	scattered	30	grassland/ beach		
11/20/95SB17	11/20/95	Klope/Penix	17	Forbes Pt./ radar dome		P	34	DF	56	LT	scattered	30	grassland/ beach		
11/20/95SB18	11/20/95	Klope/Penix	18	Forbes Pt./ radar dome		P	32	DF	51	LT	scattered	50	grassland/ beach		
11/20/95SB19	11/20/95	Klope/Penix	19	Crescent Harbor/fuel pier		P	6			lamp post		0	ocean/beach	0	
11/20/95SB20	11/20/95	Klope/Penix	20	Crescent Harbor/fuel pier		P	6			lamp post		0	ocean/beach	0	
11/20/95SB21	11/20/95	Klope/Penix	21	Crescent Harbor		P	24	MA	15	LT	edge near road	20	ocean/beach	25	
11/20/95SB22	11/20/95	Klope/Penix	22	Crescent Harbor		P	29·	SF	46	LT	edge near road	25	beach/ocean	10	
11/20/95SB23	11/20/95	Klope/Penix	23	Crescent Harbor		P	30	SS	51	LT	edge near road	25	ocean/beach	10	
11/20/95SB24	11/20/95	Klope/Penix	24	Crescent Harbor		P	34	DF	64	LT	edge near road	25	ocean/beach	10	
11/20/95SB25	11/20/95	Klope/Penix	25	Crescent Harbor		P	2	UNK		drift wood root	beach	10	beach/marsh/ ocean	400	
11/20/95SB26	11/20/95	Klope/Penix	26	Crescent Harbor		P	5			pole		25	grassland/ beach	300	
11/20/95SB27	11/20/95	Klope/Penix	27	Crescent Harbor		P	5			pole		25	grassland/ beach	300	
11/20/95SB28	11/20/95	Klope/Penix	28	Crescent Harbor		P	5			pole		35	grassland	250	
11/20/95SB29	11/20/95	Klope/Penix	29	Crescent Harbor		P	5			bunker		35	grassland	250	
11/20/95SB30	11/20/95	Klope/Penix	30	Crescent Harbor		P	5			bunker		35	grassland	250	
11/20/95SB31	11/20/95	Klope/Penix	31	Crescent Harbor		P	11	BW	13	LT	cliff edge	10	beach/ocean/ grassland	400	
11/20/95SB32	11/20/95	Klope/Penix	32	Crescent Harbor		P	6	BW	25						
11/20/95SB33	11/20/95	Klope/Penix	33	Crescent Harbor		P	12	BW	20	LT					
11/20/95SB34	11/20/95	Klope/Penix	34	Crescent Harbor		P	12	DF	25	LT					
11/20/95SB35	11/20/95	Klope/Penix	35	Crescent Harbor		P	20	DF	33	LT					
11/20/95SB36	11/20/95	Klope/Penix	36	Crescent Harbor		P	12	MA	25	LT					
11/20/95SB37	11/20/95	Klope/Penix	37	Crescent Harbor		P	17	DF	30	LT					
01/10/96SB01	01/10/96	Klope/Penix	01	Maylor's Pt.		P	5			concrete outflow		5	beach/ocean	35	
01/10/96SB02	01/10/96	Klope/Penix	02	Forbes Point		P	6	DF	15	LT	on cliff	10	beach/ocean	50	

Appendix E. Bald eagle habitat structures characterized at NASWI.

Record No.	Date	Observer(s)	Record No.	Location of Habitat	FORAGE: Type of Forage Area	NEST/ROOST/PERCH STRUCTURE: Type of Use	Height of Structure (m)	Tree: Species	Tree: dbh (cm)	Type of Structure	Location in Stand (m)	Distance from Forage Area (m)	Surrounding Vegetation/ Land Use	Distance from Distrubance (m)	Notes (by date)
01/10/96SB03	01/10/96	Klope/Penix	03	Forbes Point		P	2			rock	beach	3	beach/ocean	70	
01/10/96SB04	01/10/96	Klope/Penix	04	Forbes Point		P	4			rock	beach	2	beach/ocean	70	
01/10/96SB05	01/10/96	Klope/Penix	05	Forbes Point		P	2			brush	cliff	10	cliff/beach	70	
01/10/96SB06	01/10/96	Klope/Penix	06	pier		P				rock jetty		over water	bay	15	
01/10/96SB07	01/10/96	Klope/Penix	07	Crescent Harbor		P	1			rock	beach	2	beach/ocean	150	
01/10/96SB08	01/10/96	Klope/Penix	08	Crescent Harbor		P	6	willow	15	LT	on cliff	10	beach/ocean	150	
01/10/96SB09	01/10/96	Klope/Penix	09	Crescent Harbor		P	<1			stump	cliff	8	beach	150	
01/10/96SB10	01/10/96	Klope/Penix	10	Crescent Harbor		P	10	DF	30	LT	cliff	10	beach/ocean	175	
01/10/96SB11	01/10/96	Klope/Penix	11	Crescent Harbor		P	10	willow	30	LT	cliff	10	beach/ocean	200	
01/10/96SB12	01/10/96	Klope/Penix	12	Crescent Harbor		P	10	MA	15	LT	cliff	10	beach/ocean	200	
01/10/96SB13	01/10/96	Klope/Penix	13	Crescent Harbor		P	18	DF	35	LT	cliff (top)	15	MF/beach	300	
01/10/96SB14	01/10/96	Klope/Penix	14	Crescent Harbor		P	24	DF	40	DT	cliff (top)	15	MF/beach	300	
01/10/96SB15	01/10/96	Klope/Penix	15	Polnell Point											
12/19/95AF01	12/19/95	Penix	01	North Gate		P	33	DF	30	LT	edge	70	airfield/grass/ beach	50	nest tree (No. 33): nest is located on E side of tree. Tree has yellow placard (FW eagle nest #319). Fairly healthy, some dead snag, 50-80 yrs. old; nest is 8 ft in diameter and 3-ft thick
12/19/95AF02	12/19/95	Penix	02	North Gate		P	38	DF	25	LT	edge	70	airfield/grass/ beach	50	
12/19/95AF03	12/19/95	Penix	03	North Gate		P	26	DF	30	LT	edge	70	airfield/grass/ beach	50	
12/19/95AF04	12/19/95	Penix	04	North Gate		P	21	DF	35	LT	edge	50	airfield/grass/ beach	60	
12/19/95AF05	12/19/95	Penix	05	runway light		P	6			lights		over water	ocean/grass/ airfield	70	
12/19/95AF06	12/19/95	Penix	06	runway light		P	6			lights		over water	ocean/grass/ airfield	60	
12/19/95AF07	12/19/95	Penix	07	runway light		P	6			lights		on beach	beach/ocean/ grass	100	
12/19/95AF08	12/19/95	Penix	08	beach		P				triangle			beach/grass	150	
12/19/95AF09	12/19/95	Penix	09	beach	beach	F									
12/19/95AF10	12/19/95	Penix	10	airfield	grass	F									
12/19/95AF11	12/19/95	Penix	11	ocean	ocean	F									
12/19/95AF12	12/19/95	Penix	12	beach		P	1			drift wood		on beach	ocean/beach/ grass	100	
12/19/95AF13	12/19/95	Penix	13	North Gate		P	9			triangle		grass	grass	30	
12/19/95AF14	12/19/95	Penix	14	road		P	6			triangle		20m from beach	grass/beach	250	
12/19/95AF15	12/19/95	Penix	15	NAVFAC		P	14	DF	35	LT	edge cliff	20	NAVFAC/ beach	45	
12/19/95AF16	12/19/95	Penix	16	NAVFAC		P	14	DF	40	LT	edge cliff	20	NAVFAC/ beach	45	
12/19/95AF17	12/19/95	Penix	17	Cliffside Park		P	17	DF	55	LT	edge grass	20	park/mixed forest	within park	

Appendix E. Bald eagle habitat structures characterized at NASWI.

					FORAGE	NEST/ROOST/PERCH STRUCTURE									
Record No.	Date	Observer(s)	Record No.	Location of Habitat	Type of Forage Area	Type of Use	Height of Structure (m)	Tree Species	Tree dbh (cm)	Type of Structure	Location in Stand (m)	Distance from Forage Area (m)	Surrounding Vegetation/ Land Use	Distance from Distrubance (m)	Notes (by date)
12/19/95AF18	12/19/95	Penix	18	Cliffside Park		P	15	DF	40	LT	grass	20	park/mixed forest	within park	
12/19/95AF19	12/19/95	Penix	19	rifle range		P	11			pole		next to salt marsh	marsh/ocean/ rifle range	20	
12/19/95AF20	12/19/95	Penix	20	rifle range		P	11			pole		next to salt marsh	marsh/ocean/ rifle range	40	
12/19/95AF21	12/19/95	Penix	21	rifle range		P	11			pole		next to salt marsh	marsh/ocean/ rifle range	100	
12/19/95AF22	12/19/95	Penix	22	rifle range	open water	F							beach	45 (rifle range)	
12/19/95AF23	12/19/95	Penix	23	rifle range		P	1			drift wood		beach	beach/marsh/ ocean	100	
12/19/95AF24	12/19/95	Penix	24	Rocky Point		P	5			drift wood		beach	beach/ocean/ mixed forest	100 (archery club)	
12/19/95AF25	12/19/95	Penix	25	Rocky Point		P	38	SS	30	LT	cliff edge	40	mixed forest/ beach	50	
12/19/95AF26	12/19/95	Penix	26	Rocky Point		P	27	DF	25	LT	cliff edge	40	mixed forest/ beach	50	
12/19/95AF27	12/19/95	Penix	27	Rocky Point		P	23	DF	25	LT	25	50	mixed forest	70	
12/19/95AF28	12/19/95	Penix	28	golf course		P	27	DF	25	LT	10	400	rural/dist	15	
12/19/95AF29	12/19/95	Penix	29	CanDo Inn		P	11	DF	10	LT	on cliff	40	beach	15	
12/19/95AF30	12/19/95	Penix	30	Rocky Point		P	29	DF	70	DT	35	65	mixed forest	400	
12/19/95AF31	12/19/95	Penix	31	Rocky Point		P	15	DF	30	DF	cliff edge	30	mixed forest	400	
12/19/95AF32	12/19/95	Penix	32	Rocky Point		P/R	45	DF	100	LT	100	150	mixed forest	300	
12/19/95AF33	12/19/95	Penix	33	Rocky Point		N	38	DF	95	LT	75	125	mixed forest	300	
12/19/95AF34	12/19/95	Penix	34	skeet range	grassland	F							agriculture		
12/19/95AF35	12/19/95	Penix	35	Charles Porter gate	grassland	F							agriculture runway 3-1		
12/19/95AF36	12/19/95	Penix	36	NAVFAC		P	8	DF	15	LT	beach	25	NAVFAC/ beach	20	
12/19/95AF37	12/19/95	Penix	37	NAVFAC		P	6	DF	10	LT	beach edge	15	NAVFAC/ beach	10	
12/19/95AF38	12/19/95	Penix	38	west beach		P	0			sand bar		in water	beach	40	
12/19/95AF39	12/19/95	Penix	39	Rocky Point		P	23	SS	25	LT	cliff	15	beach/ocean	175	
12/19/95AF40	12/19/95	Penix	40	Rocky Point		P	33	SS	20	LT	cliff	15	beach/ocean	200	
12/19/95AF41	12/19/95	Penix	41	Rocky Point		P	38	SS	20	LT	cliff	15	beach/ocean	200	
12/19/95AF42	12/19/95	Penix	42	Rocky Point		P	24	SS	15	DS	cliff	15	beach/ocean	200	
01/12/96LH01	01/12/96	Rothboeck	01	Lake Hancock	wetland	P	30	red cedar	12	LT	stand-alone tree	6	east edge of lake	boater/fishers on lake	
01/12/96LH02	01/12/96	Rothboeck	02	Lake Hancock	wetland	P	11	UNK	9	S	stand-alone tree	in forage area	wetland/ scattered snag	536	
01/12/96LH03	01/12/96	Rothboeck	03	Lake Hancock	forest wetland	P	27	DF	9	LT	61 for edge	61	ocean/wetland	536	
01/12/96LH04	01/12/96	Rothboeck	04	Lake Hancock	ocean/ wetland	P	9		7	PO	stand alone	in forage area	ocean/beach/ wetland	boaters at inlet	
01/12/96LH05	01/12/96	Rothboeck	05	Lake Hancock	forest wetland	P	27	DF	12	LT	edge of forest	edge of wetland	forest/wetland		
01/12/96LH06	01/12/96	Rothboeck	06	Lake Hancock	wetland	P	9		9	S	stand alone	in forage area	wetlands/snags	edge of lake/ boaters	

Appendix F. Eagle use of perch structures at NASWI during 1995 general censuses.

Type	Ault Field No.	Ault Field Percent	Seaplane Base No.	Seaplane Base Percent	Lake Hancock No.	Lake Hancock Percent	Total No.	Total Percent
Live trees								
Douglas-fir	74	28.6	271	65.5	36	37.9	381	49.6
Willow	0	0	1	0.2	0	0	1	0.1
Conifer	6	2.3	0	0	6	6.3	12	1.6
Pacific madrona	0	0	13	3.1	0	0	13	1.7
Red alder	0	0	4	1	2	2.1	6	0.8
Subtotal	**80**	**30.9**	**289**	**69.8**	**44**	**46.3**	**413**	**53.8**
Dead tree/deadtop								
Dead tree	48	18.5	50	12.1	28	29.5	126	16.4
Deadtop Douglas-fir	12	4.6	5	1.2	0	0	17	2.2
Dead madrona	0	0	4	1	0	0	4	0.5
Subtotal	**60**	**23.2**	**59**	**14.3**	**28**	**29.5**	**147**	**19.1**
Natural Structures								
Beach/tide flat	20	7.7	3	0.7	5	5.3	28	3.7
Brush	0	0	2	0.5	0	0	2	0.3
Shrub	0	0	5	1.2	0	0	5	0.7
Cliff	0	0	1	0.2	0	0	1	0.1
Driftwood	2	0.8	3	0.7	0	0	5	0.7
Ground	11	4.2	19	4.6	6	6.3	36	4.7
Log/stump	3	1.2	4	1	4	4.2	11	1.4
Subtotal	**36**	**13.9**	**37**	**8.9**	**15**	**15.8**	**88**	**11.5**
Artificial Structures								
Runway lights	3	1.2	0	0	0	0	3	0.4
Cement slabs	3	1.2	0	0	0	0	3	0.4
Hay bale	1	0.4	0	0	0	0	1	0.1
Light poles	6	2.3	21	5.1	0	0	27	3.5
Piling	63	24.3	8	1.9	8	8.4	79	10.3
Triangle[a]	7	2.7	0	0	0	0	7	0.9
Subtotal	**83**	**32**	**29**	**7**	**8**	**8.4**	**120**	**15.6**
Total	**259**	**100**	**414**	**100**	**95**	**100**	**768**	**100**

[a] Triangle structures are the old approach lights at Ault Field.

Appendix G. Number of Observations of Potential Prey Species Noted During General Census and Breeding Eagle Monitoring.

Nearby Prey		NASWI			
Common name	Scientific name	Ault Field	Seaplane Base	Lake Hancock	Total
American crow	*Corvus brachyrhynchos*	31	3	0	34
American robin	*Turdus migratorius*	1	0	0	1
barn swallow	*Hirundo rustica*	1	0	0	1
Barrow's goldeneye	*Bucephala islandica*	0	3	0	3
black oystercatcher	*Haematopus bachmani*	0	2	0	2
black scoter	*Melanitta nigra*	0	10	0	10
black turnstone	*Arenaria melanophala*	0	3	0	3
bufflehead	*Bucephala albeola*	2	27	3	32
California gull	*Larus californicus*	1	1	0	2
Canada goose	*Branta canadensis*	0	3	0	3
Caspian tern	*Sterna caspia*	0	1	0	1
chicken		1	0	0	1
common goldeneye	*Bucephala clangula*	17	57	9	83
common loon	*Gavia immer*	0	22	0	22
common merganser	*Mergus merganser*	9	2	0	11
cormorant	*Phalacrocorax* sp.	1	0	0	1
crow	*Corvus brachyrhynchos*	1	1	3	5
unidentified duck	*Anatidae*	7	0	0	7
dunlin	*Calidris alpina*	1	23	63	87
eared grebe	*Podiceps nigicollis*	0	6	0	6
unidentified fish		23	31	0	54
glaucous-winged gull	*Larus glaucenscens*	45	62	0	107
great blue heron	*Ardea herodian*	17	11	0	28
greater scaup	*Aythya marilla*	0	0	2	2
gull	*Larus* spp.	36	31	5	72
harlequin duck	*Histrionicus histrionicus*	0	2	0	2
killdeer	*Caradrius vociferus*	0	1	0	1
lesser scaup	*Aythya affinis*	0	11	0	11
mallard	*Anas platyrhynchos*	12	8	43	63
marbled murrelet	*Brachyramphus marmoratus*	0	1	0	1
mice	*Peromyscus* sp.	0	1	0	1
Pacific loon	*Gavia pacifica*	0	2	0	2
pigeion guillemot	*Cepphus columba*	15	75	0	90
pigeon	*Columba* sp.	1	0	0	1
red-breasted merganser	*Mergus serrator*	2	0	0	2
red-throated loon	*Gavia stellata*	0	1	0	1
ruddy duck	*Oxyura jamaicensis*	0	1	0	1
sanderling	*Calidris alba*	0	2	0	2
scoter	*Melanitta* sp.	0	17	6	23
surf scoter	*Melanitta perspicillata*	28	163	0	191
western grebe	*Aechmophorus occidentalis*	1	0	0	1
western gull	*Larus occidentalis*	29	2	0	31
white-winged scoter	*Melanitta fusca*	0	49	0	49
Total		299	635	134	1,051

APPENDIX H. Forestry Program Information and Forest Stand Inventory

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Forest Program Information

Forestry Contract Requirements

In accordance with DOD and DON requirements, the Navy Forest Management Program is centrally funded and centrally executed through the Naval Facilities Engineering Command. The Forester, Naval Facilities Engineering Command Northwest (NAVFAC NW) will provide professional forestry services to develop and issue forest harvest contracts and to provide advice on forest management, when requested. Reimbursement for the cost of managing forest resources for timber production is authorized by 10 USC 2665 from the sale of forest products. Forest products sale income and reimbursement of forestry expenses are planned, budgeted and administered by the Forester at NAVFAC NW.

Sales of forest products are accomplished in accordance with NAVFAC P-73, Volume II. All forest products sale contracts, including the personal firewood cutting program, are under the contractual authority of the NAVFAC NW Real Estate Contracting Officer (RECO). Service contracts used to acquire forestry services are processed in accordance with federal procurement regulations.

General Forestry Contact Objectives and Thinning Criteria:

On the coniferous thinning areas, one hundred (100) of the best live Douglas-fir or other conifer species shall be left uncut and undamaged as Leave Trees on each acre of the sale area. This equates to a spacing of approximately 20 feet on center between Leave Trees, which are to be uniformly and consistently spaced over the entire sale area. Additionally, less frequent species, wildlife trees, snags, and unique specimens will be marked or identified in the contract for retention in furtherance of the goal of improving biological and structural diversity.

Preferred yarding technology will be, in order of preference: draft horses or mules, skidders, and cable logging. When compared to the other methods, the use of draft horses or mules minimizes soil disturbance, compaction and churning and impacts to forest floor organic matter, large organic debris and understory vegetation.

The roads developed for historic logging and construction and operation of NAS Whidbey Island are sufficient for forestry activities. To implement silvicultural treatments, it may be necessary to place crushed rock on existing roads, or to develop temporary haul spurs. Haul spurs will be developed using old grades where possible.

Wetlands will be protected in accordance with applicable law and regulation. The erosion control and buffer strip requirements included in the Plan and in timber sale and forestry services contracts will protect wetlands from damage by forestry operations.

No logging or salvage of snags, windthrow or deadfall downed material will be allowed within the primary buffer zones of bald eagle nest trees.

Forest Stand Inventory

Forest Soils. The characteristics of individual soil map units (types) can be used to predict the probable impact of various forest management practices on both vegetation and soils. Probable impacts can be predicted for woodland suitability, soil compaction, slope stability, competing vegetation and tree windthrow.

Most of the soils on the Station are well suited for tree production. The exceptions are soils that are extremely wet or high in peat content, which occur primarily in lacustrine wetlands adjacent to shorelines, at Lake Hancock, on geologically active slopes, and scattered areas of rock outcrop on upland slopes. Refer to the USDA Soil Conservation Service "Soil Survey of Island County, Washington" (1949) for specific soils mapping units, profile descriptions and pertinent land use information. Table F-1 summarizes the estimated growing potential for soil types suited to tree production on NAS Whidbey Island.

Table F-1. Tree Site Index Ratings.

Soil Name	Best Suited Tree Species	Height of Larger Trees at Age 50 (feet)
Bellingham	red alder/ spruce/ western red cedar	85
Bozarth	Douglas-fir	80
Casey	Douglas-fir	95
Coupeville	Douglas-fir	90
Coveland	Douglas-fir	95
Ebeys	Douglas-fir	95
Hovde	red alder/pine	85
Hoypus	Douglas-fir	88
Keystone	Douglas-fir	90
Lummi	red alder/ spruce/ western red cedar	90
Norma	red alder	90

San Juan	Douglas-fir	80
Swantown	Douglas-fir	82
Townsend	Douglas-fir	95
Whidbey	Douglas-fir	95

Inventory. Forest inventory data for NAS Whidbey Island is given below for the four Compartments of Ault Field, Seaplane Base, OLF Coupeville and Lake Hancock. The data includes:

Table 1: Stand Data
Table 2: Stand Data by Decade of Origin
Table 3: Habitat Data by Cruised Stand
Table 4: Type Group Summary

The inventory data was developed in 2000-2001. To develop stand delineations, the latest available aerial photography, 1:12,000 scale was obtained from the Washington State Department of Natural Resources. The Washington photos are dated 1997.

Timber stands were delineated on the photos by means of stereo photo interpretation. Stands were appropriately updated for changes from the time of exposure to the date of examination from Navy records and field observations. Stands are numbered sequentially in each compartment starting at 1. Stands found different on the ground than called by photo examination are numbered 300 to 399.

Occasionally the number sequence is broken when stands are combined with others or eliminated from the inventory. The numbers from the 1995 inventory are retained where possible. All type calls were verified in the field.

Final photo types were transferred to 1" = 500' base maps by Resource Mapping and Management, Bellevue, WA. The final map products include digitized Arc View (Reg. TM) maps on disk.

Each timber stand is designated by stand number on the photos. On the maps the stands are identified by stand number, species, size class, stocking and decade of origin. A summary of the type symbols used follows.

Species

D	Douglas-fir
H	Western hemlock
RC	Western red cedar
WP	Western white pine
LP	Lodgepole pine (shore pine)
TF	True fir (Grand fir, Silver fir)
SS	Sitka spruce
RA	Red alder (includes aspen, cherry)

BLM	Bigleaf maple
BC	Black Cottonwood
Md	Madrone
Q	Aspen
Hd	Mixed hardwoods

Lower case letter species designations indicate a secondary species which comprises 20% or more of the stand volume as estimated from the aerial photographs or cruisers judgment. The secondary call is useful to indicate that individual stands are somewhat different from the type group in which it is included.

Non-Forest Types

A	Agriculture
Br	Brush
G	Grass
O	Open (developed)

Size Class

4	21" dbh and larger
3	11-21" dbh
2	5-11" dbh
1	0-5" dbh

Occasionally a size class is difficult to determine because of the broad range of diameters present. In this case, the diameter class may be shown as 4/3 indicating a mixture of size class 4 and 3 trees.

Stocking is represented by percent of crown closure, based on aerial photo examination.

Stocking

,3	70-100 percent
,2	40-69 percent
,1	10-39 percent

Decade of origin is shown as a two-digit number following the type call. For instance, 92 indicates that the stand began between 1921 and 1930.

Origin

90	1900
91	1910
92	1920
93	1930
94	1940
95	1950
96	1960
97	1970
98	1980
99	1990
00	2000

For volume compilation purposes, cruise data from individual stands is combined with other similar stands into type groups. The groups contain stands with minor species variances that are unique to that stand, however the volume sample is too small to report individual stand volumes. Occasionally an individual stand may not receive plots or may be too small to be reported separately; in that case, a judgment is made as to the most appropriate type group. When type groups are indicated with an "a", this means that the cruiser chose a different basal area factor for that stand, though the group is the same as other stands.

Type Groups	
0	non-timber stands
1	D1,3
2	D2,1
3	D2,2
4	D2,3
5	D3,1
6	D3,2
6a	Lp3,3
7	D3,3ra
8	D3,3
10	D4/3,3
11	D4,1
12	D4,2
13	D4,3
14	Ra1,3
15	Ra3,3
16	Cw3,3
17	M3,2
18	Rc3,2
19	H3,2
20	H3,3
21	H3,3,d
22	H4,3
23	H4,3,d

Volume is calculated from variable radius plots. The plot grid is designed to attain a 5-percent sampling error. Plot grids ranged from one plot per acre to one plot per 6.5 acres depending on compartment size and tree variability. Plot sizes are chosen to achieve a tree tally of 4 to 8 trees per plot. Merchantable timber is cruised in 32-foot logs, to a 6-inch top or 40-percent of dbh. Volumes are calculated using INFO's PACNW timber cruise program. This program is formula based and allows the use of variable log lengths. Gross volumes are adjusted in the field for visible defect, and again in the office for hidden defect and breakage, ranging from 5 to 15 percent.

Data by species gathered at each measured sample point (generally every other point) are merchantable tree diameter in 1-inch classes and merchantable height. At each point, subsamples of tree form were also gathered. This information is used to calculate volumes.

Growth increment is determined from standard yield tables[1]. Basal area was calculated for each stand as well as site index based on 4 to 20 sample trees per stand. The appropriate cubic and Scribner volume is read from the tables and reported.

Table 1 reports volume data by stand. Table 2 reports volume data by 10-year age class. Table 4 reports volume data by type group.

A variable sub plot was taken at each measure point to measure snags. A fixed length transect was taken at each measure point to measure down woody material to a 4-inch diameter. [2]

A 1/20th acre fixed plot was taken at each point to estimate the coverage of brush and ground covers. In Table 3, the percentage of ground cover by primary species is provided. In some instances, either by reason of sample size or variability of conditions, the ground cover is reported in combinations such as S/F, meaning salal and ferns. The combination codes are found at the end of Table 3.

Table 3 of the report reports snag, down woody and vegetation information as well as per acre volume data by stand.

Maps are provided on disks in ArcView format. Property owner ship information was provided by the Navy. This is adjusted to State Plane Coordinates using electronic information provided by the State of Washington. Roads and other planimetric information as found on the aerial photos are shown with updates provided by the Navy. Timber types are transferred and each stand is shown with numbers and type call information corresponding with the tables. Acres are calculated electronically.

Site Index. Site quality is a term used to describe the relative productivity of a land area for a particular tree species. It is usually defined in terms of capacity to produce wood. The most common expression of site quality is site index. Site index is based on tree growth patterns and refers to the height of dominant or dominant and co-dominant trees in even-aged stands at some index age, usually 100 years. The height growth of such trees is considered to be independent of stand density over a wide range of stand density and strongly related to site quality. Due to prior land management constraints, many stands on NAS Whidbey Island have not been actively managed to maximize tree growth. Thus, the use of site indices may not always reflect actual site productivity potential. One goal of this plan is to achieve well stocked, regulated stands in order to take advantage of site productivity and to restore the coniferous forest cover previously found on these lands. Thus, site indices based on existing stand characteristics may increase with management or time. Site Indices are given in Table 1 for the dominant tree species in each stand.

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[1] Chambers, Charles J. Empirical Growth and Yield Tables for the Douglas fir Zone., Dept. of Natural Resources Report No. 41, 1980.

Chambers, Charles j. Empirical Yield Tables for Predominantly Alder Stands in Western Washington., Department of Natural Resources Report No. 31, 1974.

[2] Howard, James O. and Franklin Ward. Measurement of Logging Residue., UDSDA Forest Service, PNW-13.

Ault Field Inventory

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 11
AULT FIELD

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	1	12.4	D3,3	94	94	TOTAL	1,827	2,306	13.5	790	18	708	254	11	4.2%	227
						D	1,520		14.6	636		570	203			182
						H	12		21.0	14		12	4			4
						RC	5		21.0	2		1	1			0
						WP	0			0		0	0			0
						LP	17		13.0	2		2	0			0
						TF	174		14.1	94		85	32			29
						SS	47		15.7	36		32	12			11
						RA	51		13.9	6		6	1			1
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
14	2	6.1	RA2,3	96	88ra	TOTAL	1,467	749	8.6	194	8	175	59	4	6.3%	53
						D	0			0		0	0			0
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	1,467		9.1	194		175	59			53
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 11
AULT FIELD

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
6	3	3.1	D3,2	93	92	TOTAL	252	256	12.1	58	2	51	39	1	2.7%	35
						D	152		13.8	49		43	15			13
						H	0			0		0	0			0
						RC	2		32.0	3		2	1			1
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0		17.0	1		1	3			2
						SS	0			0		0	0			0
						RA	98		11.5	6		5	20			18
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	4	23.6	G	0		TOTAL										
15	5	33.0	RA3,3	94	78ra	TOTAL	4,689	4,818	12.2	1,397	28	1,249	387	16	4.2%	346
						D	205		14.4	112		101	37			33
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	4,485		13.2	1,285		1,148	351			314
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 11
AULT FIELD

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
3	6	1.5	D3,1	92	90	TOTAL	184	60	6.9	128	0	114	48	0	0.5%	43
						D	177		15.7	122		109	46			41
						H	5		13.0	3		2	1			1
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	2		28.1	3		3	2			1
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
8	7	2.1	D3,3	93	73	TOTAL	309	391	13.5	134	2	120	43	1	2.5%	38
						D	257		14.6	108		96	34			31
						H	2		21.0	2		2	1			1
						RC	1		21.0	0		0	0			0
						WP	0			0		0	0			0
						LP	3		13.0	0		0	0			0
						TF	29		14.1	16		14	5			5
						SS	8		15.7	6		5	2			2
						RA	9		13.9	1		1	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
15	8	2.1	RA3,3	94	73ra	TOTAL	298	307	12.2	89	2	80	25	1	3.7%	22
						D	13		14.4	7		6	2			2
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	285		13.2	82		73	22			20
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
8	9	0.8	D3,3	93	84	TOTAL	118	149	13.5	51	1	46	16	1	3.1%	15
						D	98		14.6	41		37	13			12
						H	1		21.0	1		1	0			0
						RC	0		21.0	0		0	0			0
						WP	0			0		0	0			0
						LP	1		13.0	0		0	0			0
						TF	11		14.1	6		5	2			2
						SS	3		15.7	2		2	1			1
						RA	3		13.9	0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	10	11.8	D3,3	93	99	TOTAL	1,738	2,195	13.5	752	16	674	241	10	4.3%	216
						D	1,447		14.6	605		542	193			173
						H	12		21.0	13		12	4			3
						RC	5		21.0	2		1	1			0
						WP	0			0		0	0			0
						LP	17		13.0	2		2	0			0
						TF	165		14.1	90		81	31			28
						SS	45		15.7	34		31	11			10
						RA	48		13.9	6		5	1			1
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
6	11	8.2	D3,2	93	99	TOTAL	667	678	12.1	154	11	136	104	7	7.0%	93
						D	403		13.8	130		115	40			36
						H	0			0		0	0			0
						RC	6		32.0	7		6	3			2
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0		17.0	2		2	7			6
						SS	0			0		0	0			0
						RA	258		11.5	15		13	54			48
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	12	0.8	BR	0		TOTAL										

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
0	13	2.7	BR	0		TOTAL										
6	14	1.7	D3,2	93	99	TOTAL	138	141	12.1	32	2	28	22	2	7.0%	19
						D	83		13.8	27		24	8			7
						H	0			0		0	0			0
						RC	1		32.0	2		1	1			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0		17.0	0		0	1			1
						SS	0			0		0	0			0
						RA	54		11.5	3		3	11			10
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
15	15	2.0	RA3,3	94	80ra	TOTAL	284	292	12.2	85	0	76	23	1	4.2%	21
						D	12		14.4	7		6	2			2
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	272		13.2	78		70	21			19
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
15	16	24.5	RA3,3	94	78ra	TOTAL	3,481	3,577	12.2	1,037	21	928	288	12	4.2%	257
						D	152		14.4	83		75	27			24
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	3,330		13.2	954		853	260			233
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
6	17	3.6	D3,2,ra	93	88	TOTAL	303	298	11.9	87	2	77	26	1	4.7%	23
						D	177		13.8	57		50	18			16
						H	0			0		0	0			0
						RC	3		32.0	3		3	1			1
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	10		17.0	3		3	1			1
						SS	0			0		0	0			0
						RA	113		11.5	24		21	6			6
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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										Cubic Volume			Scribner Volume			
Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Gross C c.f.	p.a.i. C.c.f.	Net C. c.f.	Gross M b.f.	p.a.i. M b.f.	p.a.i. %	Net M b.f.
15	18	5.4	Ra3,2	97	93ra	TOTAL	767	788	12.2	229	11	204	63	4	6.2%	57
						D	33		14.4	18		17	6			5
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	734		13.2	210		188	57			51
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
15	19	12.4	Ra3,3	94	77ra	TOTAL	1,762	1,810	12.2	525	11	469	146	6	4.2%	130
						D	77		14.4	42		38	14			12
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	1,685		13.2	483		432	132			118
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume			Scribner Volume			
										Gross C c.f.	p.a.i. C.c.f.	Net C. c.f.	Gross M b.f.	p.a.i. M b.f.	p.a.i. %	Net M b.f.
14	20	3.2	Ra2,3	96	88ra	TOTAL	770	393	8.6	102	4	92	31	2	7.0%	28
						D	0			0		0	0			0
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	770		9.1	102		92	31			28
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	21	2.8	Br	0		TOTAL										
8	22	3.4	D3,3	93	80	TOTAL	501	632	13.5	217	4	194	70	2	3.1%	62
						D	417		14.6	174		156	56			50
						H	3		21.0	4		3	1			1
						RC	1		21.0	1		0	0			0
						WP	0			0		0	0			0
						LP	5		13.0	1		0	0			0
						TF	48		14.1	26		23	9			8
						SS	13		15.7	10		9	3			3
						RA	14		13.9	2		2	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
1	23	1.3	D1,2,lp	99	112	TOTAL										
1	24	2.4	D1,3,lp	98	110	TOTAL										
8	25	2.1	D3,3	95	81	TOTAL	309	391	13.5	134	4	120	43	2	4.1%	38
						D	257		14.6	108		96	34			31
						H	2		21.0	2		2	1			1
						RC	1		21.0	0		0	0			0
						WP	0			0		0	0			0
						LP	3		13.0	0		0	0			0
						TF	29		14.1	16		14	5			5
						SS	8		15.7	6		5	2			2
						RA	9		13.9	1		1	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
3	26	1.4	D2,2	97	108	TOTAL	105	56	8.8	11	1	10	3	1	21.3%	2
						D	105		9.7	10		9	2			2
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0		13.0	1		1	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
							0			0		0	0			0
0	27	7.9	O	0		TOTAL										0
1	28	9.8	D1,2,lp	98		TOTAL	TAL									
1	29	35.8	D1,2,lp	98		TOTAL	TAL									
1	30	9.4	D1,2,lp	98		TOTAL	TAL									
0	31	1.8	Br	0		TOTAL										
0	32	1.6	Br	0		TOTAL										

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Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
15	33	1.6	Ra3,3	96	80ra	TOTAL	227	234	12.2	68	2	61	19	1	3.9%	17
						D	10		14.4	5		5	2			2
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	217		13.2	62		56	17			15
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
6	34	5.0	D3,2	96	92	TOTAL	421	414	11.9	57	3	107	37	2	4.2%	32
						D	246		13.8	16		70	25			22
						H	0			0		0	0			0
						RC	4		32.0	4		4	2			1
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	14		17.0	4		4	1			1
						SS	0			0		0	0			0
						RA	158		11.5	33		30	9			8
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
6	35	23.8	D3,2,ra	96	90	TOTAL	2,002	1,968	11.9	576	26	510	174	12	7.0%	383
						D	1,169		13.8	377		333	117			333
						H	0		13.0	0		0	0			0
						RC	17		32.0	21		18	8			7
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	67		17.0	21		19	6			5
						SS	0			0		0	0			0
						RA	750		11.5	156		141	43			38
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	36	2.8	Br	0		TOTAL	0	0	0	0	0	0	0	0	0	0
15	37	5.0	Ra3,3	96	86	TOTAL	711	730	12.2	212	6	189	59	3	4.8%	52
						D	31		14.4	17		15	6			5
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	680		13.2	195		174	53			48
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
0	38	5.7	Br	0		TOTAL										
0	40	3.9	Br	0		TOTAL										
0	41	21.8	G	0		TOTAL										
0	43	36.2	Br	0		TOTAL										
0	44	16.7	O	0		TOTAL										
0	45	117.3	O	0		TOTAL										
3	46	15.1	D3,1	97	88	TOTAL	1,243	604	8.4	121	10	109	28	4	13.6%	24
						D	1,134		9.7	110		99	26			23
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	109		13.0	12		11	2			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	47	8.5	Br	0		TOTAL										

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Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
6	48	6.7	D3,2,ra	97	140	TOTAL	564	554	11.9	162	12	144	49	7	13.5%	108
						D	329		13.8	106		94	33			94
						H	0		13.0	0		0	0			0
						RC	5		32.0	6		5	2			2
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	19		17.0	6		5	2			2
						SS	0			0		0	0			0
						RA	211		11.5	44		40	12			11
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
14	49	5.4	Ra2,3	96	64	TOTAL	1,299	663	8.6	172	5	155	52	2	3.7%	47
						D	0			0		0	0			0
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	1,299		9.1	172		155	52			47
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	50	8.0	D3,3	96	111	TOTAL	1,178	1,488	13.5	510	21	457	164	11	7.0%	147
						D	981		14.6	410		368	131			118
						H	8		21.0	9		8	3			2
						RC	3		21.0	1		1	0			0
						WP	0			0		0	0			0
						LP	11		13.0	1		1	0			0
						TF	112		14.1	61		55	21			19
						SS	30		15.7	23		21	8			7
						RA	33		13.9	4		4	1			1
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
8	51	8.7	D3,3	96	95	TOTAL	1,282	1,618	13.5	554	18	497	178	11	6.1%	159
						D	1,067		14.6	446		400	143			128
						H	9		21.0	9		9	3			3
						RC	3		21.0	1		1	0			0
						WP	0			0		0	0			0
						LP	12		13.0	1		1	0			0
						TF	122		14.1	66		60	23			20
						SS	33		15.7	25		23	8			8
						RA	36		13.9	4		4	1			1
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	53	28.1	G	0		TOTAL										

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NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
6a	54	5.0	D3,2,lp	97	110	TOTAL	548	500	11.5	94	12	84	18	5	30.1%	16
						D	161		11.7	35		32	8			7
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	387		13.4	58		52	10			9
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
6a	55	2.7	D3,2,ra	96	85	TOTAL	296	270	11.5	51	3	46	9	1	14.9%	9
						D	87		11.7	19		17	4			4
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	209		13.4	31		28	5			5
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
6a	56	3.2	Lp3,3,d	97	80	TOTAL	350	320	11.5	60	7	54	11	2	20%	10
						D	103		11.7	23		20	5			5
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	248		13.4	37		34	6			5
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
3	57	4.9	D3,2,lp	97	80	TOTAL	368	196	8.8	36	4	32	23	1	6.1%	8
						D	368		9.7	36		32	23			8
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
14	58	5.5	Ra2,3,d	97	80ra	TOTAL	1,323	675	8.6	175	12	158	53	5	8.7%	48
						D	0			0		0	0			0
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	1,323		9.1	175		158	53			48
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
14	59	3.4	Ra2,3	97	80ra	TOTAL	818	418	8.6	108	3	98	33	1	4.2%	30
						D	0			0		0	0			0
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	818		9.1	108		98	33			30
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
15	60	1.7	Ra3,3	93	90ra	TOTAL	242	248	12.2	72	2	64	20	1	6.3%	18
						D	11		14.4	6		5	2			2
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	231		13.2	66		59	18			16
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
10	61	3.4	D4,3,3	92	63	TOTAL	240	388	15.2	140	2	128	50	1	1.8%	45
						D	152		19.4	104		94	37			34
						H	52		9.0	15		13	5			5
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	36		17.0	21		20	7			6
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
15	62	5.4	Ra3,3	95	85ra	TOTAL	767	788	12.2	229	5	204	63	3	4.1%	57
						D	33		14.4	18		17	6			5
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	734		13.2	210		188	57			51
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
13	63	8.7	D4,3	92	106	TOTAL	643	1,541	18.6	558	11	493	278	8	2.7%	247
						D	478		23.7	546		483	213			188
						H	165		13.0	11		10	65			59
						RC	0	0	0	0	0	0	0	0	0	0
						WP	0	0	0	0	0	0	0	0	0	0
						LP	0	0	0	0	0	0	0	0	0	0
						TF	0	0	0	0	0	0	0	0	0	0
						SS	0	0	0	0	0	0	0	0	0	0
						RA	0	0	0	0	0	0	0	0	0	0
						BLM	0	0	0	0	0	0	0	0	0	0
						BC	0	0	0	0	0	0	0	0	0	0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
1	64	5.6	D1,3,lp	98	110	TOTAL	0	0		0		0	0			0
15	65	4.1	Ra3,3	97	97ra	TOTAL	583	599	12.2	174	6	155	48	4	7.4%	43
						D	25		14.4	14		13	5			4
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	557		13.2	160		143	44			39
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	66	366.7	A	0		TOTAL										
0	67	7.5	G	0		TOTAL										
0	68	116.5	G	0		TOTAL										
0	69	48.9	Br	0		TOTAL										
0	70	18.1	G	0		TOTAL										
0	71	26.2	G	0		TOTAL										
0	72	2.8	G	0		TOTAL										

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Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
0	73	14.7	G	0		TOTAL										
0	74	65.1	Br	0		TOTAL										
0	75	14.4	A	0		TOTAL										
0	76	47.0	A	0		TOTAL										
0	77	23.5	A	0		TOTAL										
0	78	126.2	G	0		TOTAL										
0	79	15.6	Br	0		TOTAL										
0	80	36.4	G	0		TOTAL										
0	81	38.1	G	0		TOTAL										
0	82	14.7	G	0		TOTAL										
0	83	20.0	G	0		TOTAL										
0	84	71.6	G	0		TOTAL										
0	85	20.1	O	0		TOTAL										
0	86	160.3	G	0		TOTAL										
0	87	28.2	Br	0		TOTAL										

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Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
0	88	7.6	G	0		TOTAL										
0	89	32.2	G	0		TOTAL										
0	90	37.3	G	0		TOTAL										
0	91	8.9	G	0		TOTAL										
0	92	8.8	G	0		TOTAL										
0	93	20.1	G	0		TOTAL										
0	94	16.6	G	0		TOTAL										
0	95	995.4	O	0		TOTAL										
0	96	8.1	G	0		TOTAL										
0	97	7.6	G	0		TOTAL										
0	98	67.7	A	0		TOTAL										
0	99	15.2	A	0		TOTAL										
0	100	28.9	G	0		TOTAL										
0	101	15.1	G	0		TOTAL										

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
1	102	10.7	D1,3,lp	98	90											
13	103	17.2	D4,3,h	96	129	TOTAL	1,271	3,046	18.6	1,103	46	975	550	28	5.0%	488
						D	944		23.7	1,080		955	421			372
						H	327		13.0	23		20	129			116
						RC	0	0	0	0	0	0	0	0	0	0
						WP	0	0	0	0	0	0	0	0	0	0
						LP	0	0	0	0	0	0	0	0	0	0
						TF	0	0	0	0	0	0	0	0	0	0
						SS	0	0	0	0	0	0	0	0	0	0
						RA	0	0	0	0	0	0	0	0	0	0
						BLM	0	0	0	0	0	0	0	0	0	0
						BC	0	0	0	0	0	0	0	0	0	0
14	104	2.9	Ra2,3	97	90ra	TOTAL	697	356	8.6	92	4	83	28	1	5.2%	25
						D	0			0		0	0			0
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	697		9.1	92		83	28			25
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	106	4.9	D3,3	87	83	TOTAL	722	911	13.5	312	4	280	100	2	2.4%	90
						D	601		14.6	251		225	80			72
						H	5		21.0	5		5	2			1
						RC	2		21.0	1		1	0			0
						WP	0			0		0	0			0
						LP	7		13.0	1		1	0			0
						TF	69		14.1	37		34	13			11
						SS	19		15.7	14		13	5			4
						RA	20		13.9	2		2	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	107	2.0	O	0		TOTAL										
8	108	5.1	D3,3	93	90	TOTAL	751	949	13.5	325	7	291	104	4	3.8%	93
						D	625		14.6	262		234	84			75
						H	5		21.0	6		5	2			1
						RC	2		21.0	1		1	0			0
						WP	0			0		0	0			0
						LP	7		13.0	1		1	0			0
						TF	71		14.1	39		35	13			12
						SS	19		15.7	15		13	5			4
						RA	21		13.9	3		2	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
3	109	4.5	D2,2	97	110	TOTAL	370	180	8.4	33	29	30	11	4	38.7%	10
						D	338		9.7	33		29	8			7
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	32		13.0	1		1	4			3
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
15	110	5.0	Ra3,3,d	96	80ra	TOTAL	711	730	12.2	212	5	189	59	2	3.9%	52
						D	31		14.4	17		15	6			5
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	680		13.2	195		174	53			48
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	111	6.5	0	0		TOTAL										

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Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume			Scribner Volume			
										Gross C c.f.	p.a.i. C.c.f.	Net C. c.f.	Gross M b.f.	p.a.i. M b.f.	p.a.i. %	Net M b.f.
8	112	10.0	D3,3	91	98	TOTAL	1,473	1,860	13.5	637	11	571	204	7	3.6%	183
						D	1,226		14.6	513		460	164			147
						H	10		21.0	11		10	3			3
						RC	4		21.0	2		1	0			0
						WP	0			0		0	0			0
						LP	14		13.0	2		1	0			0
						TF	140		14.1	76		69	26			23
						SS	38		15.7	29		26	10			9
						RA	41		13.9	5		5	1			1
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	113	6.8	G	0		TOTAL										0
14	114	9.8	Ra2,3	97	100ra	TOTAL	2,357	1,203	8.6	312	14	281	95	6	6.2%	85
						D	0			0		0	0			0
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	2,357		9.1	312		281	95			85
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	115	9.6	O	0		TOTAL										0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	116	2.7	D3,3	91	79	TOTAL	398	502	13.5	172	2	154	55	1	2.4%	49
						D	331		14.6	138		124	44			40
						H	3		21.0	3		3	1			1
						RC	1		21.0	0		0	0			0
						WP	0			0		0	0			0
						LP	4		13.0	0		0	0			0
						TF	38		14.1	21		18	7			6
						SS	10		15.7	8		7	3			2
						RA	11		13.9	1		1	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	117	64.9	G	0		TOTAL										0
0	118	148.2	G	0		TOTAL										0
10	119	2.0	D4,2	93	60	TOTAL	141	228	15.2	111	1	109	97	1	0.6%	96
						D	90	90	90	90	90	90	90	90	90	90
						H	30		9.0	9		8	3			3
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	21		17.0	12		12	4			4
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	120	5.1	D3,3	93	72	TOTAL	751	949	13.5	325	5	291	104	3	2.5%	93
						D	625		14.6	262		234	84			75
						H	5		21.0	6		5	2			1
						RC	2		21.0	1		1	0			0
						WP	0			0		0	0			0
						LP	7		13.0	1		1	0			0
						TF	71		14.1	39		35	13			12
						SS	19		15.7	15		13	5			4
						RA	21		13.9	3		2	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
8	121	2.5	D3,3	93	72	TOTAL	368	465	13.5	159	3	143	51	1	2.5%	46
						D	307		14.6	128		115	41			37
						H	3		21.0	3		2	1			1
						RC	1		21.0	0		0	0			0
						WP	0			0		0	0			0
						LP	4		13.0	0		0	0			0
						TF	35		14.1	19		17	6			6
						SS	10		15.7	7		7	2			2
						RA	10		13.9	1		1	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	122	1.8	Br	0	110	TOTAL	0		0.0	0						

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
0	123	81.4	A	0		TOTAL										
0	124	48.5	A	0		TOTAL										
8	125	13.2	D3,3	93	80	TOTAL	1,944	2,455	13.5	841	15	754	270	8	3.1%	242
						D	1,618		14.6	677		607	216			194
						H	13		21.0	14		13	4			4
						RC	5		21.0	2		1	1			0
						WP	0			0		0	0			0
						LP	18		13.0	2		2	0			0
						TF	185		14.1	100		90	34			31
						SS	50		15.7	38		34	13			11
						RA	54		13.9	7		6	1			1
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
8	126	1.8	D3,3	93	80	TOTAL	265	335	13.5	115	2	103	37	1	3.1%	33
						D	221		14.6	92		83	30			26
						H	2		21.0	2		2	1			1
						RC	1		21.0	0		0	0			0
						WP	0			0		0	0			0
						LP	3		13.0	0		0	0			0
						TF	25		14.1	14		12	5			4
						SS	7		15.7	5		5	2			2
						RA	7		13.9	1		1	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
0	127	82.5	A	0		TOTAL										
8	128	0.7	D3,3	93	100	TOTAL	103	130	13.5	45	1	40	14	1	4.3%	13
						D	86		14.6	36		32	11			10
						H	1		21.0	1		1	0			0
						RC	0		21.0	0		0	0			0
						WP	0			0		0	0			0
						LP	1		13.0	0		0	0			0
						TF	10		14.1	5		5	2			2
						SS	3		15.7	2		2	1			1
						RA	3		13.9	0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
13	129	7.2	D4,3	93	100	TOTAL	532	1,339	19.0	462	10	408	230	6	2.8%	204
						D	395		23.7	452		400	176			156
						H	137		13.0	9		9	54			49
						RC	0	0	0	0	0	0	0	0	0	0
						WP	0	0	0	0	0	0	0	0	0	0
						LP	0	0	0	0	0	0	0	0	0	0
						TF	0	0	0	0	0	0	0	0	0	0
						SS	0	0	0	0	0	0	0	0	0	0
						RA	0	0	0	0	0	0	0	0	0	0
						BLM	0	0	0	0	0	0	0	0	0	0
						BC	0	0	0	0	0	0	0	0	0	0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	130	1.2	D3,3	90	70	TOTAL	177	223	13.5	76	1	69	25	0	1.8%	22
						D	147		14.6	62		55	20			18
						H	1		21.0	1		1	0			0
						RC	0		21.0	0		0	0			0
						WP	0			0		0	0			0
						LP	2		13.0	0		0	0			0
						TF	17		14.1	9		8	3			3
						SS	5		15.7	3		3	1			1
						RA	5		13.9	1		1	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	131	206.8	G	0		TOTAL										
8	132	21.0	D3,3	93	70	TOTAL	3,093	3,906	13.5	1,338	21	1,199	429	11	2.5%	385
						D	2,575		14.6	1,077		965	344			308
						H	21		21.0	23		21	7			6
						RC	8		21.0	3		2	1			1
						WP	0			0		0	0			0
						LP	29		13.0	3		3	1			0
						TF	294		14.1	160		144	54			49
						SS	80		15.7	61		55	20			18
						RA	86		13.9	11		10	2			2
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume			Scribner Volume			
										Gross C c.f.	p.a.i. C.c.f.	Net C. c.f.	Gross M b.f.	p.a.i. M b.f.	p.a.i. %	Net M b.f.
15	133	1.4	Ra3,3	90	70	TOTAL	199	260	13.7	59	1	53	16	1	3.6%	15
						D	9		14.4	5		4	2			1
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	190		13.2	55		49	15			13
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
8	134	6.2	D3,3	90	70	TOTAL	913	1,153	13.5	395	5	354	127	2	1.8%	114
						D	760		14.6	318		285	102			91
						H	6		21.0	7		6	2			2
						RC	2		21.0	1		1	0			0
						WP	0			0		0	0			0
						LP	9		13.0	1		1	0			0
						TF	87		14.1	47		42	16			14
						SS	24		15.7	18		16	6			5
						RA	25		13.9	3		3	1			1
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	135	3.0	D3,3	93	65	TOTAL	442	558	13.5	191	3	171	61	2	2.5%	55
						D	368		14.6	154		138	49			44
						H	3		21.0	3		3	1			1
						RC	1		21.0	0		0	0			0
						WP	0			0		0	0			0
						LP	4		13.0	0		0	0			0
						TF	42		14.1	23		21	8			7
						SS	11		15.7	9		8	3			3
						RA	12		13.9	2		1	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	136	2.7	Br	0		TOTAL										
15	137	4.2	Ra3,3,d	93	80ra	TOTAL	384	613	15.2	114	3	102	32	2	4.9%	28
						D	17		14.4	9		8	3			3
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	367		13.2	105		94	29			26
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	138	1.8	D3,3	93	88	TOTAL	265	335	13.5	115	2	103	37	1	3.8%	33
						D	221		14.6	92		83	30			26
						H	2		21.0	2		2	1			1
						RC	1		21.0	0		0	0			0
						WP	0			0		0	0			0
						LP	3		13.0	0		0	0			0
						TF	25		14.1	14		12	5			4
						SS	7		15.7	5		5	2			2
						RA	7		13.9	1		1	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	139	2.4	Br	0		TOTAL										
8	140	12.4	D3,3	93	99	TOTAL	1,827	2,306	13.5	790	17	708	254	11	4.3%	227
						D	1,520		14.6	636		570	203			182
						H	12		21.0	14		12	4			4
						RC	5		21.0	2		1	1			0
						WP	0			0		0	0			0
						LP	17		13.0	2		2	0			0
						TF	174		14.1	94		85	32			29
						SS	47		15.7	36		32	12			11
						RA	51		13.9	6		6	1			1
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
10	141	32.4	D4/3,3	93	110	TOTAL	2,291	3,694	15.2	1,796	74	1,773	1,571	48	3.1%	1,559
						D	1,452	1,452	1,452	1,452	1,452	1,452	1,452	1,452	1,452	1,452
						H	492		9.0	143		129	51			45
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	347		17.0	202		193	69			62
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	142	4.4	Br	0		TOTAL										
8	143	13.2	D3,3	93	88	TOTAL	1,944	2,455	13.5	841	17	754	270	10	3.8%	242
						D	1,618		14.6	677		607	216			194
						H	13		21.0	14		13	4			4
						RC	5		21.0	2		1	1			0
						WP	0			0		0	0			0
						LP	18		13.0	2		2	0			0
						TF	185		14.1	100		90	34			31
						SS	50		15.7	38		34	13			11
						RA	54		13.9	7		6	1			1
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
6	144	2.2	D3,2	93	80	TOTAL	185	140	10.4	141	2	47	63	1	1.7%	35
						D	108		13.8	35		31	11			31
						H	0		13.0	0		0	0			0
						RC	2		32.0	2		2	1			1
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	6		17.0	2		2	1			1
						SS	0			0		0	0			0
						RA	69		11.5	14		13	4			4
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	145	9.9	Br	0		TOTAL										
8	146	4.0	D3,3	93	70	TOTAL	589	744	13.5	255	2	228	82	1	1.4%	73
						D	490		14.6	205		184	66			59
						H	4		21.0	4		4	1			1
						RC	2		21.0	1		0	0			0
						WP	0			0		0	0			0
						LP	6		13.0	1		1	0			0
						TF	56		14.1	30		27	10			9
						SS	15		15.7	12		10	4			3
						RA	16		13.9	2		2	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type	Stand			Dec.	Site		#	Basal	Ave	Cubic Volume			Scribner Volume			
Group	No.	Acres	Type	Origin	Index	Species	Trees	Area s.f.	DBH In.	Gross C c.f.	p.a.i. C.c.f.	Net C. c.f.	Gross M b.f.	p.a.i. M b.f.	p.a.i. %	Net M b.f.
8	147	1.4	D3,3	93	63	TOTAL	206	260	13.5	89	2	80	29	1	3.9%	26
						D	172		14.6	72		64	23			21
						H	1		21.0	2		1	0			0
						RC	1		21.0	0		0	0			0
						WP	0			0		0	0			0
						LP	2		13.0	0		0	0			0
						TF	20		14.1	11		10	4			3
						SS	5		15.7	4		4	1			1
						RA	6		13.9	1		1	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	148	3.2	G	0		TOTAL										
0	149	6.2	O	0		TOTAL										
0	150	8.1	G	0		TOTAL										
0	152	35.6	G	0		TOTAL										
0	157	10.7	O	0		TOTAL										

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
15	200	4.4	Ra3,3	95	110	TOTAL	625	818	13.7	186	9	167	52	5	10.5%	46
						D	27		14.4	15		13	5			4
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	598		13.2	171		153	47			42
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
15	201	2.0	Ra3,3	95	80ra	TOTAL	284	292	12.2	0	18	0	76	1	1.3%	0
						D	12		14.4	7		6	2			2
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	272		13.2	78		70	21			19
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
15	204	2.0	Ra3,3	97	80ra	TOTAL	284	292	12.2	85	2	76	23	1	3.4%	21
						D	12		14.4	7		6	2			2
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	272		13.2	78		70	21			19
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
15	209	2.2	Ra3,3	96	84	TOTAL	313	321	12.2	93	2	83	26	1	3.9%	23
						D	14		14.4	7		7	2			2
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	299		13.2	86		77	23			21
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
15	212	1.9	Ra3,3	97	80ra	TOTAL	270	277	12.2	80	2	72	22	1	3.4%	20
						D	12		14.4	6		6	2			2
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	258		13.2	74		66	20			18
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
1	214	2.3	D1,2,ra	98	110	TOTAL										
15	219	1.1	Ra3,2	97	80ra	TOTAL	156	161	12.2	47	2	42	13	1	6.0%	12
						D	7		14.4	4		3	1			1
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	149		13.2	43		38	12			10
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume			Scribner Volume			
										Gross C c.f.	p.a.i. C.c.f.	Net C. c.f.	Gross M b.f.	p.a.i. M b.f.	p.a.i. %	Net M b.f.
0	224	61.9	A	0		TOTAL										
8	235	3.9	D3,3	93	110	TOTAL	574	725	13.5	248	6	223	80	4	4.9%	71
						D	478		14.6	200		179	64			57
						H	4		21.0	4		4	1			1
						RC	2		21.0	1		0	0			0
						WP	0			0		0	0			0
						LP	5		13.0	1		1	0			0
						TF	55		14.1	30		27	10			9
						SS	15		15.7	11		10	4			3
						RA	16		13.9	2		2	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
1	248	1.6	D1,3	98	110											
0	249	2.9	G			TOTAL										
0	250	4.8	G			TOTAL										
0	251	2.9	G			TOTAL										
0	252	7.0	Br			TOTAL										
0	266	9.9	O			TOTAL										

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
TOTALS - FOREST LAND																
# Stands	85	563.5					62,949	69,676	945	22,527	667	20,301	8,591	351	4%	8,036
NON-FOREST LAND																
# Stands	78	3,665.9														
GRAND TOTAL																
# Stands	163	4,229.4														

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	p.a.i. %	Net M b.f.
3665.90	0											
1.30	99											
77.60	98											
72.80	97	TOTAL	10,220	6,581	9.6	1,646	126	1,477	473	44	9.3%	474
		D	2,602			388		347	116	0		156
		H	0			0		0	0	0		0
		RC	5			6		5	2	0		2
		WP	0			0		0	0	0		0
		LP	776			109		98	21	0		18
		TF	19			6		5	2	0		2
		SS	0			0		0	0	0		0
		RA	6,819			1,137		1,021	331	0		298
		BLM	0			0		0	0	0		0
		BC	0			0		0	0	0		0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	p.a.i. %	Net M b.f.
93.90	96	TOTAL	11,945	12,624	12.3	3,903	147	3,536	1,415	80	5.6%	1,491
		D	4,578			2,396	0	2,185	856	0		990
		H	344			41	0	37	134	0		121
		RC	27			28	0	24	10	0		9
		WP	0			0	0	0	0	0		0
		LP	232			34	0	31	6	0		5
		TF	314			152	0	137	51	0		45
		SS	63			48	0	43	16	0		15
		RA	6,386			1,204	0	1,080	342	0		307
		BLM	0			0	0	0	0	0		0
		BC	0			0	0	0	0	0		0
13.90	95	TOTAL	1,986	2,289	12.9	549	35	491	234	11	4.6%	141
		D	331			148	0	133	47	0		43
		H	2			2	0	2	1	0		1
		RC	1			0	0	0	0	0		0
		WP	0			0	0	0	0	0		0
		LP	3			0	0	0	0	0		0
		TF	29			16	0	14	5	0		5
		SS	8			6	0	5	2	0		2
		RA	1,612			460	0	412	126	0		112
		BLM	0			0	0	0	0	0		0
		BC	0			0	0	0	0	0		0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	p.a.i. %	Net M b.f.
86.4	94	TOTAL	12,342	13,110	12.4	3,922	80	3,510	1,122	47	4.2%	1,004
		D	1,979			887	0	796	285	0		256
		H	12			14	0	12	4	0		4
		RC	5			2	0	1	1	0		0
		WP	0			0	0	0	0	0		0
		LP	17			2	0	2	0	0		0
		TF	174			94	0	85	32	0		29
		SS	47			36	0	32	12	0		11
		RA	10,107			2,887	0	2,581	788	0		704
		BLM	0			0	0	0	0	0		0
		BC	0			0	0	0	0	0		0
173.50	93	TOTAL	20,925	27,574	13.8	9,855	236	8,918	4,396	143	3.3%	4,076
		D	16,029			7,804	1,541	7,143	3,572	1,541		3,379
		H	767			278	0	250	143	0		128
		RC	56			34	0	26	11	0		9
		WP	0			0	0	0	0	0		0
		LP	150			17	0	15	3	0		2
		TF	1,885			1,038	0	947	363	0		327
		SS	407			310	0	279	104	0		93
		RA	1,630			287	0	258	153	0		137
		BLM	0			0	0	0	0	0		0
		BC	0			0	0	0	0	0		0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	p.a.i. %	Net M b.f.
13.60	92	TOTAL	1,067	1,988	16.4	826	13	735	376	9	2.3%	334
		D	807	0		773	0	686	296	0		262
		H	222	0		29	0	26	71	0		64
		RC	0	0		0	0	0	0	0		0
		WP	0	0		0	0	0	0	0		0
		LP	0	0		0	0	0	0	0		0
		TF	38	0		24	0	23	9	0		8
		SS	0	0		0	0	0	0	0		0
		RA	0	0		0	0	0	0	0		0
		BLM	0	0		0	0	0	0	0		0
		BC	0	0		0	0	0	0	0		0
12.7	91	TOTAL	1,871	2,362	13.5	809	14	725	260	9	3.3%	233
		D	1,557			651	0	584	208	0		187
		H	13			14	0	12	4	0		4
		RC	5			2	0	1	1	0		0
		WP	0			0	0	0	0	0		0
		LP	18			2	0	2	0	0		0
		TF	178			97	0	87	33	0		30
		SS	48			37	0	33	12	0		11
		RA	52			6	0	6	1	0		1
		BLM	0			0	0	0	0	0		0
		BC	0			0	0	0	0	0		0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	p.a.i. %	Net M b.f.
12.9	90	TOTAL	1,872	2,235	13.1	704	12	631	216	7	3.2%	193
		D	941			398	0	357	127	0		114
		H	7			8	0	7	2	0		2
		RC	3			1	0	1	0	0		0
		WP	0			0	0	0	0	0		0
		LP	10			1	0	1	0	0		0
		TF	104			56	0	51	19	0		17
		SS	28			21	0	19	7	0		6
		RA	778			218	0	195	59	0		53
		BLM	0			0	0	0	0	0		0
		BC	0			0	0	0	0	0		0
4.9	87	TOTAL	722	911	13.5	312	4	280	100	2	2.4%	90
		D	601			251	0	225	80	0		72
		H	5			5	0	5	2	0		1
		RC	2			1	0	1	0	0		0
		WP	0			0	0	0	0	0		0
		LP	7			1	0	1	0	0		0
		TF	69			37	0	34	13	0		11
		SS	19			14	0	13	5	0		4
		RA	20			2	0	2	0	0		0
		BLM	0			0	0	0	0	0		0
		BC	0			0	0	0	0	0		0

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TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	p.a.i. %	Net M b.f.
TOTALS - FOREST LAND												
563.5			62,949	69,676	12.6	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
NON-FOREST LAND												
3665.9												
GRAND TOTAL												
4,229.40												

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
8	1	12.4	D3,3	94	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
14	2	6.1	RA2,3	96	9	*SB/N	69%	372	4.5	4.5	22.6
6	3	3.1	D3,2	93	9	*S/SB	40%	1,543	9.2	10.0	4.9
0	4	23.6	G								
15	5	33	RA3,3	94	12	Salmon berry	32%	1,050	10.5	16.5	0.39
6	6	1.5	D3,1	92	9	*S/SB	40%	1,543	9.2	10.0	4.9
8	7	2.1	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
15	8	2.1	RA3,3	94	12	Salmon berry	32%	1,050	10.5	16.5	0.4
8	9	0.8	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
8	10	11.8	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
6	11	8.2	D3,2	93	9	*S/SB	40%	1,543	9.2	10.0	4.9
0	12	0.8	BR								
0	13	2.7	BR								
6	14	1.7	D3,2	93	9	*S/SB	40%	1,543	9.2	10.0	4.9

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
15	15	2	RA3,3	94	12	Salmon berry	32%	1,050	10.5	16.5	0.4
15	16	24.5	RA3,3	94	12	Salmon berry	32%	1,050	10.5	16.5	0.4
6	17	3.6	D3,2,ra	93	9	*S/SB	40%	1,543	9.2	10.0	4.9
15	18	5.4	Ra3,2	97	12	Salmon berry	32%	1,050	10.5	16.5	0.4
15	19	12.4	Ra3,3	94	12	Salmon berry	32%	1,050	10.5	16.5	0.4
14	20	3.2	Ra2,3	96	9	*SB/N	69%	372	4.5	4.5	22.6
0	21	2.8	Br								
8	22	3.4	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
1	23	1.3	D1,2,lp	99							
1	24	2.4	D1,3,lp	98							
8	25	2.1	D3,3	95	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
3	26	1.4	D2,2	97	2	Salal	50%	494	7.3	0.0	0
0	27	7.9	O								
1	28	9.8	D1,2,lp	98							

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NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
1	29	35.8	D1,2,lp	98							
1	30	9.4	D1,2,lp	98							
0	31	1.8	Br								
0	32	1.6	Br								
15	33	1.6	Ra3,3	96	12	Salmon berry	32%	1,050	10.5	16.5	0.4
6	34	5	D3,2	96	9	*S/SB	40%	1,543	9.2	10.0	4.9
6	35	23.8	D3,2,ra	96	9	*S/SB	40%	1,543	9.2	10.0	4.9
0	36	2.8	Br								
15	37	5	Ra3,3	96	12	Salmon berry	32%	1,050	10.5	16.5	4
3	46	15.1	D3,1	97	2	Salal	50%	494	7.3	0.0	0
6	48	6.7	D3,2,ra	97	9	*S/SB	40%	1,543	9.2	10.0	4.9
14	49	5.4	Ra2,3	96	9	*SB/N	69%	372	4.5	4.5	22.6
8	50	8	D3,3	96	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
8	51	8.7	D3,3	96	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24

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TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
6a	54	5.00	D3,2,lp	97	4	*SA/R	53%	0	0.0	0.0	0
6a	55	2.7	D3,2,ra	96	4	*SA/R	53%	0	0.0	0.0	0
6a	56	3.2	Lp3,3,d	97	4	*SA/R	53%	0	0.0	0.0	0
3	57	4.9	D3,2,lp	97	2	Salal	50%	494	7.3	0.0	0
14	58	5.5	Ra2,3,d	97	9	*SB/N	69%	372	4.5	4.5	22.6
14	59	3.4	Ra2,3	97	9	*SB/N	69%	372	4.5	4.5	22.6
15	60	1.7	Ra3,3	93	12	Salmon berry	32%	1,050	10.5	16.5	0.4
10	61	3.4	D4,3,3	92	17	*SA/HZ	28%	2,010	14.4	14.4	13.1
15	62	5.4	Ra3,3	95	12	Salmon berry	32%	1,050	10.5	16.5	0.4
13	63	8.7	D4,3	92	29	*SA/HZ	50%	1,191	6.5	9.5	21.8
1	64	5.6	D1,3,lp	98							
15	65	4.1	Ra3,3	90	12	Salmon berry	32%	1,050	10.5	16.5	0.4
1	102	10.7	D1,3,lp	98							
13	103	17.2	D4,3,h	96	29	*SA/HZ	50%	1,191	6.5	9.5	21.8

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AULT FIELD

TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
14	104	2.9	Ra2,3	97	9	*SB/N	69%	372	4.5	4.5	22.6
8	106	4.9	D3,3	87	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
0	107	2	O								
8	108	5.1	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
3	109	4.5	D2,2	97	2	Salal	50%	494	7.3	0.0	0
15	110	5	Ra3,3,d	96	12	Salmon berry	32%	1,050	10.5	16.5	0.4
0	111	6.5	0								
8	112	10	D3,3	91	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
0	113	6.8	G								
14	114	9.8	Ra2,3	97	9	*SB/N	69%	372	4.5	4.5	22.6
0	115	9.6	O								
8	116	2.7	D3,3	91	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
10	119	2	D4,2	93	17	*SA/HZ	28%	2,010	14.4	14.4	13.1
8	120	5.1	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
8	121	2.50	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 11
AULT FIELD

TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
0	122	1.8	Br	98							
8	125	13.2	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
15	126	1.8	Ra3,3	93	12	*SA/HZ/EB	24%	1,576	8.7	6.9	24
0	127	82.5	A	98							
8	128	0.7	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
8	129	7.2	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
8	130	1.2	D3,3	90	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
8	132	21	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
8	133	1.4	D3,3	90	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
8	134	6.2	D3,3	90	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
8	135	3	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
15	137	4.2	Ra3,3,d	93	12	Salmon berry	32%	1,050	10.5	16.5	0.4
8	138	1.8	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
8	140	12.4	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
10	141	32.4	D4/3,3	93	17	*SA/HZ	28%	2,010	14.4	14.4	13.1

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 11
AULT FIELD

TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
8	143	13.2	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
6	144	2.2	D3,2	93	9	*S/SB	40%	1,543	9.2	10.0	4.9
8	146	4	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
8	147	1.4	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
15	200	4.40	Ra3,3	95	12	Salmon berry	32%	1,050	10.5	16.5	0.4
15	201	2.00	Ra3,3	95	12	Salmon berry	32%	1,050	10.5	16.5	0.4
15	204	2.00	Ra3,3	97	12	Salmon berry	32%	1,050	10.5	16.5	0.4
15	209	2.20	Ra3,3	96	12	Salmon berry	32%	1,050	10.5	16.5	0.4
15	212	1.90	Ra3,3	97	12	Salmon berry	32%	1,050	10.5	16.5	0.4
15	219	1.10	Ra3,2	97	12	Salmon berry	32%	1,050	10.5	16.5	0.4
8	235	3.9	D3,3	93	21	*SA/HZ/EB	24%	1,576	8.7	6.9	24
1	248	1.6	D1,3	98							

*SA/HZ/EB (Salal/Hazel/Elderberry)
*SB/N(Salmon berry/Nettles)
*S/SB (Salal/Salmon berry)
*SA/R (Salal/Rose)
*SA/HZ (Salal/Hazel)

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 11
AULT FIELD

TABLE 4 - TYPE GROUP SUMMARY

GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.		Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined			120	4.56%
3	TOTAL	82	40.0	8.4	1,648		723	5	15%
	D	75.1		9.7	1,531		653		
	H								
	RC								
	WP								
	LP	7.2		13	117		70		
	TF								
	SS								
	RA								
	BLM								
	BC								
6	TOTAL	84.1	82.7	11.9	6,467	0	2,144	15	15%
	D	49.1		13.8	4,349		1,399		
	H								
	RC	0.7		32.0	282		76		
	WP								
	LP	trace							
	TF	2.8		17.0	228		78		
	SS								
	RA	31.5		11.5	1,608		591		
	BLM								
	BC								

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 11
AULT FIELD

TABLE 4 - TYPE GROUP SUMMARY

GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.	Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined		120	4.56%
6a	TOTAL	109.5	100.0	11.5	3,163	1,687	4	5%
	D	32.1		11.7	1,445	638		
	H							
	RC							
	WP							
	LP	77.4		13.4	1,718	1,049		
	TF							
	SS							
	RA							
	BLM							
	BC							
8	TOTAL	147.3	186.0	13.5	18,323	5,709	52	6%
	D	122.6		14.6	14,688	4,595		
	H	1.0		21.0	294	98		
	RC	0.4		21.0	30	11		
	WP							
	LP	1.4		13	23	14		
	TF	14		14.1	2,331	685		
	SS	3.8		15.7	871	260		
	RA	4.1		13.9	86	46		
	BLM							
	BC							

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 11
AULT FIELD

TABLE 4 - TYPE GROUP SUMMARY

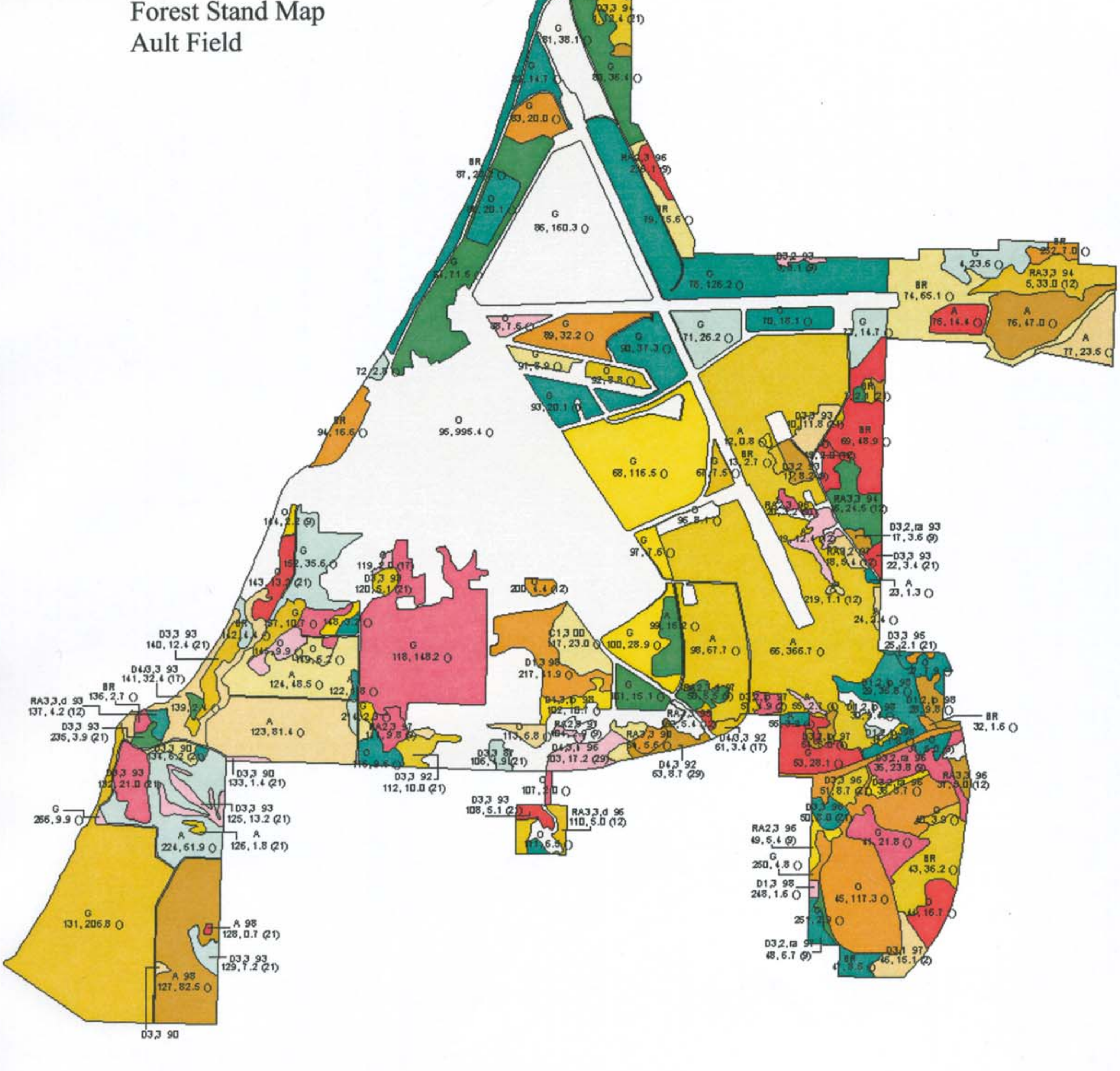
GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.	Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined		120	4.56%
10	TOTAL	70.7	114.3	15.3	13,162	3,751	7	24%
	D	44.8		19.4	9,854	2,758		
	H	15.2		9.0	1,403	397		
	RC							
	WP							
	LP							
	TF	10.7		17.0	1,905	596		
	SS							
	RA							
	BLM							
	BC							
13	TOTAL	73.9	177.1	18.6	22,819	6,226	7	16%
	D	54.9		23.7	21,632	5,552		
	H	19.0		13.0	1,187	674		
	RC							
	WP							
	LP							
	TF							
	SS							
	RA							
	BLM							
	BC							

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 11
AULT FIELD

TABLE 4 - TYPE GROUP SUMMARY

GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.	Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined		120	4.56%
14	TOTAL	240.5	122.8	8.6	8,704	2,869	7	14%
	D							
	H							
	RC							
	WP							
	LP							
	TF							
	SS							
	RA	240.5		9.1	8,704	2,869		
	BLM							
	BC							
15	TOTAL	142.1	146.0	12.2	10,499	3,786	23	21%
	D	6.2		14.4	996	306		
	H							
	RC							
	WP							
	LP							
	TF							
	SS							
	RA	135.9		13.2	9,503	3,480		
	BLM							
	Q A							

Forest Stand Map
Ault Field



Seaplane Base Inventory

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	1	64.8	D3,3	92	100	TOTAL	10,731	12,254	12.8	4,533	82	4,053	1,535	53	3.4%	1,373
						D	10,491		13.7	4,406		3,939	1,494			1,335
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	58		13.0	12		11	1			1
						SS	0			0		0	0			0
						RA	181		17.7	115		103	40			36
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
4	2	7.1	D3/2,3	97	145	TOTAL	829	77	3.7	129	12	116	34	6	19.0%	31
						D	829		10.5	129		116	34			31
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	3	2.3	D3,3	87	58	TOTAL	381	435	12.8	161	2	144	54	1	1.5%	49
						D	372		13.7	156		140	53			47
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	2		13.0	0		0	0			0
						SS	0			0		0	0			0
						RA	6		17.7	4		4	1			1
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
5	4	11.0	D3,1	87	53	TOTAL	505	806	15.2	212	3	187	58	2	2.6%	52
						D	447	0	17.5	174	0	153	47	0	0	41
						H	0	0		0	0	0	0	0	0	0
						RC	0	0		0	0	0	0	0	0	0
						WP	0	0		0	0	0	0	0	0	0
						LP	0	0		0	0	0	0	0	0	0
						TF	20	0	32.0	26	0	24	10	0	0	9
						SS	0	0		0	0	0	0	0	0	0
						RA	39	0	21.0	11	0	10	2	0	0	1
						BLM	0	0		0	0	0	0	0	0	0
						BC	0	0		0	0	0	0	0	0	0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 1 - STAND DATA

Type	Stand			Dec.	Site		#	Basal	Ave	Cubic Volume			Scribner Volume			
Group	No.	Acres	Type	Origin	Index	Species	Trees	Area s.f.	DBH In.	Gross C c.f.	p.a.i. C.c.f.	Net C. c.f.	Gross M b.f.	p.a.i. M b.f.	p.a.i. %	Net M b.f.
11	5	9.2	D4,1,ra	87	67	TOTAL	387	1,077	20.0	417	4	369	168	2	1.2%	149
						D	121		22.3	186		163	84			73
						H	184		17.4	159		141	60			53
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	27		21.0	33		29	12			10
						SS	0			0		0	0			0
						RA	40		17.0	18		16	5			5
						BLM	16		23.6	22		20	8			7
						BC	0			0		0	0			0
13	6	3.2	D4,3	89	92	TOTAL	232	587	19.1	273	3	245	110	2	1.8%	99
						D	217		19.5	256		230	104			93
						H	7		17.0	8		7	2			2
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	2		32.0	4		4	2			2
						SS	0			0		0	0			0
						RA	4		21.0	3		2	1			1
						BLM	2		29.0	2		2	1			1
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
13	7	8.6	D4,3	89	92	TOTAL	623	1,578	19.1	733	9	659	296	5	1.8%	266
						D	582		19.5	688		619	279			251
						H	18		17.0	22		19	7			6
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	4		32.0	12		10	6			5
						SS	0			0		0	0			0
						RA	12		21.0	7		6	2			2
						BLM	6		29.0	5		4	2			2
						BC	0			0		0	0			0
14	8	4.1	RA,3,2	95	78ra	TOTAL	308	355	12.9	107	2	97	32	1	2.9%	29
						D	17		21.0	11		10	3			3
						H	26		17.0	20		18	7			6
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	265		13.7	77		69	22			20
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
15	9	28.0	Ra3,3	95	78ra	TOTAL	2,125	4,175	16.8	1,504	11	1,336	530	6	1.2%	471
						D	31		32.0	181		162	94			84
						H	302		13.0	56		51	13			12
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	25		32.0	59		53	29			26
						SS	0			0		0	0			0
						RA	1,722		18.0	1,179		1,045	386			342
						BLM	45		25.0	29		26	8			7
						BC	0			0		0	0			0
0	10	5.1	Br	0		TOTAL										
10	11	11.6	D4/3,3	93	111	TOTAL	1,448	2,630	16.2	1,201	23	1,076	458	15	3.3%	411
						D	1,448		17.2	1,201		1,076	458			411
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
0	12	32.4	O	0		TOTAL										
0	13	943.0	O	0		TOTAL										
0	14	11.5	O	0		TOTAL										
10	15	3.0	D4/3,3	91	97	TOTAL	374	680	16.2	311	0	278	119	3	2.2%	106
						D	374		17.2	311		278	119			106
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
12	16	7.8	D4,2,m	91	83	TOTAL	404	970	18.6	356	5	319	138	5	3.5%	124
						D	250		19.7	285		255	116			104
						H	0			0		0	0			0
						RC	2		32.0	7		6	3			3
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	140		13.9	50		45	13			11
						BLM	11		27.0	15		13	6			5
						BC	0			0		0	0			0
8	17	23.6	D3,3	91	70	TOTAL	3,908	4,463	12.8	1,651	16	1,476	559	8	1.4%	500
						D	3,821		13.7	1,605		1,435	544			486
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	21		13.0	4		4	1			0
						SS	0			0		0	0			0
						RA	66		17.7	42		38	15			13
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	18	8.2	D3,3	90	63	TOTAL	1,358	1,551	12.8	574	6	513	194	3	1.3%	174
						D	1,328		13.7	558		498	189			169
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	7		13.0	2		1	0			0
						SS	0			0		0	0			0
						RA	23		17.7	15		13	5			5
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
8	19	16.9	D3,3	91	78	TOTAL	2,799	3,196	12.8	1,182	15	1,057	400	8	2.1%	358
						D	2,736		13.7	1,149		1,027	390			348
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	15		13.0	3		3	0			0
						SS	0			0		0	0			0
						RA	47		17.7	30		27	10			9
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	20	5.6	D3,3	89	57	TOTAL	927	1,059	12.8	392	5	350	133	3	2.0%	119
						D	907		13.7	381		340	129			115
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	5		13.0	1		1	0			0
						SS	0			0		0	0			0
						RA	16		17.7	10		9	3			3
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
8	21	1.6	D3,3	87	46	TOTAL	265	303	12.8	112	1	100	38	1	1.5%	34
						D	259		13.7	109		97	37			33
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	1		13.0	0		0	0			0
						SS	0			0		0	0			0
						RA	4		17.7	3		3	1			1
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
0	23	267.6	Br	0		TOTAL										
0	24	42.9	A	0		TOTAL										
0	25	65.7	A	0		TOTAL										
0	26	4.7	A	0		TOTAL										
0	27	6.2	Br	0		TOTAL										
0	28	19.8	Br	0		TOTAL										

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	30	3.3	D3,3	92	86	TOTAL	546	189	7.1	231	4	206	78	2	3.0%	70
						D	534		13.7	224		201	76			68
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	3		13.0	1		1	0			0
						SS	0			0		0	0			0
						RA	9		17.7	6		5	2			2
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
8	31	3.5	D3,3	92	87	TOTAL	580	662	12.8	245	4	219	83	2	3.0%	74
						D	567		13.7	238		213	81			72
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	3		13.0	1		1	0			0
						SS	0			0		0	0			0
						RA	10		17.7	6		6	2			2
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
0	32	31.7	Br	0		TOTAL										
0	33	158.7	A	0		TOTAL										
0	34	282.9	Br	0		TOTAL										
2	35	9.5	D2,1ra	98		TOTAL										
0	36	8.4	Br	0		TOTAL										
1	37	18.2	Ra2,3	97	80ra	TOTAL										
1	38	8.4	Ra2,3	97	80ra	TOTAL										
1	39	11.2	Ra2,3	97	80ra	TOTAL										
0	40	4.1	Br	0		TOTAL										
0	41	1.1	Br	0		TOTAL										
0	42	8.8	Br	0		TOTAL										
0	43	3.7	G	0		TOTAL										
0	44	0.8	O	0		TOTAL										
0	45	1.1	G	0		TOTAL										

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NAVAL AIR STATION, WHIDBEY ISLAND
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SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	46	2.6	D3,3	93	100	TOTAL	3,453	492	4.5	5,353	4	4,754	2,023	2	0.1%	1,794
						D	421		13.7	177		158	60			54
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	2		13.0	0		0	0			0
						SS	0			0		0	0			0
						RA	7		17.7	5		4	2			1
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
11	47	35.9	D4,1,m	93	84(H)	TOTAL	1,511	4,204	20.0	3,544	26	3,153	1,305	14	1.1%	1,160
						D	474		22.3	724		635	327			286
						H	718		17.4	620		549	233			207
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	104		21.0	127		115	45			41
						SS	0			0		0	0			0
						RA	154		17.0	69		62	21			19
						BLM	61		23.6	87		78	30			27
						BC	0			0		0	0			0

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NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	48	13.7	D3,3	93	100	TOTAL	2,269	2,591	12.8	958	19	857	325	12	3.8%	290
						D	2,218		13.7	932		833	316			282
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	12		13.0	3		2	0			0
						SS	0			0		0	0			0
						RA	38		17.7	24		22	8			8
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
8	49	13.4	D3,3	93	115	TOTAL	2,219	2,534	12.8	937	21	838	317	14	4.3%	284
						D	2,169		13.7	911		815	309			276
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	12		13.0	3		2	0			0
						SS	0			0		0	0			0
						RA	38		17.7	24		21	8			7
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	50	6.0	Br	0		TOTAL										

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NAVAL AIR STATION, WHIDBEY ISLAND
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SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
5	51	3.7	D3,1	96	120	TOTAL	170	271	15.2	71	4	63	20	2	11.5%	17
						D	150		17.5	59		52	16			14
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	7		32.0	9		8	3			3
						SS	0			0		0	0			0
						RA	13		21.0	4		3	1			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
11	52	23.3	D4,1,h	90	110(H)	TOTAL	981	2,728	20.0	1,056	184	35,419	426	12	2.8%	376
						D	308		22.3	470		412	212			186
						H	466		17.4	402		356	151			134
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	68		21.0	82		74	29			26
						SS	0			0		0	0			0
						RA	100		17.0	45		41	14			12
						BLM	40		23.6	56		51	19			18
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
12	53	0.3	D4,2,m	89	89	TOTAL	16	37	18.6	14	0	18,331	5	0	1.9%	5
						D	10		19.7	11		10	4			4
						H	0			0		0	0			0
						RC	0		32.0	0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	5		13.9	2		2	0			0
						BLM	0		27.0	1		1	0			0
						BC	0			0		0	0			0
14	54	14.8	Ra2,2,wh	95	90ra	TOTAL	1,111	1,283	12.9	388	16	349	115	6	5.2%	103
						D	62		21.0	38		35	11			10
						H	93		17.0	73		65	24			21
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	956		13.7	277		249	80			72
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

										Cubic Volume			Scribner Volume			
Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Gross C c.f.	p.a.i. C.c.f.	Net C. c.f.	Gross M b.f.	p.a.i. M b.f.	p.a.i. %	Net M b.f.
15	55	7.9	Ra3,2,d	93	80	TOTAL	600	1,178	16.8	424	7	377	150	4	2.6%	133
						D	9		32.0	51		46	27			24
						H	85		13.0	16		14	4			3
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	7		32.0	17		15	8			7
						SS	0			0		0	0			0
						RA	486		18.0	333		295	109			96
						BLM	13		25.0	8		7	2			2
						BC	0			0		0	0			0
8	56	6.3	D3,3	90	100	TOTAL	1,043	1,191	12.8	441	7	394	149	5	3%	133
						D	1,020		13.7	428		383	145			130
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	6		13.0	1		1	0			0
						SS	0			0		0	0			0
						RA	18		17.7	11		10	4			3
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
15	57	27.5	Ra3,2,d	93	66ra	TOTAL	2,087	4,100	16.8	1,477	18	1,312	521	10	2.0%	463
						D	30		32.0	178		159	93			83
						H	297		13.0	55		50	13			12
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	25		32.0	58		52	28			26
						SS	0			0		0	0			0
						RA	1,691		18.0	1,158		1,026	379			336
						BLM	44		25.0	29		26	8			7
						BC	0			0		0	0			0
8	58	8.5	D3,3	93	116	TOTAL	1,408	1,607	12.8	595	14	532	201	9	4.5%	180
						D	1,376		13.7	578		517	196			175
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	8		13.0	2		1	0			0
						SS	0			0		0	0			0
						RA	24		17.7	15		14	5			5
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
15	59	2.3	Ra3,3	93	66ra	TOTAL	175	343	16.8	124	2	110	44	1	2.0%	39
						D	3		32.0	15		13	8			7
						H	25		13.0	5		4	1			1
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	2		32.0	5		4	2			2
						SS	0			0		0	0			0
						RA	141		18.0	97		86	32			28
						BLM	4		25.0	2		2	1			1
						BC	0			0		0	0			0
8	60	13.8	D3,3	91	111	TOTAL	2,285	2,610	12.8	965	18	863	327	12	3.6%	292
						D	2,234		13.7	938		839	318			284
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	12		13.0	3		2	0			0
						SS	0			0		0	0			0
						RA	39		17.7	24		22	9			8
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
13	61	28.3	D4,3	91	110	TOTAL	2,049	5,193	19.1	2,413	36	2,170	973	24	2.4%	874
						D	1,916		19.5	2,265		2,036	918			826
						H	59		17.0	71		64	22			19
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	14		32.0	38		34	19			17
						SS	0			0		0	0			0
						RA	40		21.0	23		21	7			6
						BLM	20		29.0	16		14	7			6
						BC	0			0		0	0			0
8	62	31.4	D3,3	93	87	TOTAL	5,200	5,938	12.8	2,197	4,070	1,964	744	25	3.3%	665
						D	5,084		13.7	2,135		1,909	724			647
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	28		13.0	6		5	1			1
						SS	0			0		0	0			0
						RA	88		17.7	56		50	19			17
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 1 - STAND DATA

										Cubic Volume			Scribner Volume			
Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Gross C c.f.	p.a.i. C.c.f.	Net C. c.f.	Gross M b.f.	p.a.i. M b.f.	p.a.i. %	Net M b.f.
12	64	16.4	D4,2ra	93	108	TOTAL	850	2,040	18.6	749	17	671	291	11	3.8%	260
						D	526		19.7	599		536	244			219
						H	0			0		0	0			0
						RC	5		32.0	14		12	7			6
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	295		13.9	105		95	27			24
						BLM	23		27.0	31		28	13			12
						BC	0			0		0	0			0
12	65	10.2	D4,2,ra	93	108	TOTAL	528	1,979	23.2	466	10	417	181	7	3.8%	162
						D	327		19.7	373		334	152			136
						H	0			0		0	0			0
						RC	3		32.0	9		7	4			4
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	184		13.9	66		59	17			15
						BLM	14		27.0	19		17	8			7
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
15	66	1.8	Ra3,3	93	77ra	TOTAL	137	268	16.8	97	2	86	34	1	2.6%	30
						D	2		32.0	12		10	6			5
						H	19		13.0	4		3	1			1
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	2		32.0	4		3	2			2
						SS	0			0		0	0			0
						RA	111		18.0	76		67	25			22
						BLM	3		25.0	2		2	1			0
						BC	0			0		0	0			0
11	67	3.2	D4,1,ra	90	97	TOTAL	135	375	20.0	145	2	128	58	1	2.5%	52
						D	42		22.3	65		57	29			26
						H	64		17.4	55		49	21			18
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	9		21.0	11		10	4			4
						SS	0			0		0	0			0
						RA	14		17.0	6		6	2			2
						BLM	5		23.6	8		7	3			2
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
13	68	19.9	D4,3	88	93	TOTAL	1,441	3,652	19.1	1,697	20	1,526	684	12	1.8%	615
						D	1,347		19.5	1,593		1,432	646			581
						H	42		17.0	50		45	15			14
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	10		32.0	27		24	13			12
						SS	0			0		0	0			0
						RA	28		21.0	17		15	5			5
						BLM	14		29.0	11		10	5			4
						BC	0			0		0	0			0
2	69	3.1	D2,1	98	110											
12	70	34.1	D4,2,ra	92	110	TOTAL	1,766	4,242	18.6	1,558	31	1,395	604	9	1.5%	541
						D	1,095		19.7	1,246		1,115	508			455
						H	0			0		0	0			0
						RC	10		32.0	29		24	14			12
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	614		13.9	219		197	55			50
						BLM	48		27.0	64		58	27			24
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
10	71	4.1	D4/3,3	92	112	TOTAL	512	929	16.2	425	7	380	162	5	2.8%	145
						D	512		17.2	425		380	162			145
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
4	72	1.7	D2,2ra	91	114	TOTAL	198	385	16.7	31	3	28	41	2	4.2%	7
						D	198		10.5	31		28	8			7
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	16			0
						BLM	0			0		0	16			0
						BC	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
10	74	15.6	D4/3,3	91	100	TOTAL	1,947	3,537	16.2	1,616	22	1,448	616	14	2.2%	552
						D	1,947		17.2	1,616		1,448	616			552
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
8	75	6.1	D3,3	91	63	TOTAL	1,010	1,154	12.8	427	5	382	144	2	1.5%	129
						D	988		13.7	415		371	141			126
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	5		13.0	1		1	0			0
						SS	0			0		0	0			0
						RA	17		17.7	11		10	4			3
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	76	3.1	D3,3	91	61	TOTAL	513	586	12.8	217	2	194	73	1	1.5%	66
						D	502		13.7	211		188	71			64
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	3		13.0	1		1	0			0
						SS	0			0		0	0			0
						RA	9		17.7	5		5	2			2
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
8	77	13.7	D3,3	93	115	TOTAL	2,269	2,591	12.8	958	21	857	325	14	4.3%	290
						D	2,218		13.7	932		833	316			282
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	12		13.0	3		2	0			0
						SS	0			0		0	0			0
						RA	38		17.7	24		22	8			8
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	78	13.4	D3,3	93	101	TOTAL	2,219	2,534	12.8	937	19	838	317	12	3.8%	284
						D	2,169		13.7	911		815	309			276
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	12		13.0	3		2	0			0
						SS	0			0		0	0			0
						RA	38		17.7	24		21	8			7
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
8	79	10.9	D3,3	91	97	TOTAL	1,805	2,061	12.8	763	13	682	258	8	3.1%	231
						D	1,765		13.7	741		663	251			225
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	10		13.0	2		2	0			0
						SS	0			0		0	0			0
						RA	31		17.7	19		17	7			6
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
13	80	22.1	D4,3	91	100	TOTAL	1,600	4,055	19.1	1,885	25	1,695	760	16	2.1%	683
						D	1,496		19.5	1,769		1,590	717			645
						H	46		17.0	55		50	17			15
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	11		32.0	30		27	15			13
						SS	0			0		0	0			0
						RA	31		21.0	18		17	6			5
						BLM	15		29.0	12		11	5			5
						BC	0			0		0	0			0
13	81	2.0	D4,3	91	101	TOTAL	145	367	19.1	171	2	153	69	1	2.1%	62
						D	135		19.5	160		144	65			58
						H	4		17.0	5		5	2			1
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	1		32.0	3		2	1			1
						SS	0			0		0	0			0
						RA	3		21.0	2		2	1			0
						BLM	1		29.0	1		1	0			0
						BC	0			0		0	0			0
0	82	7.6	O	0		TOTAL										

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NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
12	83	10.6	D4,2	90	88	TOTAL	549	1,319	18.6	484	7	434	188	4	2.3%	168
						D	340		19.7	387		347	158			141
						H	0			0		0	0			0
						RC	3		32.0	9		8	4			4
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	191		13.9	68		61	17			16
						BLM	15		27.0	20		18	8			7
						BC	0			0		0	0			0
8	84	6.9	D3,3	93	88	TOTAL	1,143	1,305	12.8	483	9	432	163	5	3.3%	146
						D	1,117		13.7	469		419	159			142
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	6		13.0	1		1	0			0
						SS	0			0		0	0			0
						RA	19		17.7	12		11	4			4
						BLM	0			0		0	0			0
0	85	1.8	Br	0		TOTAL										0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
4	86	0.7	D3/2,3	96	101	TOTAL	82	54	9.8	13	1	11	17	0	2.2%	3
						D	82		10.5	13		11	3			3
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	7			0
						BLM	0			0		0	7			0
15	87	4.7	Ra3,3	93	77ra	TOTAL	357	701	16.8	252	4	224	870	2	0.3%	219
						D	5		32.0	30		27	16			14
						H	51		13.0	9		9	2			2
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	4		32.0	10		9	5			4
						SS	0			0		0	0			0
						RA	289		18.0	198		175	65			57
						BLM	8		25.0	5		4	1			1
						BC	0			0		0	0			0
0	88	19.9	O	0		TOTAL										

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NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
4	203	32.3	D3/2,3	96	101	TOTAL	3,769	2,492	9.8	588	33	529	781	17	2.2%	140
						D	3,769		10.5	588		529	156			140
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	312			0
						BLM	0			0		0	312			0
4	230	6.5	D3/2,3	96	103	TOTAL	759	501	9.8	118	7	106	157	3	2.2%	28
						D	759		10.5	118		106	31			28
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	63			0
						BLM	0			0		0	63			0
							0			0		0	0			0

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NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	235	11.2	D3,3	94	76	TOTAL	1,855	2,118	12.8	784	26	701	265	11	4.2%	237
						D	1,813		13.7	762		681	258			231
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	10		13.0	2		2	0			0
						SS	0			0		0	0			0
						RA	31		17.7	20		18	7			6
						BLM	0			0		0	0			0
0	236	3.1	Br	0		TOTAL										
13	253	9.1	D4,3	91	100	TOTAL	659	1,670	19.1	776	10	698	313	7	2.1%	281
						D	616		19.5	728		655	295			265
						H	19		17.0	23		21	7			6
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	5		32.0	12		11	6			5
						SS	0			0		0	0			0
						RA	13		21.0	8		7	2			2
						BLM	6		29.0	5		5	2			2

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SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
13	266	2.1	D4,3	91	100	TOTAL	152	385	19.1	179	4	161	72	2	3.2%	65
						D	142		19.5	168		151	68			61
						H	4		17.0	5		5	2			1
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	1		32.0	3		3	1			1
						SS	0			0		0	0			0
						RA	3		21.0	2		2	1			0
						BLM	1		29.0	1		1	0			0
8	270	3.1	D3,3	92	100	TOTAL	513	586	12.8	217	4	194	73	3	3.4%	66
						D	502		13.7	211		188	71			64
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	3		13.0	1		1	0			0
						SS	0			0		0	0			0
						RA	9		17.7	5		5	2			2
						BLM	0			0		0	0			0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	p.a.i. C.c.f.	Net C. c.f.	Scribner Volume Gross M b.f.	p.a.i. M b.f.	p.a.i. %	Net M b.f.
4	303	13.0	D3/2,3	97	140	TOTAL	1,517	1,002	9.8	236	22	213	63	12	18.6%	56
						D	1,517		10.5	236		213	63			56
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
15	330	15.7	Ra3,3	96	103ra	TOTAL	1,192	2,341	16.8	843	27	749	297	11	3.6%	264
						D	17		32.0	101		91	53			47
						H	170		13.0	32		28	7			7
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	14		32.0	33		30	16			15
						SS	0			0		0	0			0
						RA	966		18.0	661		586	216			192
						BLM	25		25.0	16		15	5			4
0	331	5.0	Br	0		TOTAL										
0	370	7.9	Br	0		TOTAL										0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
13	371	7.0	D4,3,ra	92	118	TOTAL	507	1,285	19.1	597	10	537	241	7	2.8%	216
						D	474		19.5	560		504	227			204
						H	15		17.0	18		16	5			5
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	4		32.0	9		8	5			4
						SS	0			0		0	0			0
						RA	10		21.0	6		5	2			2
						BLM	5		29.0	4		4	2			1
TOTALS - FOREST LAND		808.7					85,433	119,860	14.2	52,995	5,012	100,155	20,780	480	2.3%	17,294
# Stands	69															
NON-FOREST LAND		1,951.5														
# Stands	27															
GRAND TOTAL		2,760.2														
# Stands	96															

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 2 - STAND DATA BY DECADE OF ORIGIN

						Cubic Volume			Scribner Volume			
Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Gross C c.f.	p.a.i. C.c.f.	Net C. c.f.	Gross M b.f.	p.a.i. M b.f.	pai %	Net M b.f.
1,951.5	0											
12.6	98											
57.9	97	TOTAL	2,346	1,079	8.1	366	33	329	97	18	19%	87
		D	2,346	0		366	0	329	97	0		87
		H	0	0		0	0	0	0	0		0
		RC	0	0		0	0	0	0	0		0
		WP	0	0		0	0	0	0	0		0
		LP	0	0		0	0	0	0	0		0
		TF	0	0		0	0	0	0	0		0
		SS	0	0		0	0	0	0	0		0
		RA	0	0		0	0	0	0	0		0
		BLM	0	0		0	0	0	0	0		0
		BC	0	0		0	0	0	0	0		0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume pai %	Scribner Volume Net M b.f.
58.9	96	TOTAL	5,971	5659.1	11.7	1,633	72	1,459	1,272	33.887	3%	453
		D	4,777	0		879	0	789	259	0		232
		H	170	0		32	0	28	7	0		7
		RC	0	0		0	0	0	0	0		0
		WP	0	0		0	0	0	0	0		0
		LP	0	0		0	0	0	0	0		0
		TF	21	0		42	0	38	20	0		18
		SS	0	0		0	0	0	0	0		0
		RA	979	0		665	0	589	599	0		192
		BLM	25	0		16	0	15	387	0		4
		BC	0	0		0	0	0	0	0		0
46.9	95	TOTAL	3,545	5813.4	15.4	2,000	28	1,782	677	13.108	2%	603
		D	110	0		230	0	206	108	0		97
		H	421	0		149	0	134	44	0		39
		RC	0	0		0	0	0	0	0		0
		WP	0	0		0	0	0	0	0		0
		LP	0	0		0	0	0	0	0		0
		TF	25	0		59	0	53	29	0		26
		SS	0	0		0	0	0	0	0		0
		RA	2,943	0		1,533	0	1,363	488	0		434
		BLM	45	0		29	0	26	8	0		7
		BC	0	0		0	0	0	0	0		0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume pai %	Scribner Volume Net M b.f.
11.2	94	TOTAL	1,855	2117.9	12.8	784	26	701	265	11.066	4%	237
		D	1,813	0		762	0	681	258	0		231
		H	0	0		0	0	0	0	0		0
		RC	0	0		0	0	0	0	0		0
		WP	0	0		0	0	0	0	0		0
		LP	0	0		0	0	0	0	0		0
		TF	10	0		2	0	2	0	0		0
		SS	0	0		0	0	0	0	0		0
		RA	31	0		20	0	18	7	0		6
		BLM	0	0		0	0	0	0	0		0
		BC	0	0		0	0	0	0	0		0
221.9	93	TOTAL	27,871	37,034	13.8	20,755	4,284	18,498	8,268.5	158.5	2%	0
		D	19,597	0		10,228	0	9,134	3,718	0.0		281
		H	1,195	0		709	0	629	254	0.0		0
		RC	8	0		22	0	19	11	0.0		265
		WP	0	0		0	0	0	0	0.0		6
		LP	0	0		0	0	0	0	0.0		0
		TF	237	0		240	0	216	93	0.0		0
		SS	0	0		0	0	0	0	0.0		0
		RA	3,642	0		2,285	0	2,030	737	0.0		5
		BLM	169	0		182	0	164	64	0.0		0
		BC	0	0		0	0	0	0	0.0		2

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume pai %	Scribner Volume Net M b.f.
119.9	92	TOTAL	15,155	20147	13.8	7,806	141	6,984	2,776	80.636	3%	2,484
		D	14,174	0		7,311	0	6,541	2,619	0		2,344
		H	15	0		18	0	16	5	0		5
		RC	10	0		29	0	24	14	0		12
		WP	0	0		0	0	0	0	0		0
		LP	0	0		0	0	0	0	0		0
		TF	71	0		24	0	21	6	0		6
		SS	0	0		0	0	0	0	0		0
		RA	833	0		357	0	321	103	0		93
		BLM	53	0		68	0	61	28	0		26
		BC	0	0		0	0	0	0	0		0
166.1	91	TOTAL	19,849	31312	15.1	12,942	174	11,603	4,862	112.45	2%	4,331
		D	19,121	0		12,392	0	11,108	4,638	0		4,158
		H	134	0		160	0	144	48	0		44
		RC	2	0		7	0	6	3	0		3
		WP	0	0		0	0	0	0	0		0
		LP	0	0		0	0	0	0	0		0
		TF	99	0		99	0	90	44	0		40
		SS	0	0		0	0	0	0	0		0
		RA	438	0		235	0	211	91	0		67
		BLM	55	0		50	0	45	37	0		19
		BC	0	0		0	0	0	0	0		0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume pai %	Scribner Volume Net M b.f.
51.6	90	TOTAL	4,066	7163.7	15.9	2,700	206	36,888	1,016	24.95	2%	903
		D	3,038	0		1,908	0	1,697	733	0		652
		H	530	0		458	0	405	172	0		153
		RC	3	0		9	0	8	4	0		4
		WP	0	0		0	0	0	0	0		0
		LP	0	0		0	0	0	0	0		0
		TF	90	0		97	0	87	34	0		30
		SS	0	0		0	0	0	0	0		0
		RA	345	0		145	0	131	42	0		37
		BLM	60	0		84	0	75	30	0		27
		BC	0	0		0	0	0	0	0		0
17.7	89	TOTAL	1,797	3261.6	16.2	1,412	17	19,586	544	9.8919	2%	488
		D	1,715	0		1,336	0	1,199	516	0		464
		H	25	0		30	0	27	9	0		8
		RC	0	0		0	0	0	0	0		0
		WP	0	0		0	0	0	0	0		0
		LP	0	0		0	0	0	0	0		0
		TF	11	0		17	0	15	8	0		7
		SS	0	0		0	0	0	0	0		0
		RA	38	0		22	0	19	7	0		6
		BLM	9	0		7	0	6	3	0		3
		BC	0	0		0	0	0	0	0		0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume pai %	Scribner Volume Net M b.f.
19.9	88	TOTAL	1,441	3651.7	19.1	1,697	20	1,526	684	12.137	2%	615
		D	1,347	0		1,593	0	1,432	646	0		581
		H	42	0		50	0	45	15	0		14
		RC	0	0		0	0	0	0	0		0
		WP	0	0		0	0	0	0	0		0
		LP	0	0		0	0	0	0	0		0
		TF	10	0		27	0	24	13	0		12
		SS	0	0		0	0	0	0	0		0
		RA	28	0		17	0	15	5	0		5
		BLM	14	0		11	0	10	5	0		4
		BC	0	0		0	0	0	0	0		0
24.1	87	TOTAL	1,538	2621.1	15.7	902	10	800	319	5.0402	2%	283
		D	1,199	0		625	0	553	220	0		195
		H	184	0		159	0	141	60	0		53
		RC	0	0		0	0	0	0	0		0
		WP	0	0		0	0	0	0	0		0
		LP	0	0		0	0	0	0	0		0
		TF	50	0		60	0	54	22	0		20
		SS	0	0		0	0	0	0	0		0
		RA	89	0		36	0	32	9	0		8
		BLM	16	0		22	0	20	8	0		7
		BC	0	0		0	0	0	0	0		0

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 2 - STAND DATA BY DECADE OF ORIGIN

	Dec.		#	Basal	Ave	Cubic Volume			Scribner Volume			
Acres	Origin	Species	Trees	Area s.f.	DBH In.	Gross C c.f.	p.a.i. C.c.f.	Net C. c.f.	Gross M b.f.	p.a.i. M b.f.	pai %	Net M b.f.
TOTALS - FOREST LAND												
808.7			85,433	######	14.2	52,995	5,012	100,155	20,780	480	2%	10,484
NON-FOREST LAND												
1,951.5												
GRAND TOTAL												
2,760.2												

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
8	1	64.8	D3,3	92	24	*SA/OS	40%	1,198	8.3	5.9	17.6
4	2	7.1	D3/2,3	97	5	Ocean spray	34%	0	0.0	0.0	0
8	3	2.3	D3,3	87	24	*SA/OS	40%	1,198	8.3	5.9	17.6
5	4	11	D3,1	87	7	Rose	28%	832	10.0	13.5	2.5
11	5	9.2	D4,1,ra	87	18	*F/EB	34%	1,715	11.3	19.0	1.1
13	6	3.2	D4,3	89	33	*F/OS/HZ	37%	2,775	10.3	14.1	3.6
13	7	8.6	D4,3	89	33	*F/OS/HZ	37%	2,775	10.3	14.1	3.6
14	8	4.1	Ra2,3	95	8	*F/SB	42%	758	7.0	0.0	0
15	9	28	Ra3,3	95	17	*F/N	26%	1,707	13.0	11.1	14.3
0	10	5.1	Br								
10	11	11.6	D4/3,3	93	40	*SA/OS	30%	915	12.7	10.5	4.1
0	12	32.4	O								
0	13	943	O								
0	14	11.5	O								
10	15	3	D4/3,3	91	40	*SA/OS	30%	915	12.7	10.5	4.1

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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SEAPLANE BASE

TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
12	16	7.8	D4,2,m	91	17	*F/SA	42%	2,719	12.8	22.2	3.2
8	17	23.6	D3,3	91	24	*SA/OS	40%	1,198	8.3	5.9	17.6
8	18	8.2	D3,3	90	24	*SA/OS	40%	1,198	8.3	5.9	17.6
8	19	16.9	D3,3	91	24	*SA/OS	40%	1,198	8.3	5.9	17.6
8	20	5.6	D3,3	89	24	*SA/OS	40%	1,198	8.3	5.9	17.6
8	21	1.6	D3,3	87	24	*SA/OS	40%	1,198	8.3	5.9	17.6
0	23	267.6	Br								
0	24	42.9	A								
0	25	65.7	A								
0	26	4.7	A								
0	27	6.2	Br								
0	28	19.8	Br								
8	30	3.3	D3,3	92	24	*SA/OS	40%	1,198	8.3	5.9	17.6
8	31	3.5	D3,3	92	24	*SA/OS	40%	1,198	8.3	5.9	17.6
0	32	31.7	Br								

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
0	33	158.7	A								
0	34	282.9	Br								
2	35	9.5	D2,1ra								
0	36	8.4	Br								
1	37	18.2	Ra2,3	97							
1	38	8.4	Ra2,3	97							
1	39	11.2	Ra2,3	97							
0	40	4.1	Br								
0	41	1.1	Br								
0	43	3.7	G								
0	44	0.8	O								
0	45	1.1	G								
8	46	2.6	D3,3	93	24	*SA/OS	40%	1,198	8.3	5.9	17.6
11	47	35.9	D4,1,m	93	18	*F/EB	34%	1,715	11.3	19.0	1.1
8	48	13.7	D3,3	93	24	*SA/OS	40%	1,198	8.3	5.9	17.6

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
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TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
8	49	13.4	D3,3	93	24	*SA/OS	40%	1,198	8.3	5.9	17.6
0	50	6	Br								
5	51	3.7	D3,1	96	7	Rose	28%	832	10.0	13.5	2.5
11	52	23.3	D4,1,h	90	18	*F/EB	34%	1,715	11.3	19.0	1.1
12	53	0.3	D4,2,m	89	17	*F/SA	42%	2,719	12.8	22.2	3.2
14	54	14.80	Ra2,2,wh	93	8	*F/SB	42%	758	7.0	0.0	0
15	55	7.9	Ra3,2,d	93	17	*F/N	26%	1,707	13.0	11.1	14.3
8	56	6.3	D3,3	90	24	*SA/OS	40%	1,198	8.3	5.9	17.6
15	57	27.5	Ra3,2,d	93	17	*F/N	26%	1,707	13.0	11.1	14.3
8	58	8.5	D3,3	93	24	*SA/OS	40%	1,198	8.3	5.9	17.6
15	59	2.3	Ra3,3	93	17	*F/N	26%	1,707	13.0	11.1	14.3
8	60	13.8	D3,3	91	24	*SA/OS	40%	1,198	8.3	5.9	17.6
13	61	28.3	D4,3	91	34	*F/OS/HZ	37%	2,775	10.3	14.1	3.6
8	62	31.4	D3,3	93	24	*SA/OS	40%	1,198	8.3	5.9	17.6
12	64	16.4	D4,2ra	93	17	*F/SA	42%	2,719	12.8	22.2	3.2

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
12	65	10.2	D4,2,ra	93	17	*F/SA	42%	2,719	12.8	22.2	3.2
15	66	1.8	Ra3,3	93	17	*F/N	26%	1,707	13.0	11.1	14.3
11	67	3.2	D41,ra	90	18	*F/EB	34%	1,715	11.3	19.0	1.1
13	68	19.9	D4,3	88	33	*F/OS/HZ	37%	2,775	10.3	14.1	3.6
2	69	3.1	D2,1								
12	70	34.1	D4,2,ra	92	17	*F/SA	42%	2,719	12.8	22.2	3.2
10	71	4.1	D4/3,3	92	40	*SA/OS	30%	915	12.7	10.5	4.1
4	72	1.7	D2,2ra	91	5	Ocean spray	34%	0	0.0	0.0	0
10	74	15.6	D4/3,3	91	40	*SA/OS	30%	915	12.7	10.5	4.1
8	75	6.1	D3,3	91	24	*SA/OS	40%	1,198	8.3	5.9	17.6
8	76	3.1	D3,3	91	24	*SA/OS	40%	1,198	8.3	5.9	17.6
8	77	13.7	D3,3	93	24	*SA/OS	40%	1,198	8.3	5.9	17.6
8	78	13.4	D3,3	93	24	*SA/OS	40%	1,198	8.3	5.9	17.6
8	79	10.9	D3,3	91	24	*SA/OS	40%	1,198	8.3	5.9	17.6
13	80	22.10	D4,3	91	33	*F/OS/HZ	37%	2,775	10.3	14.1	3.6

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
13	81	2	D4,3	91	33	*F/OS/HZ	37%	2,775	10.3	14.1	3.6
0	82	7.6	O								
12	83	10.6	D4,2	90	17	*F/SA	42%	2,719	12.8	22.2	3.2
8	84	6.9	D3,3	93	24	*SA/OS	40%	1,198	8.3	5.9	17.6
0	85	1.8	Br								
4	86	0.7	D3/2,3	96	5						
15	87	4.7	Ra3,3	96	17						
O	88	19.9	0								
4	203	32.3	D3/2,3	96	5	Ocean spray	34%	0	0.0	0.0	0
4	230	6.5	D3/2,3	96	5	Ocean spray	34%	0	0.0	0.0	0
8	235	11.2	D3,3	94	24	*SA/OS	40%	1,198	8.3	5.9	17.6
0	236	3.1	Br								
13	253	9.1	D4,3	91	34	*F/OS/HZ	37%	2,775	10.3	14.1	3.6
13	266	2.1	D4,3	91	24	*SA/OS	40%	1,198	8.3	5.9	17.6

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
8	270	3.1	D3,3	92	24	*SA/OS	40%	1,198	8.3	5.9	17.6
4	303	13	D3/2,3	97	5	Ocean spray	34%	0	0.0	0.0	0
15	330	15.7	Ra3,3	96	17	*F/N	26%	1,707	13.0	11.1	14.3
0	331	5	Br								
0	370	7.9	Br								
13	371	7	D4,3,ra	92	33	*F/OS/HZ	37%	2,775	10.3	14.1	3.6

TOTALS - FOREST LAND		
# Stands	16	842.4
NON-FOREST LAND		
# Stands	79	1917.8
GRAND TOTAL		
# Stands	95	2760.2

*SA/OS (Salal/Ocean spray)
*F/EB (Swordfern/Elderberry)
*F/OS/HZ (Swordfern/Ocean spray/Hazel)
*F/SB (Swordfern/Salmon berry)
*F/N (Swordfern/Nettles)
*F/SA (Swordfern/Salal)

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 4 - TYPE GROUP SUMMARY

GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.	Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined		140	3.64%
4	TOTAL	116.7	77.1	9.8	4343.0	1637.0	7	24%
	D	116.7		10.5	4,343	1,637		
	H							
	RC							
	WP							
	LP							
	TF							
	SS							
	RA							
	BLM							
	BC							
5	TOTAL	45.9	40.0	11.2	4,682	1,700	6	17%
	D	40.6			3,719	1,393		
	H							
	RC							
	WP							
	LP							
	TF	1.8		32.0	838	215		
	SS							
	RA	3.5		21.0	125	92		
	BLM							
	BC							

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 4 - TYPE GROUP SUMMARY

GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.	Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined		140	3.64%
8	TOTAL	165.6	189.1	12.8	21,181	6,255	55	5%
	D	161.9		13.7	20,605	6,079		
	H							
	RC							
	WP							
	LP							
	TF	0.9		13.0	21	17		
	SS							
	RA	2.8		17.7	555	159		
	BLM							
	BC							
10	TOTAL	124.8	226.7	16.2	35,402	9,279	6	11%
	D	124.8		17.2	35,402	9,279		
	H							
	RC							
	WP							
	LP							
	TF							
	SS							
	RA							
	BLM							
	BC							

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 4 - TYPE GROUP SUMMARY

GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.	Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined		140	3.64%
11	TOTAL	42.3	117.1	20.0	16,142	4,008	14	17%
	D	13.2		22.3	7,975	1,768		
	H	20.2		17.4	5,757	1,530		
	RC							
	WP							
	LP							
	TF	2.9		21.0	1,135	319		
	SS							
	RA	4.3		17.0	523	174		
	BLM	1.7		23.6	752	217		
	BC							
12	TOTAL	51.8	124.4	18.6	15,855	4,090	18	7%
	D	32.1		19.7	13,342	3,271		
	H							
	RC	0.3		32.0	344	71		
	WP							
	LP							
	TF							
	SS							
	RA	18.0		13.9	1,464	579		
	BLM	1.4		27.0	705	169		
	BC							

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

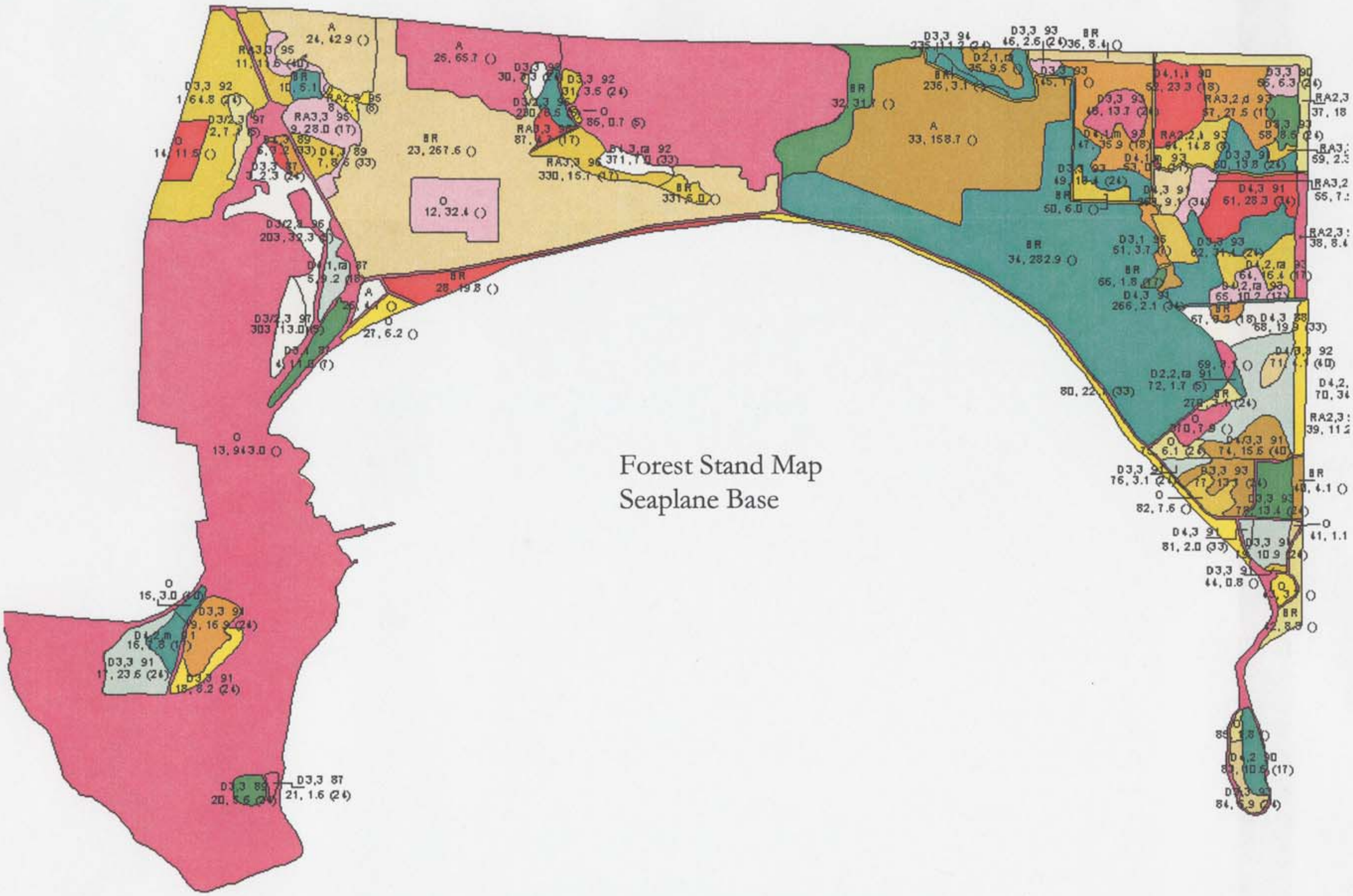
TABLE 4 - TYPE GROUP SUMMARY

GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.	Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined		140	3.64%
13	TOTAL	72.4	183.5	19.1	30,899	7,668	17	8%
	D	67.7		19.5	29,173	7,196		
	H	2.1		17.0	685	226		
	RC							
	WP							
	LP							
	TF	0.5		32.0	601	121		
	SS							
	RA	1.4		21.0	229	75		
	BLM	0.7		29.0	211	50		
	BC							
14	TOTAL	75.1	86.7	12.9	6,979	2,359	6	20%
	D	4.2		21.0	674	234		
	H	6.3		17.0	1,447	442		
	RC							
	WP							
	LP							
	TF							
	SS							
	RA	64.6		13.7	4,858	1,683		
	BLM							
	BC							

TIMBER INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 12
SEAPLANE BASE

TABLE 4 - TYPE GROUP SUMMARY

GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.	Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined		140	3.64%
15	TOTAL	75.9	149.1	16.8	16,833	4,772	11	18%
	D	1.1		32.0	3,005	577		
	H	10.8		13.0	426	181		
	RC							
	WP							
	LP							
	TF	0.9		32.0	932	189		
	SS							
	RA	61.5		18.0	12,210	3,731		
	BLM	1.6		25.0	260	94		



Forest Stand Map
Seaplane Base

OLF Coupeville Inventory

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
8	1	32.8	D3,3,h	94	98	TOTAL	619	4,853	33.6	1,890	51	1,695	691	29	4.3%	620
						D	173		11	1,630		1,462	590			529
						H	344		9	224		202	90			81
						RC	102		13	36		30	11			10
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	2	3.9	Br	0												
0	3	3.3	Br	0												
1	4	1.5	Ra1,3	98												

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
4	5	4.2	D2,3	95	105	TOTAL	714	502	10.1	201	5	181	76	3	3.8%	68
						D	714		11	201		181	76			68
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	6	96.4	A	0												
0	7	12.9	A	0												
0	8	117.4	A	0												
0	9	87.1	O	0												
0	10	8.7	Br	0												
0	11	13.6	A	0												
0	12	32.1	A	0												
0	13	197.2	A	0												

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
12	14	9.9	D4,2	93	116	TOTAL	4,464	1,034	5.8	3,282	36	2,954	1,332	1	0.0%	1,199
						D	473		16	484		436	230			207
						H	0			0		0	0			0
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
13	15	13.3	D3,2	94	119	TOTAL	1,995	3,221	15.2	1,399	48	1,259	551	1	0.1%	496
						D	1,899		16	1,357		1,221	537			483
						H	97		13	42		38	14			13
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
6	16	6.8	D3,2,h	93	96	TOTAL	946	1,500	15.1	556	6	479	194	3	1.7%	168
						D	487		18	287		251	100			87
						H	49		17	13		12	5			4
						RC	411		16	255		217	90			76
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
15	17	18.2	Ra3,3,d	96	124ra	TOTAL	2,814	2,863	12.1	1,125	22	1,008	402	13	3.3%	361
						D	80		25	125		113	55			50
						H	1,113		12	191		172	71			64
						RC	38		21	79		67	20			17
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	1,583		15	729		656	255			230
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 1 - STAND DATA

Type	Stand			Dec.	Site		#	Basal	Ave	Cubic Volume			Scribner Volume			
Group	No.	Acres	Type	Origin	Index	Species	Trees	Area s.f.	DBH In.	Gross C c.f.	p.a.i. C.c.f.	Net C. c.f.	Gross M b.f.	p.a.i. M b.f.	p.a.i. %	Net M b.f.
TOTALS - FOREST LAND																
# Stands	7	86.6					11,554	13,973	92	8,453	166	7,577	3,246	50	1.5%	2,911
NON-FOREST LAND																
# Stands	10	572.5														
GRAND TOTAL																
# Stands	17	659.1														

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume Net M b.f.
572.5		TOTAL	0	0	0.0	0	0	0	0	0	0
1.5	98	TOTAL	0	0	0.0	0	0	0	0	0	0
18.2	96	TOTAL	2,814	2,863	12.1	1,125	22	1,008	402	13	361
		D	80	0	24.7	125	0	113	55	0	50
		H	1,113	0	11.5	191	0	172	71	0	64
		RC	38	0	21.0	79	0	67	20	0	17
		WP	0	0	0.0	0	0	0	0	0	0
		LP	0	0	0.0	0	0	0	0	0	0
		TF	0	0	0.0	0	0	0	0	0	0
		SS	0	0	0.0	0	0	0	0	0	0
		RA	1,583	0	14.7	729	0	656	255	0	230
		BLM	0	0	0.0	0	0	0	0	0	0
		BC	0	0	0.0	0	0	0	0	0	0
4.2	95	TOTAL	714	502	10.1	201	5	181	76	3	68
		D	714	0	11.1	201	0	181	76	0	68
		H	0	0	0.0	0	0	0	0	0	0
		RC	0	0	0.0	0	0	0	0	0	0
		WP	0	0	0.0	0	0	0	0	0	0
		LP	0	0	0.0	0	0	0	0	0	0
		TF	0	0	0.0	0	0	0	0	0	0
		SS	0	0	0.0	0	0	0	0	0	0
		RA	0	0	0.0	0	0	0	0	0	0
		BLM	0	0	0.0	0	0	0	0	0	0
		BC	0	0	0.0	0	0	0	0	0	0

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume Net M b.f.
46.0	94	TOTAL	2,614	8,074	48.8	3,289	98	2,954	1,242	30	1,115
		D	2,072	0	27.6	2,987	0	2,683	1,127	0	1,012
		H	441	0	22.0	266	0	240	104	0	93
		RC	102	0	13.0	36	0	30	11	0	10
		WP	0	0	0.0	0	0	0	0	0	0
		LP	0	0	0.0	0	0	0	0	0	0
		TF	0	0	0.0	0	0	0	0	0	0
		SS	0	0	0.0	0	0	0	0	0	0
		RA	0	0	0.0	0	0	0	0	0	0
		BLM	0	0	0.0	0	0	0	0	0	0
		BC	0	0	0.0	0	0	0	0	0	0
16.7	93	TOTAL	5,410	2,534	20.9	3,838	41	3,433	1,527	4	1,367
		D	960	0	34.0	771	0	687	330	0	294
		H	49	0	17.0	13	0	12	5	0	4
		RC	411	0	16.2	255	0	217	90	0	76
		WP	0	0	0.0	0	0	0	0	0	0
		LP	0	0	0.0	0	0	0	0	0	0
		TF	0	0	0.0	0	0	0	0	0	0
		SS	0	0	0.0	0	0	0	0	0	0
		RA	0	0	0.0	0	0	0	0	0	0
		BLM	0	0	0.0	0	0	0	0	0	0
		BC	0	0	0.0	0	0	0	0	0	0

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume Net M b.f.
TOTALS - FOREST LAND 86.6			11,554	13,973	92	8,453	166	7,577	3,246	50	2,911
NON-FOREST LAND 572.5											
GRAND TOTAL 659.1											

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
8	1	32.8	D3,3,h	94	21	Salal	1	4	7.8	12.6	0
0	2	3.9	Br								
0	3	3.3	Br								
1	4	1.5	Ra1,3								
4	5	4.2	D2,3	95	18	box	0	0	0.0	0.0	0
0	6	96.4	A								
0	7	12.9	A								
0	8	117.4	A								
0	9	87.1	O								
0	10	8.7	Br								
0	11	13.6	A								
0	12	32.1	A								
0	13	197.2	A								
12	14	1.0	D4,2	93	22	*RO/SB	1	0	0.0	13.5	2

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
13	15	13.3	D3,2	94	11	*OS/N	0	2	5.3	9.5	3
6	16	6.8	D3,2,h	93	32	Salal	1	73	0.2	0.1	0
15	17	18.2	Ra3,3,d	96	25	*EB/N	1	912	9.5	15.6	12
TOTALS - FOREST LAND		86.6					Average:	0	0.0	0.0	0
NON-FOREST LAND		572.5									
GRAND TOTAL		659.1									

*RO/SB(Rose/Salmonberrry)
*OS/N(Ocean spray/Nettles)
*EB/N(Elderbery/Netles)

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 4 - TYPE GROUP SUMMARY

GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.		Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined			78	5.71%
4	TOTAL	171	120.0	10.1	16,269		4,338	6	25%
	D	171		11.1	16,269		4,338		
	H								
	RC								
	WP								
	LP								
	TF								
	SS								
	RA								
	BLM								
	BC								
6	TOTAL	140	222.2	15.1	24,854	0	7,102	9	13%
	D	72		17.8	12,944		3,716		
	H	7		17	630		175		
	RC	61		16.2	11,280		3,211		
	WP								
	LP								
	TF								
	SS								
	RA								
	BLM								
	BC								

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 4 - TYPE GROUP SUMMARY

GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.	Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined		78	5.71%
8	TOTAL	187	148.0	10.7	18,893	5,168	30	11%
	D	173		11.4	16,134	4,459		
	H	11		9	2,464	616		
	RC	3		13	295	93		
	WP							
	LP							
	TF							
	SS							
	RA							
	BLM							
	BC							
12	TOTAL	48	104.0	17.7	20,833	4,383	10	10%
	D	48		16.2	20833	4383		
	H							
	RC							
	WP							
	LP							
	TF							
	SS							
	RA							
	BLM							
	BC							

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 4 - TYPE GROUP SUMMARY

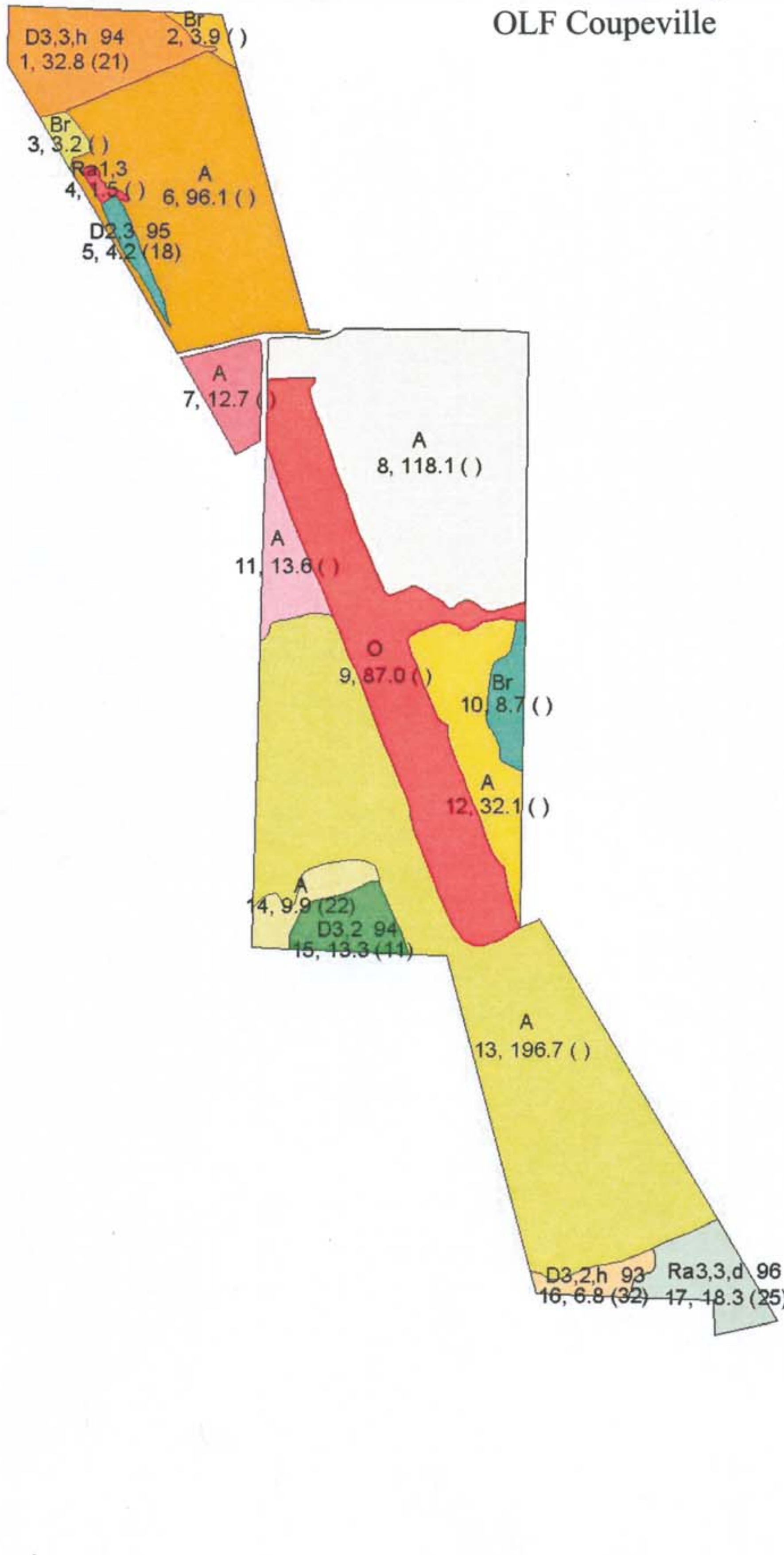
GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.	Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined		78	5.71%
13	TOTAL	151	243.1	15.2	37,428	9,503	13	9%
	D	143		16.2	36,476	9,217		
	H	7		13	952	286		
	RC							
	WP							
	LP							
	TF							
	SS							
	RA							
	BLM							
	BC							
15	TOTAL	155	157.5	12.1	19,833	4,735	16	16%
	D	4		24.7	2,734	621		
	H	61		11.5	3,521	136		
	RC	2		21	954	371		
	WP							
	LP							
	TF							
	SS							
	RA	87		14.7	12,624	3,607		
	BLM							
	BC							

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 13
OLF COUPEVILLE

TABLE 4 - TYPE GROUP SUMMARY

GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.	Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined		78	5.71%
14	TOTAL	241	122.8	8.6	8,704	2,869		14%
	D							
	H							
	RC							
	WP							
	LP							
	TF							
	SS							
	RA	241		9.1	8,704	2,869		
	BLM							
	BC							
15	TOTAL	142	146.0	12.2	10,499	3,786		21%
	D	6		14.4	996	306		
	H							
	RC							
	WP							
	LP							
	TF							
	SS							
	RA	136		13.2	9,503	3,480		
	BLM							
	Q A							

Forest Stand Map
OLF Coupeville



Lake Hancock Inventory

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 14
LAKE HANCOCK

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
0	1	0.67	G													
1	2	2.69	Ra1,3	98	98	TOTAL										
6	3	48.2	H3,2d,ra	92	84	TOTAL	3,977	5,628	14.3	2,305	30	2,056	895	17	1.9%	798
						D	1,779		14.5	1,258		1,119	498			443
						H	1,306		14.3	956		855	369			330
						RC	24		25.0	14		11	4			3
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	868		10.0	77		72	25			22
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 14
LAKE HANCOCK

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
14	4	12.06	Ra2,3,h	96	106ra	TOTAL	2,376	1,848	10.6	672	19	602	231	10	4.1%	207
						D	110		11.9	25		22	6			6
						H	87		18.8	94		84	39			34
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	22		22.7	13		12	5			4
						SS	0			0		0	0			0
						RA	2,158		11.2	540		484	181			162
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
14	5	15.66	Ra2,3	96	129ra	TOTAL	3,085	2,399	10.6	872	27	782	300	14	4.7%	268
						D	143		11.9	32		29	8			7
						H	113		18.8	122		109	50			45
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	28		22.7	17		16	6			6
						SS	0			0		0	0			0
						RA	2,802		11.2	701		628	235			211
						BLM	0			0		0	0			0
						BC	0			0		0	0			0

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 14
LAKE HANCOCK

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
14	10	15.8	Ra2,3	95	115	TOTAL	3,113	2,421	10.6	880	27	789	302	16	5.3%	271
						D	144		11.9	32		29	8			7
						H	114		18.8	124		110	51			45
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	28		22.7	17		16	6			6
						SS	0			0		0	0			0
						RA	2,827		11.2	707		634	237			213
						BLM	0			0		0	0			0
							0			0		0	0			0
0	11	3.86	Br													

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 14
LAKE HANCOCK

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
24	12	4.54	Lp3,3,h,c	95	100	TOTAL	1,592	1,271	10.7	457	13	390	154	8	4.9%	133
						D	0			0		0	0			0
						H	434		11.1	129		116	48			44
						RC	295		14.3	119		90	34			26
						WP	0			0		0	0			0
						LP	863		9.7	209		185	72			63
						TF	0			0		0	0			0
						SS	0			0		0	0			0
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
4	13	7.56	D2,3	95	110	TOTAL	1,564	867	8.9	423	10	375	165	6	3.5%	147
						D	0			0		0	0			0
						H	1,242		9.0	284		256	119			107
						RC	155		12.9	51		40	17			14
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	167		13.8	88		79	29			26
						RA	0			0		0	0			0
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
0	14	7.9	Br													

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 14
LAKE HANCOCK

TABLE 1 - STAND DATA

Type Group	Stand No.	Acres	Type	Dec. Origin	Site Index	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.	Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume p.a.i. %	Scribner Volume Net M b.f.
15	15	48.95	Ra3,3,s,h	95	100ra	TOTAL	5,590	7,504	13.9	3,293	54	2,952	1,310	35	2.7%	1,174
						D	0			0		0	0			0
						H	671		18.9	715		641	319			286
						RC	0			0		0	0			0
						WP	0			0		0	0			0
						LP	0			0		0	0			0
						TF	0			0		0	0			0
						SS	470		17.5	538		480	242			216
						RA	4,450		14.1	2,041		1,831	748			671
						BLM	0			0		0	0			0
						BC	0			0		0	0			0
TOTALS - FOREST LAND																
# Stands	3	155.46					21,296	21,937	12.2	8,903	179	7,947	3,357	105	3.1%	2,997
NON-FOREST LAND																
# Stands	7	12.43														
GRAND TOTAL																
# Stands	10	167.89														

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 14
LAKE HANCOCK

TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.		Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume Net M b.f.
12.43	0		0	0	0.0	0	0	0		0	0	0
2.69	98	TOTAL	0	0	0.0	0	0	0	0	0	0	0
27.72	96	TOTAL	5,461	4,247	21.2	1,544	46	1,384		530	24	475
		D	252	0	23.8	57	0	51		15	0	13
		H	200	0	37.6	217	0	193		89	0	79
		RC	0	0	0.0	0	0	0		0	0	0
		WP	0	0	0.0	0	0	0		0	0	0
		LP	0	0	0.0	0	0	0		0	0	0
		TF	50	0	45.4	30	0	27		11	0	10
		SS	0	0	0.0	0	0	0		0	0	0
		RA	4,959	0	22.4	1,240	0	1,112		416	0	373
		BLM	0	0	0.0	0	0	0		0	0	0
		BC	0	0	0.0	0	0	0		0	0	0
76.85	95	TOTAL	11,859	12,063	44.1	5,053	103	4,507	0	1,931	65	1,724
		D	144	0	11.9	32	0	29	0	8	0	7
		H	2,461	0	57.8	1,252	0	1,123	0	537	0	482
		RC	450	0	27.2	170	0	130	0	52	0	40
		WP	0	0	0.0	0	0	0	0	0	0	0
		LP	863	0	9.7	209	0	185	0	72	0	63
		TF	28	0	22.7	17	0	16	0	6	0	6
		SS	637	0	31.3	626	0	559	0	271	0	242
		RA	7,276	0	25.3	2,748	0	2,465	0	985	0	884
		BLM	0	0	0.0	0	0	0	0	0	0	0
		BC	0	0	0.0	0	0	0	0	0	0	0

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 14
LAKE HANCOCK

TABLE 2 - STAND DATA BY DECADE OF ORIGIN

Acres	Dec. Origin	Species	# Trees	Basal Area s.f.	Ave DBH In.	Cubic Volume Gross C c.f.	Cubic Volume p.a.i. C.c.f.	Cubic Volume Net C. c.f.		Scribner Volume Gross M b.f.	Scribner Volume p.a.i. M b.f.	Scribner Volume Net M b.f.
48.2	92	TOTAL	3,977	5,628	14.3	2,305	30	2,056	0	895	17	798
		D	1,779	0	14.5	1,258	0	1,119	0	498	0	443
		H	1,306	0	14.3	956	0	855	0	369	0	330
		RC	24	0	25.0	14	0	11	0	4	0	3
		WP	0	0	0.0	0	0	0	0	0	0	0
		LP	0	0	0.0	0	0	0	0	0	0	0
		TF	0	0	0.0	0	0	0	0	0	0	0
		SS	0	0	0.0	0	0	0	0	0	0	0
		RA	868	0	10.0	77	0	72	0	25	0	22
		BLM	0	0	0.0	0	0	0	0	0	0	0
		BC	0	0	0.0	0	0	0	0	0	0	0
TOTALS - FOREST LAND 155.46			21,296	21,937	80	8,903	179	7,947		3,357	105	2,997
NON-FOREST LAND 12.43												
GRAND TOTAL 167.89												

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 14
LAKE HANCOCK

TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*		Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
0	1	0.67	G								
1	2	2.69	Ra1,3	94							
6	3	48.2	H3,2d,ra	89	15	Salal	51%	397	8.4	13.3	2.9
14	4	12.06	Ra2,3,h	96	20	*N/SB	72%	436	11.8	12.5	3.4
14	5	15.66	Ra2,3	96	20	*N/SB	72%	436	11.8	12.5	3.4
0	6	1.98	Br								
0	7	205.19	W								
0	8	27.08	A								
0	9	8.85	Br								
14	10	15.8	Ra2,3	95	20	*N/SB	72%	436	11.8	12.5	3.4
0	11	3.86	Br								
24	12	4.54	Lp3,3,h,c		31	Salal	27%	0	0.0	12.7	5.2
4	13	7.56	D2,3	95	23	Salal	10%	915	10.5	60.0	0.1
0	14	7.9	Br								
15	15	48.95	Ra3,3,s,h	88	28	*SB/F	64%	442	14.0	20.3	0.1

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 14
LAKE HANCOCK

TABLE 3 - HABITAT DATA BY CRUISED STANDS

Type Group	Stand No.	Acres	Type	Dec. Origin	Vol/ac M b.f.	Dominant Understory*	Vol. Down Woody cu.ft/ac	Ave Dia. Down Woody	Ave. Dia. Snags	# Snags Acre
TOTALS - FOREST LAND						Average:	0	0.0	0.0	0.0
		155.46								
# Stands	7									
NON-FOREST LAND										
		255.53		*N/SB, Nettles, salmonberry						
# Stands	7			*SB/F, Salmonberry, fern						
GRAND TOTAL										
		410.99								
# Stands	14									

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 14
LAKE HANCOCK

TABLE 4 - TYPE GROUP SUMMARY

GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.		Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined			124	5.38%
4	TOTAL	206.9	115.0	8.9	19,425		4,966	8	20%
	D	164.3		9.0	14,147		3,386		
	H								
	RC	20.5		12.9	1,830		535		
	WP								
	LP								
	TF								
	SS	22.1		13.8	3,448		1,045		
	RA								
	BLM								
	BC								
6	TOTAL	82.5	116.8	14.3	16,560	0	4,269	35	10%
	D	36.9		14.5	9,188		2,322		
	H	27.1		14.3	6,851		1,776		
	RC	0.5		25.0	62		22		
	WP								
	LP								
	TF								
	SS								
	RA	18.0		10.0	459		149		
	BLM								
	BC								

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 14
LAKE HANCOCK

TABLE 4 - TYPE GROUP SUMMARY

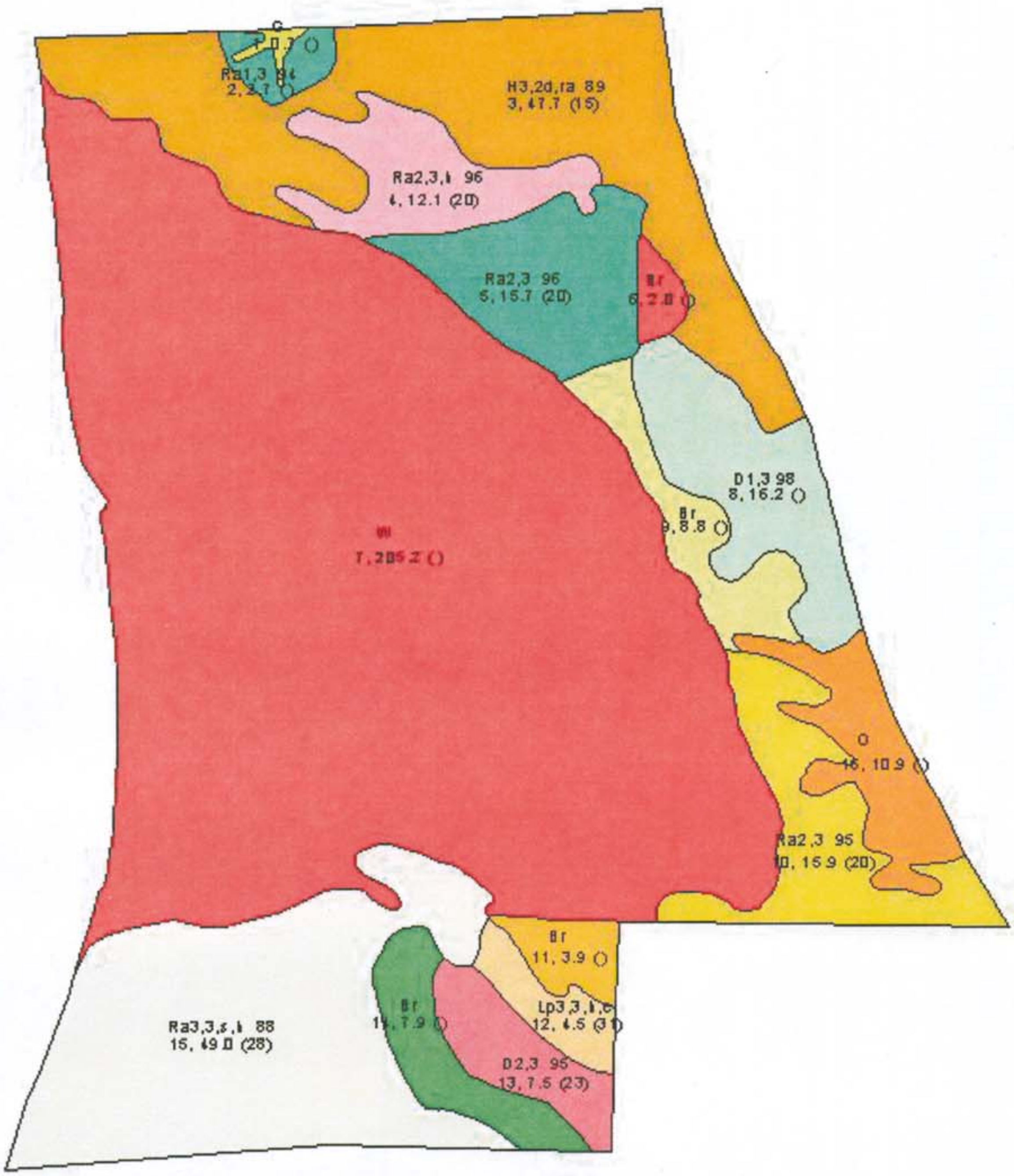
GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.	Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined		124	5.38%
14	TOTAL	197.0	153.2	10.6	17,142	4,994	41	8%
	D	9.1		11.9	472	185		
	H	7.2		18.8	2,852	697		
	RC							
	WP							
	LP							
	TF	1.8		22.7	362	99		
	SS							
	RA	178.9		11.2	13,456	4,013		
	BLM							
	BC							
15	TOTAL	114.2	153.3	13.9	23,974	6,030	36	10%
	D							
	H	13.7		18.9	5,845	1,310		
	RC							
	WP							
	LP							
	TF							
	SS	9.6		17.5	4,413	980		
	RA	90.9		14.1	13,716	3,740		
	BLM							
	BC							

FOREST INVENTORY - 2000
NAVAL AIR STATION, WHIDBEY ISLAND
COMPARTMENT 14
LAKE HANCOCK

TABLE 4 - TYPE GROUP SUMMARY

GROUP		# Trees per ac.	Basal Area s.f.	Ave DBH In.	Net VOLUME PER ACRE b.f.	Net VOLUME PER ACRE Cu. Feet	# Plots	SE %
					Compartment All Stands Combined		124	5.38%
24	TOTAL	350.6	280	10.7	29,257	8,598	4	12%
	D							
	H	95.6		11.1	9,613	2,555		
	RC	64.9		14.3	5,696	1,979		
	WP							
	LP	190.1		9.7	13,948	4,064		
	TF							
	SS							
	RA							
	BLM							
	BC							

Forest Stand Map
Lake Hancock



APPENDIX I. BASH Instruction

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DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
OAK HARBOR, WASHINGTON 98278-5000

NASWHIDBEYINST 3700.3
N3
5 Aug 13

NAS WHIDBEY ISLAND INSTRUCTION 3700.3

From: Commanding Officer, Naval Air Station Whidbey Island

Subj: BIRD AIRCRAFT STRIKE HAZARD PLAN

Ref: (a) CNICINST 3700
(b) CNIC M-BASH
(c) OPNAVINST 3750.6R
(d) OPNAVINST 3710.7R
(e) FAA Handbook 7110.65
(f) NAVFAC P-73, Vol II

Encl: (1) NAS Whidbey Island BASH Plan

1. Purpose. To issue the Bird Aircraft Strike Hazard (BASH) Plan as enclosure (1), which provides a program per references (a) through (f) to reduce the potential for collisions between aircraft and birds or other animals.

2. Cancellation. NASWHIDBEYINST 5090.10A

3. Background. No single solution exists to the BASH problem; a variety of techniques and organizations must be involved to ensure success of this program. The program encompasses all actions which may identify, reduce, or eliminate bird or other animal hazards to aviation, specifically, bird avoidance and bird control (including harassment, grounds maintenance, habitat modification, and depredation).

4. Objectives. BASH does exist at this installation and within the immediate vicinity due to resident and migratory bird species. Daily and seasonal bird movements create various hazardous conditions to aviation. This plan is designed to reduce the bird hazard in and around Naval Air Station (NAS) Whidbey Island.

5. Records Management. Records created as a result of this instruction, regardless of media and format, will be managed per SECNAV M-5210.1 of January 2012.

MKN

M. K. NORTIER

Distribution:
Electronic via CNIC Gateway
https://g2.cnic.navy.mil/tscnrnw/N00/TeamSite/WPPL/CNRNWDirectives.aspx

NAS WHIDBEY ISLAND
BASH PLAN

RECORD OF CHANGES

CHANGE NUMBER	DATE	DATE ENTERED	ENTERED BY

TABLE OF CONTENTS

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CHAPTER 1

GENERAL INFORMATION

1. GENERAL. NAS Whidbey Island and Outlying Landing Field (OLF) Coupeville have a large and potentially dangerous bird population. Daily and seasonal bird movements in the vicinity of the airport create various hazards to aircraft. Accordingly, the BASH Program is designed to control wildlife and to provide increased levels of safety during the critical phases of flight. This plan establishes specific procedures to reduce known and future wildlife hazards. There is no single solution or agency that can solve the bird strike problem. Therefore, a variety of techniques and organizations must be involved in the overall program. This plan is designed to:

a. Establish a Bird Hazard Working Group (BHWG) and designate responsibilities to its members.

b. Establish training for all NAS Whidbey Island base members concerning responsibilities and actions.

c. Establish procedures to identify high hazard situations and to aid supervisors and aircrews in alerting/discontinuing flying operations when required.

d. Establish aircraft and airfield operating procedures to avoid high hazard situations.

e. Provide a method for disseminating information to all tenant and transient aircrews on bird hazards and procedures for bird avoidance.

f. Establish passive techniques to decrease airfield attractiveness to birds.

g. Establish active/static techniques to disperse birds from the airfield.

h. Establish local procedures for reporting of damaging/non-damaging bird strikes.

i. Establish procedures for collecting bird strike remains.

2. **AIRFIELD INSTALLATION DESCRIPTION**

a. Ault Field (NAS Whidbey Island) is an active military airfield. The primary missions supported are maritime patrol and electronic warfare, with logistic and search and rescue operations in a secondary role. The primary aircraft types using the airfield runways include the assigned EA-18G, EA-6B, P-3, C-9, MH-60S, and transient aircraft.

b. OLF Coupeville is an active military airfield used by NAS Whidbey Island based tactical jet aircraft for Field Carrier Landing Practice (FCLP) operations. These consist of touch and go landings to a simulated carrier deck on the runway. The NAS Whidbey Island MH-60S helicopters use OLF Coupeville for simulated deck landings and for autorotation training. Takeoffs and full stop landings by fixed wing aircraft are not authorized and the airfield is not used by other types of military or transient aircraft.

3. **LOCAL AREA**

a. NAS Whidbey is situated on a narrow island in Puget Sound between the Strait of Juan de Fuca and Saratoga Passage. The town of Oak Harbor borders to the southeast. There are 4,253 acres within Ault Field's boundaries. The airfield elevation is 47 feet above sea level.

b. OLF Coupeville is located 10 miles southeast of NAS Whidbey and two miles southeast of the town of Coupeville. The airfield encompasses 677 acres and elevation is 199 feet above sea level.

4. **GENERAL TOPOGRAPHY**. Ault Field has generally level topography. The coastal plain surface slopes very gently southward toward the Sound, ground elevation varies from sea level to approximately 55 feet above sea level along the northern installation boundary.

5. **DEVELOPED AREA**. The Ault Field developed area (including the runways) is approximately 23 percent of the total installation.

6. **VEGETATION COVER TYPES**. 14 different types of vegetation cover can be found in the Ault Field complex.

7. **HABITATS**. Systematic surveys of bird life on NAS Whidbey Island have tallied over 200 different bird species within the four major habitat types found on station. The four major

habitats are wetlands, woodlands, grasslands, and coastal/open ocean. Additionally, standing water, perch sites, tall brush and short grass are all present on station and attract large numbers of individual and flocking birds. The combination of all these environments and attractors increases the potential for a serious bird strike incident.

8. **SPECIES**. Chapter 5 contains a comprehensive listing of birds/mammals which may be observed in the airfield area. There may be occasional sightings of other species during migration, but this list is considered thorough for BASH purposes.

9. **EXPLANATION OF TERMS**

a. Active Bird Dispersal. Harassment techniques employed to disperse birds from airfield and surrounding areas. Methods may include chase, pyrotechnics, bioacoustics, other forms of non-lethal harassment and depredation.

b. BASH. General term to describe bird and wildlife hazards and bird and wildlife hazard programs.

c. BASH Advisory. A radio transmission from Air Traffic Control (ATC) or aircrew reporting specific bird hazard information. May be real time or disseminated via Automated Terminal Information Service (ATIS) broadcasts.

d. BASH Window. Known periods of severe bird activity where the Bird Watch Condition (BWC) may be automatically set in advance. Designated by a Fly Safe Plan (FSP), as needed.

e. Bird Dispersal Team. Individuals authorized by United States Department of Agriculture (USDA) and NAS Whidbey Island to conduct dispersal techniques onboard the station.

f. Bird Exclusion Zone. The designated area surrounding the airfield where bird habitation is discouraged.

g. BHWG. Local committee of base and unit offices concerned with wildlife hazards. Executes and makes recommendations to the BASH Program.

h. Bird Strike. Any contact between a bird or other animal and an aircraft, whether or not damage occurred. All wildlife strikes, damaging or non-damaging, are required to be reported to the Navy Safety Center thru the USDA Wildlife Biologist.

i. BWC. A wildlife alert condition used to warn aircrew of wildlife activity.

j. BWC Low. Wildlife activity on or around the airfield representing low potential for strikes.

k. BWC Moderate. Wildlife activity in locations representing increased potential for strikes. BWC Moderate requires increased vigilance by all agencies and supervisors and caution by aircrews.

l. BWC Severe. Wildlife activity on or immediately above the active runway or other specific location representing high potential for strikes. Supervisors and aircrews must thoroughly evaluate mission need before conducting operations in areas under condition SEVERE.

m. Depredation. Technique used to remove problem birds and animals permanently from the airfield and hangars when other scare tactics are ineffective. Permits for some species are required.

n. Models/Decoys. Various static devices used to disperse birds from airport areas. May include scarecrows, decoys, Mylar tape and eye spots.

o. Propane Cannons. Stationary non-projectile sound producing device used to disperse birds from airport areas.

p. Pyrotechnics. Noise producing devices fired from pistol or shotgun. Used by USDA BASH personnel to scare birds away from runways and airport areas. Pyrotechnics are Class 1.4 explosives.

q. Salvage. The act of collecting wildlife or wildlife remains from an aircraft or from the airfield environment. Birds covered by the Migratory Bird Treaty Act must be reported to the U.S. Fish and Wildlife Service via a Salvage Permit. Certain mammalian species are reported through State agency permitting requirements.

r. USDA BASH Personnel. Responsible for the daily management of the installation's BASH program. The USDA biologist is the command's expert on BASH and will make recommendations to the BHWG, the installation's natural resources program and Airfield Management on habitat modifications and emerging issues and hazards. The USDA Biologist will provide training on request to local squadrons and will coordinate with state and local wildlife agencies as necessary to conduct BASH work on the airfield. USDA will provide a roving airport patrol that reports BWC and disperses problem birds via chase, pyrotechnic, bioacoustics, depredation and other methods.

s. Wildlife Services (WS). An office of the USDA Animal and Plant Health Inspection Service which the Navy has under contract to provide BASH assistance.

CHAPTER 2

ORGANIZATIONAL TASKS AND RESPONSIBILITIES

1. BIRD HAZARD WORKING GROUP (BHWG)

a. General. The BHWG is organized to implement and monitor the BASH Plan. It allows base offices affected by bird and wildlife problems the opportunity to meet and discuss possible solutions. The BHWG shall meet regularly with representatives from each organization concerned with bird hazards.

b. Composition. As a minimum, the group shall have a representative assigned from the following specialties:

(1) Operations Department.

(2) NAVFAC - Facilities and Environmental Divisions.

(3) Commander, Electronic Attack Wing, U.S. Pacific Fleet (COMVAQWINGPAC) Safety.

(4) Commander, Patrol and Reconnaissance Wing TEN (COMPATRECONWING-10) Safety.

(5) Security (as required).

(6) Tenant aviation units when required.

(7) USDA Wildlife Services Biologist.

c. Authority. The Commanding Officer is responsible for the BASH Program and is approval authority for all BHWG recommendations. Active participation by Operations and NAVFAC is the key to ensuring success of this program.

d. BHWG Meeting Schedule. BHWG meetings will be scheduled at least once per quarter. The BHWG will meet as often as necessary to stay current on bird hazards and to discuss solutions, results, and effectiveness of the program. An important concept is that the BHWG address problems as they develop, before they create a serious safety hazard.

e. BHWG Function

(1) Execute and update the BASH Plan.

(2) Monitor base-wide compliance with reference (c).

(3) Collect, compile, and review data on all wildlife strikes.

(4) Review the Wildlife Hazard Assessment data to identify and recommend actions to reduce bird hazards.

(5) Recommend changes in operational procedures.

(6) Prepare informational programs and safety briefings for aircrews.

2. **NAS OPERATIONS OFFICER**

a. Chair BHWG meetings.

b. Monitor the effectiveness of the BASH program.

c. Conduct periodic reviews of the BASH program using the self-inspection checklist contained in Appendix A-3 of reference (b).

d. Ensure BASH program is a part of safety surveys conducted by the Naval Safety Center.

3. **WING COMMANDERS**

a. Wing Commanders should publish operating instructions/ checklists and conduct training as appropriate to support this plan.

b. Ensure representatives are assigned to the BHWG.

c. Issue specific guidance for units on:

(1) Procedures and restrictions to be followed under each of the bird hazard conditions.

(2) Bird strike reporting.

(3) Bird remains collection and preservation.

(4) Ensure squadrons comply with reference (d) regarding mandatory reporting of all bird strikes.

4. **TENANT SQUADRONS**

a. Publish operating instructions/checklists as appropriate to support this plan and Wing directives.

b. Ensure a bird hazard awareness program is established and briefings conducted to include web based BASH training, posters, and information on seasonal bird hazards. Chapter 4 of this instruction should be reviewed in the Spring and Fall when bird hazards are typically greatest.

c. Ensure aircrew briefings are conducted on bird hazards and attendance documented. This briefing is mandatory for all aircrew and shall cover in-flight avoidance procedures and go/no-go criteria.

d. Monitor, on a regular basis, aircrew mission briefings to ensure existing BASH information is briefed.

e. Coordinate unit flying activities through Wing to minimize exposure to migratory birds.

f. During spring and fall migration seasons make BASH a special interest item.

g. Issue specific guidance to maintenance personnel for reporting observed hazardous bird activity to the Tower or Operations Duty Officer.

h. Issue specific guidance to maintenance personnel for reporting all discovered bird strikes on aircraft to the Squadron Safety Officer.

i. Issue procedures for the preservation of bird remains and blood smears if discovered on an aircraft. Even the smallest fragment of a feather should be preserved for identification.

j. Ensure aircrew complies with reference (d) regarding mandatory reporting of all bird strikes, damaging and non-damaging.

k. Brief bird hazard awareness and the NAS Whidbey Island BASH program to all hosted aviation units.

5. **AIRFIELD MANAGER**

a. Serves as the BASH Officer who will co-chair the BHWG and run the BASH program for the Operations Officer.

b. Maintain a file of all bird strikes occurring at NAS Whidbey Island.

c. Provide liaison with all aviation activities at NAS Whidbey Island concerning BASH issues.

d. Develop passive, active, and static procedures to reduce BASH hazard.

e. Monitor grass height, drainage ditches, etc., and report problems to Naval Facilities Engineering Command Northwest (NAVFAC NW) Public Works.

f. Assist Wings in development of in-flight avoidance procedures.

g. Develop a continuing information and education program to disseminate bird hazard information.

h. Establish a BASH awareness training program for all airfield management, ATC, and airfield facilities personnel.

6. **AIR TRAFFIC CONTROL TOWER**

a. In the absence of USDA BASH personnel, or at the discretion of the Tower Supervisor, declare BWC based on reported sightings or BWC criteria in paragraphs 3.2. and 3.3.

b. Pass BWC information to the Operations Duty Officer.

c. Alert USDA BASH of observed bird hazards.

d. Allow USDA BASH priority movement on the airfield to disperse birds on or near active runways.

e. Include BWC and bird advisory information in ATIS broadcasts. Update frequently.

f. Issue bird advisory information to aircraft over air traffic control frequencies per Federal Aviation Administration (FAA) Orders 7110.65 and 7210.3.

7. <u>NAVFAC NW PUBLIC WORKS</u>

a. Provide representative for BHWG.

b. Based upon the direction of the BHWG, maintain runway lateral and approach zones in a manner that is least attractive to birds.

c. Ensure training is conducted for all Public Works (PW) and base support personnel (sweepers, etc) covering responsibilities, actions and techniques applied under this instruction.

d. Ensure all trash receptacles in Bird Exclusion Zone have covers which prevent bird access and are emptied on a timely basis to prevent overflowing. Trash is a bird attractor.

e. Incorporate practices described in Chapter 3 into the base land management plan.

f. When available, provide recycled propane gas for BASH cannons.

8. <u>ENVIRONMENTAL DIVISON</u>

a. Participate in the BHWG.

b. Ensure BASH program is in compliance with all applicable state and federal environmental laws and regulations including permit conditions.

9. <u>NATURAL RESOURCES PROGRAM</u>

a. Participate in the BHWG.

b. Ensure BASH program and plans are in compliance with the installation Integrated Natural Resources Management Plan (INRMP) and all applicable state and federal natural resources laws and regulations.

c. Ensure that BASH management actions are considered sustainable land management practices and that monitoring protocols use scientifically sound techniques.

d. Coordinate INRMP revisions with air operations and incorporate developed BASH management actions into the INRMP.

e. Coordinate and manage all applicable natural resources consultations and depredation permits necessary to support the BASH program. This includes coordinating with the Airfield Manager to identify permit needs and consolidating and submitting reporting requirements.

f. Coordinate natural resources actions with USDA BASH personnel.

10. **SECURITY DEPARTMENT**

a. Provide representative for BHWG when required.

b. Establish procedures that allow USDA personnel to enter the installation on a daily basis while armed.

11. **PUBLIC AFFAIRS**. Public Affairs will provide a public information program designed to inform base personnel, dependents and the general public on the hazards of uncontrolled bird activity and the measures being taken to minimize the danger.

12. **USDA BASH**. Responsibility for bird detection and dispersal is an airport management function and as such falls under the control of the NAS Airfield Manager. Prepare and update the airfield Wildlife Hazard assessment to provide data to identify problem species and high risk areas. Coordinate BASH actions with the installation natural resources program. The Airfield Manager will utilize trained USDA Washington State (WS) personnel to carry out detection and dispersal activities.

CHAPTER 3

CONCEPT OF OPERATIONS

1. **GENERAL**. The BASH program is an ongoing process including both information dissemination and active/passive wildlife control techniques. Of these processes, the most critical is the aircrew notification and warning system. This system establishes procedures for the immediate exchange of information between ground agencies and aircrews concerning the existence and location of birds that pose a hazard to flight safety. Additionally, a cautionary advisory is published in the Department of Defense (DOD) Flight Information Publication (FLIP) AP/1 under Supplementary Airdrome Remarks.

2. **BIRD WATCH CONDITION SYSTEM**. Bird Watch Conditions (Severe, Moderate, and Low) are defined in Section 1 of this instruction. The terminology is identical to the United States Air Force (USAF) codes in section B of the DoD FLIP. Bird locations should be given with the condition code. Species and/or size information may also be provided.

a. Bird Watch Alert. A general warning that indicates when weather, time of day and seasonal conditions make an influx of birds onto the airfield likely. Upon receipt of special conditions, airfield management Operations Duty Officer (ODO) will set the alert and the Tower will include a general statement in ATIS broadcasts.

b. BASH Window. BASH windows are based on historical bird survey data that show specific times when a hazard is known to exist, i.e., dawn seagull movements, etc. When BASH windows are set, aircraft operations during these time frames are not recommended. The ODO will post BASH windows designated in a Fly Safe Plan (FSP). Squadron flight schedulers should exercise caution when scheduling operations during BASH windows. Guidance for aircraft operations is contained in Chapter 4.

3. **BIRD WATCH CONDITION REPORTS**

a. Bird Hazard Reporting. The NAS Operations Officer, ODO, or designated representative ensures hazardous conditions are reported. Declaration of a BWC will be based on the following:

(1) Visual observation of bird activity on or near the airfield by Control Tower or USDA BASH personnel.

(2) Information relayed by ATC Radar, airborne and taxiing aircraft.

(3) Observations relayed to the tower by any of the following personnel: airfield facilities, weather observers, Landing Signaling Officer (LSO), ground electronics maintenance, airfield lighting technicians, crash crews, arresting gear maintenance, sweepers, mowers, security police, transient line personnel and any other personnel driving on the airfield.

(4) ATC or weather radar observation.

b. USDA BASH BWC Reporting

(1) The most accurate and real-time reporting of bird hazard information is obtained from USDA BASH personnel. USDA provides a roving patrol to the maximum level their staffing posture allows and is in the best position to make accurate BWC reports.

(2) When the USDA BASH is patrolling the airfield, they will have the primary responsibility to make BWC reports to the control tower. At a minimum, reports will be made hourly for inclusion in tower ATIS broadcasts. USDA BASH personnel will continue to make real-time reports and update BWC as hazard conditions change.

(3) Once BWC Severe has been declared the condition will be updated, at a minimum, every five minutes until downgraded. When aircraft are holding for BWC Severe, the USDA BASH personnel will report to the Tower immediately if initial attempts to disperse the birds have failed. During BWC Severe, USDA BASH personnel shall remain on the airfield and be actively involved in dispersal techniques until BWC Severe is downgraded.

c. OLF Coupeville Reporting

(1) Prior to scheduled FCLP operations, OLF personnel will make a BASH sweep of the runway and pass BWC reports to the ODO and LSO.

(2) OLF personnel will make periodic sweeps of the runway when breaks in flight operations allow, and report BWC to the ODO and LSO as necessary.

(3) The LSO shall also report BWC to the ODO and issue radio advisories to inbound and pattern aircraft.

d. BWC Declarations by Maintenance Personnel, Sweepers, Grass Mowers and Others

(1) If a bird hazard exists, other personnel may notify USDA BASH, Tower or ODO as applicable. This notification can be made on a radio net or by telephone. Telephone reports can be passed to the ODO at extension 7-2681.

(2) Reports should include:

(a) Identity of caller (agency for ground personnel, call sign for aircrews.)

(b) Location.

(c) Altitude.

(d) Time of sighting.

(e) Approximate number of birds or hazardous wildlife.

(f) Type of wildlife (if known).

(g) Behavior of birds (soaring, flying to or from a location, etc.)

e. Aircrew Reporting. Aircrews should report significant activity as follows:

(1) Notify Tower (or LSO for OLF).

(2) On a low level route/range area, notify ATC and NAS Whidbey Island Schedules after landing.

4. **DOWNGRADING BWC**. Once a BWC has been declared, it shall be downgraded commensurate with updated information. The Control Tower will make the final determination on BWC. For OLF Coupeville, the LSO will change BWC as required.

5. **BIRD HAZARD COMMUNICATION**. Disseminating BWC is critical to BASH effectiveness. The agencies below will disseminate the BWC by the following means:

a. Control Tower Communications

(1) Include BWC on ATIS Broadcasts.

(2) Notify inbound/departing aircraft of BWC if aircraft has received ATIS and the BWC has changed.

(3) Provide additional bird advisories per reference (e).

(4) The Tower Supervisor will direct USDA BASH to the location where the wildlife is posing a problem.

(5) Pass BWC to ODO.

(6) For rapidly changing BWC place a statement on ATIS advising aircrews to contact Ground, Tower, or Approach for the latest BWC.

(7) Pass OLF BWC to aircraft outbound to OLF.

(8) Notify other area airfields via ATC direct lines of all sightings of large flocks or migratory movements.

(9) If BWC Severe is declared for extended periods of time and will impact flying operations, the Control Tower will notify Whidbey Approach.

b. ODO Communications

(1) Notify the Operations Officer and Wing Operations when the BWC is changed to Condition Severe.

(2) Notify Naval Pacific Meteorology and Oceanography Facility (NPMOF) of BWC reports for inclusion on Weathervision.

6. **BIRD DISPERSAL TEAM (BDT) PROCEDURES**. BDT will actively patrol Ault Field Monday-Friday, sunrise to sunset, operating as staffing permits. At other times, they will be activated on an as-needed basis. All members of the BDT will receive training from the USDA Biologist prior to commencing BDT duties.

a. Prior to initiation of dispersal actions the BDT leader will coordinate the location and methods with the Tower Supervisor and ensure that BHC Severe has been declared prior to dispersal activities on the duty runway.

b. Horns and bioacoustics distress calls should be used before pyrotechnics are used.

c. Pyrotechnics should be used in conjunction with distress tapes. These consist of screamer, whistle banger and cracker shells.

d. Propane sound cannons may be placed around the airfield and moved periodically to prevent habituation.

e. If the methods above do not work or the birds become accustomed to the hazing, it may become necessary to remove several birds via lethal methods to reinforce the dispersal methods.

f. When the target flock or problem birds are dispersed, Tower shall be notified so the BWC can be lowered.

Note: Lethal control shall be within depredation permit guidelines.

7. **BASH DISPERSAL EQUIPMENT**

a. General. There are a variety of methods for dispersing birds using static, pyrotechnic, bioacoustics, and depredation equipment. Any or all of these may be used at NAS Whidbey Island/OLF Coupeville to disperse wildlife. The BDT (and OLF personnel) are specially trained in use of this equipment.

b. Static Deterrent Devices. Static deterrents include, but are not limited to: propane cannons, scarecrows, silhouettes, and effigies. They are sometimes effective in bird deterrence. Static devices are designed to augment the activities of the BDT.

c. Propane Cannons. The BDT will position and operate propane sound cannons based on active runway, bird locations, and air traffic density. Locations will be changed regularly to avoid habituation by the birds.

d. Pyrotechnics. Pyrotechnics are effective for dispersing most bird species and should also be used for coyotes, deer and other animals. Pyrotechnics are fired from modified pistols and 12 gauge shotguns. Pyrotechnics may include a variety of devices similar to commercial fireworks, including bangers, whistlers, screamers, and salutes. These small but very loud firecrackers are shot from the pistol/shotgun into flocks or near individual animals to frighten them away when they are discharged. Only personnel trained by the USDA Biologist in the proper procedures will operate Pyrotechnics as follows:

(1) Liaison with the Tower prior to discharging pyrotechnics and coordinate the location. If aircraft

operations are imminent, ensure the BWC is raised prior to initiating dispersal operations.

(2) Use personal protective equipment, including but not limited to, ear and eye protection, and gloves.

e. Lethal Control (Depredation). Occasional depredation of birds reinforces the other methods. Shooting one or two from a flock then following with a volley of pyrotechnics is generally a very effective strategy for deterrence. Domestic Pigeons, European Starlings, and House Sparrows may be removed without permit. All birds (with the exception of the Domestic Pigeon, European Starling, and the House Sparrow) that are removed using lethal methods must be reported to the U.S. Fish and Wildlife Service under the Depredation permit process. Mammals removed may require a state equivalent permit.

f. Record Keeping. BDT will maintain daily activity logs. These logs will document all bird dispersal operations to include species, location, methods, and number of birds dispersed. These will be forwarded on a weekly basis to the BASH Officer. Monthly data will be summarized at BHWG, Aviation Safety and Foreign Object Debris (FOD) Council Meetings.

8. LAND MANAGEMENT PROCEDURES

a. General. One of the most effective and permanent methods of discouraging birds from using the airfield is the removal of attractive habitat features. Passive control methods are described below. Although effective, budget restrictions may preclude incorporating all of these measures. Implement land management procedures when funding and manpower resources are available.

b. Managing Grass Height

(1) Mow to maintain a uniform grass height between 7 and 14 inches. Long grass discourages flocking species because reduced visibility disrupts interflock communication and prevents predator detection. When grasses do not naturally achieve at least 10 inches in height they should be encouraged to do so. Grass heights in excess of 14 inches may attract rodents and will also result in the grass laying flat (lodging) thus reducing its deterrent effect to flocking species.

(2) Grass heights below 7 inches are of equal concern, as they are generally more attractive to birds which feed on the easily accessible worms and insects. Begin mowing adjacent to

runways and finish in the infield or outer-most grass areas. This will cause insects and other animals to move away from aircraft take-off and landing areas.

(3) Cut grass before it goes to seed to discourage seed eating birds.

c. Controlling Broad-leafed Weeds. Keep broad-leafed weeds to a minimum on the airfield. Apply herbicides as necessary for control. Broad-leafed weeds attract a variety of birds, may produce seeds or berries, and may limit grass growth. Obtain assistance in herbicide selection for weed control, appropriate grass seed selection, fertilization, and erosion control vegetation from BASH team recommendations, U.S. Soil Conservation Service, or the Agricultural Extension Service.

d. Planting Bare Areas. Eliminate bare areas on the airfield. Plant grass as necessary and appropriate to maintain ground cover at 7 inches to 14 inches in height.

e. Fertilizing. Selectively stimulate grass growth to promote a uniform cover at 7 inches to 14 inches in height. Irrigation may be required to support turf growth.

f. Removing Edge Effect. Maintain the airfield as uniformly as possible to reduce the transition zone between two distinct habitat types (e.g., brush to grassland).

g. Leveling of Airfield. Level or fill high or low spots to reduce attractiveness to birds and prevent standing water.

h. Removing Dead Vegetation. As soon as possible, remove dead vegetation such as brush piles, and the cover it affords.

i. Removing Bird and Animal Carcasses from the Airfield. This is to avoid attracting scavengers that feed on them. Forward remains, which may have been caused by collision with aircraft, to Environmental Affairs for identification.

j. Pest Control. Invertebrates and rodents are key food sources for many birds. Periodically survey and reduce these pests when required. Pesticides and traps can reduce pest populations. Only Environmental Protection Agency (EPA) approved pesticides are authorized and they must be used strictly according to label instructions. Inspection and control should begin early in the spring after coordination is made with the animal control section of the Natural Resources Management Plan.

k. Maintaining Drainage Ditches. Regularly inspect ditches to keep them clear. Maintain ditch sides as steeply as possible (minimum slope ratio of 5 to 1) to discourage wading birds and emergent vegetation. Improve drainage as necessary to inhibit even temporary ponds or puddles. When able, cover ditches with netting/plastic fencing.

l. Employing Erosion Control Vegetation. Use vegetation that is appropriate for the region and does not produce seeds at heights below 14 to 18 inches.

m. Eliminate Roosting Sites. Control roosts by vegetation management of roost sites where possible. Prune trees to reduce the number of perches if necessary.

n. Bird Proof Buildings and Hangars. Often, bird proofing of buildings and hangars is required to exclude Pigeons, Sparrows, and Swallows. Excluding birds from a structure they currently utilize will often displace them to an adjacent structure. Existing birds should be destroyed (in accordance with the depredation) prior to the exclusion effort whenever possible. Denying access by screening windows, closing doors, and blocking entry holes is most effective. When necessary consider:

(1) Toxic perches. Install where maximum numbers of birds will contact them. Ensure perches are maintained with avicides to remain effective.

(2) Pellet guns. A short term solution only. Proper safety equipment and skilled personnel are required.

(3) Netting. Install under superstructure to exclude birds from roosting areas.

(4) Trapping and removal. Use a large cage with food and water to trap birds. Release birds away from buildings or depredate if permitted by law. Permits will be coordinated through Environmental Affairs.

(5) Design features. If designing a new hangar, consider locating supports on the exterior.

(6) Door coverings. Use netting or plastic strips suspended over the doors to exclude birds. Ensure no tears or holes are present that allow birds access to the hangar.

(7) Sharp projections. Use in limited areas such as ledges and overhangs, or small places where birds cannot be allowed. Too expensive for large areas.

(8) Night harassment. Use high-pressure air or water to make hangars an undesirable roosting site. Persistence is the key.

o. Managing Off-Base Land Use. The Navy cannot control off-base land use, however, when a proposed land use may increase or alter bird populations and habits (i.e., landfills, new crops, etc.), the Navy concerns should be addressed at public hearings and zoning meetings. Environmental Affairs, the NAS Whidbey Island Community Liaison Office and Public Works shall monitor off-base land use and report findings to the BHWG.

p. Agricultural Outleases. Public Works and Environmental Affairs shall consider BASH when renewing agricultural lease contracts within the established exclusion zone. Planting agricultural leases to attract birds away from the bird exclusion zone should be considered.

CHAPTER 4

AIRCREW PROCEDURES

1. PLANNING THE FLIGHT

a. Check FLIP AP/1 (Supplementary Aerodrome Remarks) and NOTAMs for information about permanent and seasonal bird problems at both departure and destination airports and on route of flight.

b. Check Weathervision, rolling local Notices to Airmen (NOTAMs) and flight planning displays for BWC and BASH Windows in effect.

c. Consult with the Squadron Safety Officer or Squadron Duty Officer for additional BASH information.

d. Brief all crewmembers on potential bird problems and a strong lookout doctrine.

e. Discuss emergency procedures before departure, including aborts following a strike and engine failure. Note: 75% of all multi-engine strikes occur to engines on same side.

f. Discuss procedures for cockpit lost communications, including change of aircraft control.

g. Consider using combination sunglasses and visor during daylight hours and the clear visor at night during all low-level phases of flight.

2. DURING THE FLIGHT

a. Prior to taxi, listen to ATIS for current BWC. Ask tower for specific bird locations or additional information.

b. When taxiing, watch for birds on the airport. The most frequently struck birds (raptors) may be hard to see on the tarmac or concrete. Flocking birds may be partially hidden in grass areas. Look for raptors circling overhead, perched in trees, tall bushes and on airfield structures. Report bird sightings to the tower.

c. Birds on the ground face into the wind and may not see or hear you coming. They may take flight just prior to you reaching them.

d. If birds are observed, notify the tower and request that BASH personnel disperse them before takeoff if they are in a location that presents a likely danger to aircraft.

e. Increase interval on section departures to 20 seconds during condition Moderate. The lead aircraft in flight can cause birds to lift and circle behind causing a strike to the wingman.

f. Use landing lights during takeoff, climb, descent, approach and landing. Although, there is no conclusive evidence that birds see and avoid aircraft lights, they *will* make the aircraft more visible.

g. Travel as much as possible above the bird layer. More than 40% of all strikes occur at ground level, 30% from 1 foot to 500 feet, 11% from 501 to 1,500 feet and 17% of all strikes occur above 1,500 feet. In practice, this means to climb to 500 feet Above Ground Level (AGL) as rapidly and safely as possible and continue to climb without delay to 1,500 feet.

h. If you see birds ahead, attempt to pass above them, as birds usually break away downward when threatened.

i. If dense bird concentrations are expected, avoid high-speed descent and approach. Reducing speed can significantly reduce impact energy. The force of impact is roughly proportional to the square of the aircraft speed.

j. If flocks are encountered during approach, go around for a second attempt, the approach area may then be clear.

k. When able, descend and climb-out in a straight line. This makes it easier for the birds to anticipate your flight path and thus get out of your way.

l. Avoid flying one hour before thru one hour after dawn and dusk to the maximum extent practical.

3. **LOW LEVEL ROUTES**. Guidance for aircrew actions on routes or segments with severe bird activity is contained in amplifying Commander, Electronic Attack Wing, U.S. Pacific Fleet (COMVAQWINGPAC) instructions. All flights must avoid those segments that are under BWC Severe based on migration patterns or Weather Radar reports. Additional low-level hazard guidance will be obtained from Bird Hazard Avoidance data provided by the USAF BASH Team. Each squadron safety office should maintain a

copy of this data. The following are some general operational changes to reduce threats from bird strikes, mission permitting:

a. When practical, reduce low-level flight time. The majority of all bird strikes occur below 1,500 feet AGL.

b. Reduce formation flying. The first aircraft can redirect birds into trailing aircraft.

c. Reduced airspeeds will allow birds to be seen sooner and lessen damage in event of a strike.

d. Avoid areas with known raptor concentrations during summer, especially during 1,000-1,700 time frame due to increased thermals.

4. <u>ACTIONS FOLLOWING A BIRD STRIKE</u>

a. If airborne, complete the damaged aircraft checklist per specific NATOPS procedures.

b During a takeoff or planned touch and go, the aircraft commander should assess the option of aborting if a bird strike occurs, and if enough runways remain to stop. Bird strike damage cannot be accurately assessed in flight and may result in a complex airborne emergency. Only maintenance personnel on the ground can make damage assessments. Several bird strikes that appeared to cause minor damage have proven to be much more substantial and, had aircrews continued the mission, a serious emergency could have resulted. Structural damage, such as a dent in the wing, has led to fuel and hydraulic system failures. Birds lodged in landing gear have prevented gear extension.

c. Aircrew experiencing en route bird strikes should abort the mission when possible.

d. After landing, if you suspect or have had a strike, check the aircraft for damage.

5. <u>BIRD STRIKE REPORTING</u>

a. Post flight follow-up and reporting of bird strikes are an essential and important part of the BASH program. After a strike:

(1) If airborne, inform Control Tower and complete emergency landing, if required.

(2) After post-flight inspection, preserve any remains (however slight) and notify BASH Team immediately.

(3) Report strikes even if no bird remains are found on the aircraft. BASH Team and airfield facilities personnel may be able to retrieve the bird on the airfield.

(4) Follow up local reporting by completing the standardized "Bird/Animal Strike Hazard Report" form found in Annex N of reference (d), or via the Navy Safety Center web site www.safetycenter.navy.mil. Both damaging and non-damaging strikes are required to be reported.

(5) All wildlife remains collected for identification must be reported to the appropriate Federal and State agencies. All collected avian species covered under the Migratory Bird Treaty Act must be reported through the station's U.S. Fish and Wildlife Service Salvage permit.

b. The BASH team also encourages aircrew to report near strikes that involve evasive action, or whenever the proximity of the miss is "too close for comfort."

6. **BIRD IDENTIFICATION**. All strike data is entered into both local and Navy Safety Center databases to help track and identify bird hazards. Therefore, it is necessary to know which species are causing bird strike problems so appropriate measures can be taken. Identification of bird remains is essential. If bird remains are found on the aircraft, the following preservation procedures shall be followed:

a. During normal working hours, contact USDA BASH at (360) 485-3970. Have the appropriate maintenance personnel collect remains. USDA will send a representative to assist remove the pieces and collecting blood and feather samples.

b. After hours or on weekends, notify the ODO at (360) 257-2681. If a BASH representative is unavailable, remove remains from aircraft, and place in zip lock plastic bag. It does not take much (remains) to identify the bird species. Even if just a small part, feather or bloody smear with or without down or feathers, the species can be identified through microscopic techniques or Deoxyribonucleic acid (DNA) analysis.

CHAPTER 5

LOCAL ANIMAL SPECIES

1. GENERAL. The following is a summary of birds within the airfield environment.

2. AULT FIELD ANIMAL HAZARDS

a. Avian Species

(1) Gulls. Gulls are most active just after sunrise and before sunset as they move to and from feeding areas.

(2) Waterfowl (ducks, geese, swans). Waterfowl are most active at dawn and dusk, moving at low altitudes to and from feeding areas. Swans may remain active throughout the day.

(3) Loon, Grebes, Cormorants, Mergansers. These are fish eating birds. Avoid flying at sunrise and sunset when large flocks, often in formation, can be found flying to and from feeding areas.

(4) Long-legged Waders (Herons). Most of these species are attracted to water where they feed on fish, amphibians, reptiles, and arthropods and small mammals.

(5) Raptors (Hawks, Falcons, Kites, Eagles, Vultures). These birds can be particularly hazardous to aircraft because of their size and widespread distribution over bases and low-level areas.

(6) Sandpipers/Shorebirds. The most significant hazard from these birds occurs when large numbers flock in tight groups, particularly during migration and along coastlines.

(7) Terns. Avoid flying near areas where these birds may be active, such as nesting colonies or piers in coastal areas.

(8) Owls. Most owls are nocturnal and attracted to rodents as a food source. Short eared owls are common at all times and are active even in daylight hours.

(9) Goatsuckers (Nighthawks), Whippoorwills, etc. These birds are active particularly at sunset when insects are abundant.

(10) Woodpeckers. Woodpecker strikes should be extremely rare.

(11) Flycatchers. These birds are present on airfields to feed on insects. Strikes are infrequent, but should not be overlooked.

(12) Horned Larks. These birds are attracted by bare spots such as along runway sides, where they eat weed seeds and insects.

(13) Swallows and Swifts. These birds eat insects in flight and are commonly found above airfields or loafing on hard surfaces particularly after rain events.

(14) Crows and Ravens. These omnivorous birds are common in open areas and around landfills and solid waste transfer stations.

(15) Blackbirds, Grackles, Cowbirds, and Starlings. These birds can be particularly hazardous because they frequently occur in large flocks.

(16) Meadowlarks. These birds occur on nearly every airfield and are attracted to grasslands and low weeds.

(17) House Sparrows. These birds are not frequently struck by aircraft, but are common pests around structures.

b. Mammalian species. While concern is mostly centered on birds, several mammalian species also pose threats to flight operations and must be considered.

(1) Coyotes. These animals are attracted to airfields by rodents, rabbits and other food sources.

(2) Rabbits. In addition to direct hazards to aircraft these animals often attract raptors and carnivores.

(3) Rodents. These animals attract raptors.

(4) Deer. This mammalian species poses the greatest threat to aircraft due to its size and preferred nocturnal activities.

APPENDIX J. Hunting Instruction

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NAS WHIDBEY INSTRUCTION 11106.4CC

From: Commanding Officer

Subj: NAVAL AIR STATION WHIDBEY ISLAND HUNTING PROGRAM

Ref: (a) Sikes Act
(b) OPNAVINST 5090.1C
(c) Washington Administrative Code 232
(d) NAS Whidbey Island Integrated Natural Resource Management Plan (INRMP)
(e) NASWHIDBEYINST 5000.1J

1. Purpose. To establish a wildlife hunting program on lands administered by Naval Air Station (NAS) Whidbey Island per references (a) through (e). This instruction is not a reiteration of references (a) and (b) but amplifies their requirements to describe NAS Whidbey Island policies, procedures and conditions for hunting. This instruction has been substantially revised and should be reviewed in its entirety.

2. Cancellation. NASWHIDBEYINST 11106.4BB

3. Scope. These requirements apply to all NAS Whidbey Island organizations and individuals including tenant commands, housing residents, contractors, and visitors on Ault Field, Seaplane Base, Outlying Landing Field (OLF) Coupeville and Lake Hancock.

4. Policy

a. NAS Whidbey Island provides for hunting and fishing in reference (d) as part of the sustainable multipurpose use of natural resources. This instruction describes hunting activities, general rules and procedures and assigns responsibilities pertaining to all forms of recreational hunting aboard the station so as to be consistent with references (a) through (e).

b. Participation in the NAS Whidbey Island Hunting Program is a privilege granted at the discretion of the Commanding Officer, NAS Whidbey Island. Persons granted these privileges are expected to adhere to applicable regulations and procedures published by Washington State Department of Fish and Wildlife, U.S. Fish and Wildlife Service and NAS Whidbey Island.

Individuals interested in participating in the station's hunting program shall be responsible for knowing and understanding this instruction's requirements.

c. Persons participating in the NAS Whidbey Island hunting program shall exercise such a degree of sportsmanship and general prudence that safety, security, government property and the privileges and property of others are not jeopardized. Conservation areas (hay fields, ponds, etc.), surveyors' markers, signs, barricades, etc., shall not be moved, defaced, mutilated, damaged or destroyed.

d. Hunters and their guests hunt at their own risk and assume all risks and hazards incident to or attendant with participation in the hunting program. All hunters and their guests are required to sign an acknowledgment statement prior to obtaining permits to hunt.

5. General

a. A hunting season is evaluated and normally allowed for the following species each year and identified in the annual hunting procedures information sheets produced by the NAS Whidbey Island Public Works Department, Environmental Division:

(1) Waterfowl defined as ducks, geese and coots.

(2) Upland game defined as cottontail rabbit, pheasant and valley quail.

(3) Black-tailed deer

b. NAS Whidbey Island schedules periods for hunting per Washington State Department of Fish and Wildlife authorized hunting seasons. The Commanding Officer may reduce or suspend these periods at any time.

c. Designated hunting area maps for areas open to hunting are published and made available annually to all hunters by the Environmental Division. The Commanding Officer may close or restrict these areas at any time.

6. Eligibility

a. Active duty, retired military, dependents 16 years and older, Reserve military personnel and Department of Defense (DOD) civilian employees working at NAS Whidbey Island are eligible to apply to hunt unescorted at NAS Whidbey Island.

b. Eligible unescorted hunters may apply to sponsor guests by following station procedures.

c. Members of the general public may participate in the Washington State Pheasant Release Program or as a bona fide guest of the aforementioned, per the station's requirements and procedures. A copy of station procedures may be obtained from the Environmental Division.

7. License and Station Permit Requirements

a. Each hunter must have in his or her possession a valid Washington State Hunting License, including applicable tags, cards and stamps.

b. Waterfowl hunting requires that each adult hunter have in his possession a valid and appropriate NAS Whidbey Island Hunting Permit, NASW 11106/3. Upland game hunting requires that each adult hunter have in his possession a valid and appropriate NAS Whidbey Island Hunting Permit, NASW 11106/4. Deer hunting requires that each adult hunter have in his possession a valid and appropriate NAS Whidbey Island Hunting Permit, NASW 11106/5. General public hunters who participate in the Washington State Pheasant Release Program are issued only an upland game-hunting permit. Hunters, including those participating in the Pheasant Release Program, obtain permits by following station permit application procedures including payment for the station's annual hunting fee.

c. Youth hunters under the age of 16 do not need to obtain either the NAS Whidbey Island Waterfowl, Upland Game or Deer Hunting Permits. However, an adult sponsor with both a valid State of Washington Hunting License and the appropriate NAS Whidbey Island Hunting Permit must accompany youth hunters.

d. NAS Whidbey Island Hunting Permits, NASW 11106/3, NASW 11106/4 and NASW 11106/5, are valid through the hunting season, but may be revoked at anytime for infractions of this instruction, the station hunting procedures or applicable federal and state game laws.

e. Washington State Hunting Licenses and NAS Whidbey Island Hunting Permits shall be presented for inspection whenever requested by a Washington State game warden or NAS Whidbey Island Security or Environmental Division personnel.

8. Security and Access to Hunting Areas

a. Hunters shall follow station procedures for access to designated hunting areas. Standard procedures are published annually and made available to hunters when applying for station permits or may be obtained from the Environmental Division.

b. The Commanding Officer or Security Officer may alter procedures or restrict access at any time.

c. Hunters are prohibited from allowing other persons access to station property except as a sponsored and approved guest.

d. Eligible hunters must carry Department of Defense (DOD) photo identification. Guest hunters must be in the company of an eligible hunter possessing DOD identification. Members of the general public participating in the Pheasant Release Program must carry photo identification. All hunters must also possess their hunting license and station permit.

9. Firearms

a. Each hunter with a firearm is to enter the designated range from a public road per station procedures for hunter access. Hunters are prohibited from transporting firearms to any other areas of NAS Whidbey Island. Exceptions are those authorized to carry guns on station or keep in housing.

b. A shotgun is allowed for hunting if it is incapable of holding more than three shot shells in the magazine and chamber combined. In hunting areas, hunters will retain their shotguns unloaded, broken down or otherwise made inoperative unless actually hunting. Off the range, hunters will keep their shotguns in a locked trunk or vehicle.

c. Only non-toxic shot is authorized for use. Lead shot is prohibited. All hunters are required to retrieve expended hulls and leave no ammunition or debris on station property.

d. Use of center fire or rim fire rifles and handguns is prohibited.

e. Hunters are to pay attention to and obey safety zone signs. Discharging a firearm within 300 feet in the direction of buildings, roadways, personnel, utility lines or vehicles is prohibited. Shooting or defacing signs is prohibited.

f. For upland game hunting, shotgun, muzzleloader or archery equipment may be used. For waterfowl hunting, each hunter may bring only one shotgun to the hunting area on the day of, and for the period of, his or her blind assignment.

g. All federal and state firearm laws will be strictly enforced aboard NAS Whidbey Island. All regulations pertaining to firearms as outlined in reference (e) will be enforced.

10. Archery

a. Authorized bows are long bow, straight limb, reflex, recurve and compound. Bows must have a minimum draw-pull weight of 45 pounds. Arrows must have broad head tips meeting the following specifications:

(1) Minimum length shall be 1 3/8 inches on the main cutting edge.

(2) Cutting edges shall be well-sharpened metal only.

b. The use, possession or control of a poison arrow, arrow with explosive tip or any device propelled by any means that is used for the purpose of injecting or delivering any type of drug into an animal is strictly prohibited.

c. A 50-yard buffer zone will exist between stands and the wood line around buildings, the golf course and public roads.

11. General NAS Whidbey Island Hunting Regulations

a. Hunters are to provide information by completing logs and forms required by station procedures. This information is used to manage the resources being hunted.

b. Dogs may be used while hunting for waterfowl or upland game only during the station’s open hunting seasons. Dog training or other dog use is not allowed in the hunting areas at any other time.

c. Hunting or shooting animals or birds, other than those allowed in this instruction, is prohibited.

d. No releasing of wildlife on installation property is allowed. This restriction does not apply to pheasants released under the Washington State Pheasant Release Program.

e. Trapping of fur-bearers is prohibited on NAS Whidbey Island.

f. Baiting (i.e., placing food in a location to attract animals to a specific location to hunt) is prohibited on NAS Whidbey Island. The use of scents and attractants when placed and used only during a hunters respective hunting time is allowed (i.e., scent can only be placed in the hunting area just before start of hunt and must be removed at the end of the hunting time).

12. Enforcement

a. NAS Whidbey Island law enforcement officers or natural resources staff may order a hunter to leave station property for the purpose of recreational hunting and suspend a person’s hunting privileges for nonconformance with regulations and procedures or for acting in a manner prejudicial to the safety of personnel, equipment or sound wildlife practices. Such suspensions shall be for the remainder of the hunting day or the entire season depending on the severity of the offence and the discretion of the respective NAS Whidbey Island law enforcement officer or natural resources staff member. Security may recommend to the Commanding Officer that future hunting privileges for the individual be denied.

b. The following is a list of common violations and administrative actions that may be taken against personnel who violate applicable State and Federal hunting laws and regulations and this instruction. Permit suspensions may be in addition to criminal prosecution and/or prosecution through the Uniform Code of Military Justice. Suspensions are measured in "Hunting days from date of violation." Penalties for the second offense are indefinite revocation of hunting privileges. The Commanding Officer has unlimited authority to control access to the installation and provide for the safety and security thereof. Penalties for the first offense are listed below:

VIOLATION	ACTION
Violation of parking requirements or parking in an unauthorized area.	10 Days
Guest not accompanied by sponsor violation.	30 Days
First violation of any station regulation, not a violation of state regulations.	30 Days
Violation of station permit procedures.	60 Days
Unauthorized or unethical hunting methods.	60 Days

Violation of check-in or check-out procedures.	Termination For Season
Hunting on unauthorized days	Termination For Season
Hunting in unauthorized areas or unauthorized movement into other hunting areas or stands.	Termination For Season
Second violation of any station regulation, not a violation of state regulations.	1 Year
Violation of any state or federal wildlife law.	Indefinite
Use of unauthorized weapons or ammunition.	Indefinite

c. Persons found violating Washington State or federal hunting regulations will be cited by NAS Whidbey Island Security and/or detained and turned over to a Washington State Game Warden or a U.S. Fish and Wildlife Service Special Agent for appropriate action.

d. Department heads and Commanding Officers of tenant commands may recommend in writing to the Commanding Officer that a person's hunting privilege be suspended for nonconformance with station policies, regulations or procedures.

e. A hunter may request review of their hunting privilege suspension by submitting a written letter to the Commanding Officer NAS Whidbey Island no later than 14 calendar days from the date of the suspension. The Commanding Officer may refer the appeal to the NAS Whidbey Island Hunting Privilege Suspension Review Committee for review and recommendation.

f. If the Commanding Officer (or Executive Officer acting under the direction of the Commanding Officer) notifies a hunter that his hunting privilege is suspended, that decision is final.

13. NAS Whidbey Island Hunting Coordination Team. The NAS Whidbey Island Natural Resource Manager leads the Hunting Coordination Team that includes as members the Security Officer or their representative and a representative of Community Programs serving as the collection agent receiving hunting fees and issuing permits. The Hunting Coordination Team is responsible for coordination of the hunting program including developing and drafting procedures for the upcoming hunting season, interfacing with federal and state natural resource managers and enforcement officials, coordinating with hunters and other parties for the overall sound management of the program and responding to recommendations, comments and

complaints regarding the hunting program. The Hunting Coordination Team also identifies resource requirements to appropriate resource providers to sustain the program.

14. NAS Whidbey Island Hunting Privilege Suspension Review Committee. The Hunting Privilege Suspension Review Committee is composed of the NAS Whidbey Island Executive Officer, Legal Officer and Environmental Program Manager.

a. This committee shall:

(1) At the Commanding Officer's direction, meet to hear appeals of hunting privilege suspensions issued by station law enforcement officers. Appeal hearings shall consist of the committee providing opportunity for the hunter and station law enforcement officer to present facts surrounding the incident.

(2) At the Commanding Officer's direction, meet to consider requests to suspend a person's hunting privilege. Before recommending suspension or revocation of hunting privileges, the Committee shall notify the hunter and provide opportunity for the hunter to present facts regarding the issues leading to the suspension request.

(3) Provide to the Commanding Officer, in writing, the committee's recommendation regarding suspension or revocation of hunting privilege. The recommendation is to include a summary of the facts and reasons for the recommendation, and be signed by the Executive Officer.

b. At the Commanding Officer's direction the Executive Officer will sign correspondence notifying the hunter and the law enforcement officer or requestor of the final decision, with copies to the Environmental Program Manager, Legal Officer and others as appropriate.

15. Action

a. The NAS Whidbey Island Executive Officer shall chair the Hunting Privilege Review Committee.

b. The NAS Whidbey Island Environmental Program Manager shall:

(1) Administer the hunting program per the Security Officer, Legal Officer and Community Programs.

(2) Serve as a member of the Hunting Privilege Review Committee.

(3) Assign the station Natural Resource Manager to manage the station's hunting program, lead the Hunting Coordination Team and integrate the hunting program with the station's overall natural resource management, including ensuring consistency with reference (d), and to oversee compliance of the hunting program with applicable natural resource and environmental laws and regulations.

(4) Receive and investigate, with NAS Whidbey Island Security Officer, all reported game law violations or acts of unsportsmanlike conduct.

(5) Identify resources required to support hunting program in coordination with Security and Community Programs. Budget, program and execute environmental resources provided to sustain hunting program.

c. The NAS Whidbey Island Natural Resource Manager shall:

(1) Manage the NAS Whidbey Island hunting program by integrating hunting with the overall natural resource program per references (a) through (d).

(2) Lead the NAS Whidbey Island Hunting Coordination Team. Prepare for and coordinate the annual hunting seasons. Develop all notices, procedures and guidance prior to the start of hunting season for timely presentation to the hunters. Lead the Team in developing and implementing appropriate communication with the hunting community and other involved parties and organizations. Identify resources required to support hunting program in coordination with Security and Community Programs and coordinate budget submissions to appropriate resource sponsors.

(3) Interface with federal and state natural resource managers and enforcement officials as necessary.

(4) Receive and investigate, with NAS Whidbey Island Security Officer, all reported game law violations or acts of unsportsmanlike conduct.

(5) Budget, program and execute environmental resources provided to sustain hunting program.

(6) Accumulate all data needed to evaluate program and overall natural resource status such as yearly bag record information. Ensure that all data is provided to the appropriate military, federal and state agency upon request.

(7) Investigate possible species and habitat improvement projects to enhance the environment and the hunting program.

d. The NAS Whidbey Island Security Officer shall:

(1) Serve as a member of the station's Hunting Coordination Team or appoint a representative. Assist in managing the hunting program by advising the other Team members on security requirements, participating in developing guidance and procedures, identifying resource requirements, engaging in communication with the hunting community and responding to recommendations, comments and complaints.

(2) Supervise department law enforcement officers to ensure their knowledge of the hunting program requirements and procedures in order to provide appropriate surveillance of designated hunting areas and compliance with station hunting regulations.

(3) Investigate complaints against NAS Whidbey Island law enforcement officers in regards to their enforcement actions for the hunting program. Forward these complaints, with recommendations, to the NAS Whidbey Island Commanding Officer. Inform the Environmental Program Manager of the complaints as appropriate.

(4) Work with the Washington State Game Warden and the U.S. Fish and Wildlife Special Agents assigned to this area to ensure compliance with laws and station regulations. Report violations of federal or state game laws that occur on station lands to the appropriate agency. Reports shall provide pertinent information to apprehend, arrest, and/or prosecute violators. Copies of all reports shall be maintained on file. Report any violations to the Hunting Coordination Committee.

(5) Confiscate illegally taken game and surrender evidence to the proper authorities. Use of chain of custody documents is required to ensure accountability.

(6) Patrol hunting areas to the extent possible to sustain the hunting program.

e. The Community Programs Director shall:

(1) Serve as a member of the NAS Whidbey Island Hunting Coordination Team or appoint a representative. Assist in managing the hunting program by advising the other Team members on support capability and requirements, participating in

developing guidance and procedures, identifying resource requirements, engaging in communication with the hunting community, and responding to recommendations, comments and complaints.

(2) Assign a representative to act as the collection agent in collecting the fee for the station permits. Administer the hunting permit issuance process.

(3) Provide or make available publications of the annual hunting procedures.

f. Hunters shall:

(1) Comply with all federal and state hunting laws and the station’s regulations and procedures.

(2) Remove all spent shells and trash from the field.

(3) Immediately depart from any hunting area when directed by proper authority.

(4) Provide due cooperation and assistance to federal, state and station law enforcement officers.

16. Forms. NAS Whidbey Island acknowledgement statement, NAS Whidbey Island Waterfowl Hunting Permit, NASW 11106/3, NAS Whidbey Island Upland Game Hunting Permit, NASW 11106/4 and NAS Whidbey Island Deer Hunting Permit, NASW 11106/5, are produced by the NAS Whidbey Island Public Works Department, Environmental Division, Building 103, Ault Field and are available at permit issuance locations as identified in the annual hunting procedures information sheet.

/s/
P. A. MEHL
By direction

Distribution:
Electronic only, via CNIC Gateway Portal,
https://cnicgateway.cnic.navy.mil/Regions/NW/Installations/NAS%20Whidbey%20Island/NAS%20Admin%20Documents/default.aspx